The impact of buying power on corporate sustainability

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The impact of buying power on corporate sustainability - The mediating role of suppliers' traceability data

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ABSTRACT

Companies are pressured by regulatory authorities, consumers and other stakeholders to improve their environmental performance. Within globalized supply chains, corporate sustainability performance is inevitably influenced by the behaviour of suppliers. Gathering reliable traceability data from suppliers (e.g. regarding raw materials) is an important, yet difficult issue to contribute to (measuring) environmental sustainability. Most studies overlook the importance of sharing traceability data, and lack a holistic approach to the environmental, social and economic dimensions of sustainability. Our study sets focus on whether traceability data exchange within the dyadic relationship between the focal firm (buyer) and its major suppliers positively correlates with the environmental, social and economic dimensions of sustainability. Furthermore, we investigate the effects of reward and coercive power use on traceability data and on corporate sustainability dimensions. The findings of a survey among 136 purchasing professionals in the manufacturing industry confirm the positive effect of sharing traceability data on the buyer's corporate sustainability performance. The use of reward power encourages suppliers to share traceability data, while coercive power does not influence on information sharing. Within buyer-supplier relationships, buyers should be aware of the importance of reward power in the process of traceability information sharing.

1. Introduction

In response to the negative environmental and social impact of global industrial growth, there is an urgent need for more sustainable ways of doing business (Rajeev et al., 2017). Within corporate context, these concerns have led to the integration of environmental systems analysis tools, such as Life Cycle Assessment and Environmental Impact Assessment. Regarding the use of (raw) materials, such tools are based on input data (e.g. Finnveden et al., 2009; Finnveden and Moberg, 2005). Many of these tools have been used with procedural aims, thus linking the operational scope of environmental systems with their societal and decision context (Finnveden and Moberg, 2005). Specifically in relation to the (corporate; strategic) sustainability goals, environmental systems have the potential to contribute to the wider strategic agenda, such as sustainability disclosure (Mohammad and Wasiuzzaman, 2021) and Circular business models (e.g. Barros et al., 2020).

Given their focus on input data, environmental systems analysis tools rely heavily on supplier information. This is also reflected within the context of Supply Chain Management, where both the academic and practical focus has been set on integrating sustainability, e.g. through supplier development; certification schemes; ethical and sustainable sourcing initiatives (Pagell and Shevchenko, 2014; Gelderman et al., 2021; Wong, 2013; Lambrechts, 2021). The growing importance of ethical and sustainable sourcing poses specific challenges in a globalized context. As many supply chains cover a multitude of countries and continents, it is challenging to check whether all suppliers at different tiers are committed to sustainability.

Furthermore, a myriad of stakeholders are holding (focal) companies accountable for the actions, even if these are situated upstream in the supply chain. Governments and regulatory authorities request companies to minimize the exhaustion of natural resources and to take responsibility for social issues in their supply chains. Further pressure is exerted by media, non-governmental organizations (NGOs), consumers, society, and other stakeholders to gain transparency concerning the origin of products (Gardner et al., 2018; Mangla et al., 2018; Seuring and Müller, 2008). Companies adopt a number of practices in order to deal with these stakeholder demands regarding sustainability. These include: (i) the introduction of sustainability in daily operations, e.g. by means of

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Corporate Social Responsibility, often with a focus on the Triple Bottom Line (albeit the trade-off interpretation has been criticized recently by Elkington, 2018); (ii) adherence to internationally adopted initiatives for ethical and sustainable sourcing, such as the Ethical Trading Initiative Base Code (Lambrechts, 2021); (iii) extensively communicating towards stakeholder through sustainability reporting, e.g. the Global Reporting Initiative.

In the context of Sustainable Supply Chain Management (SSCM), the integration and coordination of business processes through an inter-organizational network from raw-material supplier to end consumer, is specifically oriented towards minimizing environmental and social harm, as well as making products themselves sustainable (Ahi & Searcy, 2013; Pagell and Shevchenko, 2014). Managing the flow of products is challenging, as well as managing the information that is needed to develop sustainable supply chains. Today's supply chains are complex because they operate globally, consist of many actors, and have to deal with a variety of stakeholders. To achieve sustainability in this complex environment, information sharing between supply chain stakeholders is essential (Gardner et al., 2018).

The supply chains of many global companies have suffered tremendously from the epidemic COVID-19 outbreak (e.g. Ivanov, 2020). Especially the globally connected supply chains proved to be vulnerable to this unprecedented crisis (Sengupta and Bose, 2020). Moreover, the pandemic has made clear that many companies encountered insurmountable difficulties for the identification, the tracking and tracing of their “invisible” lower-tier suppliers (Linton and Vakil, 2020). Although the importance of upstream visibility and traceability has been recognized in literature, the empirical evidence on the benefits remains elusive (cf. Swift et al., 2019). The pandemic placed issues of traceability on the strategic agenda of many companies.

Many companies have pursued traceability measures in their supply chains, in order to comply with various regulations, as well as effectively gather information from supply chain partners (e.g. Kros et al., 2019). On the one hand, traceability information can address concerns related to environmental and sustainable regulation. On the other hand, traceability supports companies in tracing components and raw materials in case of quality issues. Traceability thus has a positive impact on quality control, product safety, tracking product recalls, and reverse logistics (Kros et al., 2019; Zhao and Chen, 2012). Improving traceability in supply chain context highly depends on information sharing. Two major aspects of information sharing are *information content* (which information is shared?) and *information quality* (what is the quality of the shared information?) (cf. Zhou and Benton, 2007; Rashed et al., 2010).

This paper sets focus on the dynamics of information sharing regarding traceability, within the context of effectively developing sustainable supply chains. Despite both topics of sustainability and information sharing receiving much attention in research and practice, the impact of information sharing on sustainability is relatively understudied (Khan et al., 2016; Lai et al., 2015). With this paper, we aim to contribute to a number of challenges as identified in the current body of knowledge. First, despite traceability and transparency being interpreted as a vital part of sustainability, it has been identified as fourth most understudied topic in relation to future supply chain management research themes (Wieland et al., 2016). More specifically, the role of suppliers in providing traceability in the context of sustainable supply chain management remains understudied (Quarshie et al., 2016).

Second, the current body of knowledge displays a lack of systemic or holistic approach to sustainability, e.g. by focusing on either the economic, social or environmental dimension. for example, some studies focus on economic effects related to performance and productivity improvement (Marshall, 2015; Najjar et al., 2018). Other studies interlink environmental performance with economic benefits due to reducing the use of resources and improving efficiency, resulting in a lack of attention towards the social dimension of sustainability (Hassini et al., 2012; Seuring and Müller, 2008; Waller et al. 2015).

Third, although both power in buyer–supplier relationships and information sharing have been extensively studied (Chaex et al., 2017; Griffith et al., 2017; Matanda et al., 2016), the effects of power on the extent to which information is shared remains relatively unexplored from the buyer's perspective. For example, previous studies focused on the supplier's perspective and the possession of power, while largely ignoring the buyer's perspective and the effects of the actual use of power. Moreover, the existing studies lead to contradictory findings (e.g. Chen et al., 2016; Gelderman et al., 2020). In light of these results, several researchers have proposed to further examine the impact of buyer–supplier relationships on traceability (e.g. Gualandris and Kalchschmidt, 2016; Morgan et al., 2018; Wong et al. 2012).

In order to tackle these specific challenges, this study examines three gaps. First, whether traceability data exchange within the dyadic relationship between the focal firm (buyer) and its major suppliers positively correlates with sustainability (gap 1). Second, sustainability is interpreted and analysed in relation to its three dimensions, thus including economic, social and environmental sustainability (gap 2). Third, the effects of actual (reward and coercive) power use on the sharing and the quality of traceability data (direct), and the effects of power use on corporate sustainability dimensions (indirect) is examined (gap 3).

Based on a literature review, we developed a conceptual model with hypotheses, as presented in section 2. Subsequently, the hypotheses are tested with survey data collected through an electronic survey amongst a sample of 585 purchasing professionals, employed by Dutch industrial companies. Methodology is further outlined in section 3 ‘materials and methods’. Based on an effective response rate of 23.2%, 136 records were available to examine our conceptual model using PLS-SEM, running the SmartPLS3 software. Results of this data analysis are presented in section 4; the contribution of this study to the existing body of knowledge is further discussed in section 5. Section 6 presents the conclusions of our study, together with its limitations and recommendations for further research.

2. Literature review and hypotheses development

2.1. Stakeholder pressures for cleaner practices

Stakeholder pressure on green and sustainable practices has increased considerably, both in corporate and supply chain context (e.g. Engert and Baumgartner, 2016; Veit et al., 2018; Vluggen et al., 2019). Companies need to be sensible to their responsibilities and commitments to many internal and external stakeholders (e.g. Harangozo et al., 2015; Reuter et al., 2012; Svensson et al., 2010; Wolf, 2014). A problem for the management of companies is that stakeholder requirements and expectations differ widely across stakeholder groups (Wolf, 2014), and may be irreconcilable (Gavetti et al., 2005). The multitude of conflicting stakeholder pressures are difficult to manage (Kassinis and Vafeas, 2006). Various studies conclude that stakeholders can be characterized as a driver as well as a barrier for an organisation's sustainability (e.g. Giunipero et al., 2012; Schneider and Wallenburg, 2012; Walker et al., 2008). In addition, external stakeholder pressure is often in conflict with traditional objectives and practices of purchasing organizations, e.g. saving costs, improving flexibility, reducing lead times (Reuter et al., 2012).

From a network-, stakeholder-, or supply chain perspective, the (end) consumer increasingly expects companies to take environmental issues into account in their (global) supply chains (e.g. Chen and Chai, 2010). In order to ‘green’ their own operations, focal companies adopt cleaner environmental systems, and furthermore expect their suppliers to contribute to their environmental objectives as well (de Haan-Hoek et al., 2020), e.g. by incorporating supplier selection and certification tools such ISO 14001. Cleaner environmental systems cannot be viewed from a reductionist organizational perspective. As they rely on the information and resources provided from suppliers, the importance of the purchasing department, and to a wider extent, buyer-supplier relationships, needs to be taken into account.

Resource dependency theory predicts that the ability to influence managerial decisions is a function of the dependence of the company on specific external resources (Pfeffer et al., 1978). Organizations are more dependent on some stakeholders than on others (Kassinis and Vafeas, 2006). The result is that the impact of a particular stakeholder group on sustainability depends on the relative power of that group (e.g. Eesley and Lenox, 2006; Henriques and Sadorsky, 1999). According to the stakeholder theory, the priority of stakeholder claims is based on three stakeholder attributes: power, legitimacy, and urgency (Mitchell et al., 1997). In line with these perspectives, the actual impact of external stakeholders are based on the extent of interest and the extent of power (e.g. Johnson et al., 2005; Williams and Lewis, 2008). Also within the context of buyer-supplier relationships, dynamics of power and interdependence are at play. Power asymmetries affect relationships in many aspects, such as commitment, flexibility, innovativeness, resource sharing, and relationship performance (e.g. Chaex et al., 2017). Depending on the relationship, either the supplier or the buyer has more power and is more dominant, resulting in different outcomes regarding their collaboration and information sharing (Caniëls and Gelderman, 2007). In our study, we focus on the external pressure exerted by companies on their suppliers to share traceability data. We expect that the pressure by buying companies has much impact on the behaviour of suppliers, considering their commercial interests and sales targets.

2.2. Sharing traceability data and sustainability

Traceability refers to the ability to trace the path of materials upstream all the way. Traceability data include names or suppliers, and the materials used and produced by suppliers, the source location and how the materials were extracted or produced (Sodhi and Tang, 2019). More in general, traceability data refer to recorded identifications of properties (Olsen and Borit, 2013), such as the origin, distribution, location and application of products, parts and materials (ISO, 2000). Traceability data include system and operational specifics (cf. Morgan et al., 2018), like “batch sizes, run quantity, transfer quantity, buffer stock sizes, throughput time, available machines, number of operators and engineers, resource utilization, transport time, level of work in progress and so on” (Cheng and Simmons, 1994, p. 11).

Traceability can play a significant role in advancing and measuring environmental sustainability (e.g. Gardner et al., 2019; Germani et al., 2015), although sustainability performance is difficult due to a lack of identification and compliance with codes of conduct (cf. Mejías et al., 2019). The need for incorporating sustainability into purchasing and supply chain management has resulted in a growing, but limited number of academic publications on traceability (cf. Mejías et al., 2019; Garcia-Torres et al., 2019). Information sharing is essential for sustainable decision making as most supply chains consist of numerous actors, each having their own information (Zhang et al., 2018). Sharing information improves the relationship between partners, which is necessary for the collaboration required to meet sustainable goals (Khan et al., 2016). Studies on supplier collaboration in sustainability topics (e.g., process and product stewardship) and supplier sustainability capability have shown that supplier involvement can lead to better corporate financial and environmental performance for the buying firm (e.g. Gualandris and Kalchschmidt, 2016; Wong et al., 2012).

The absence of information has been identified as a barrier to sustainable management, as it decreases the much-needed transparency concerning how the chain operates (Gardner et al., 2018; Seuring and Müller, 2008). A lack of proper information sharing may cause unfortunate incidents, exposing unsafe and unethical practices (Agrawal and Pal, 2019). Information sharing refers to the exchange of significant information between supply chain partners, in this particular study by suppliers disclosing data to the buyer (Susanty et al., 2018). In the current literature, researchers have used the terms “information” and “data” in studies on information sharing. This study uses the two terms interchangeably, as their uses in previous studies on information sharing are similar (Flores and Sun, 2018).

Important aspects of information sharing are the extent to which information is shared and the quality of information (Li and Lin, 2006). Most studies on information sharing in the supply chain focussed on the exchange of demand information (cf. Marshall, 2015). Studies include different types of information (e.g., business or industry knowledge, process information, and price information). A more operational view is taken in research that measures information as inventory data, forecast information, and production planning information (e.g. Li and Lin, 2006; Li et al., 2014; Susanty et al., 2018). Hence, there seems to be no general or common understanding in the literature concerning which type(s) of information are measured when referring to the topic of “information sharing”, which makes it hard to compare the results of these studies. In our study, we follow Morgan et al. (2018) who identified which type of information specifically needs to be measured to ensure traceability, i.e. operations, planning and design and strategy. Despite the known benefits of sharing traceability data from previous studies, such as increase in consumer satisfaction and improvement in tracing quality issues, little is known about the effects on the triple bottom line (Bosona and Gebresenbet, 2013; Morgan et al., 2018).

Business data such as stock levels, losses, and available capacity can optimize operations between buyer and seller, thereby reducing waste (Khan et al., 2016). A study from Meacham et al. (2013) reported that several reductions of both waste and use of toxic materials were achieved by sharing information improving environmental performance. This study, however, did not directly specify the type of information that was shared, and looked only into environmental performance, excluding the social aspect. In a case study on 10 companies it was found that nine companies demanded traceability data from their suppliers, which not only reduced risks but also caused them to gain access to new knowledge about processes improving total performance (Pagell and Wu, 2009). Khan et al. (2018) report a direct and positive effect of information sharing on sustainable performance, although this study was done at the supply chain level, not at the organizational level (Khan et al., 2018). A study in the agri-food industry found that information sharing between supply chain actors works as an enabler for supply chain sustainability, significantly reducing food wastage (Mangla et al., 2018). Information sharing of different content types has proven to enhance efficiency and minimize waste, leading to an economic advantage. As traceability data is a specific dimension of information sharing, the same positive effects are expected. Therefore, we posit:

H1a. The sharing of traceability data by suppliers has a positive effect on the corporate economic performance of the buyers' company.

H1b. The sharing of traceability data by suppliers has a positive effect on the corporate environmental performance of the buyers' company.

Most academic studies and business initiatives on sustainability are limited to the environmental element of sustainability, showing less focus on the social aspect. Social sustainability is harder for companies to implement and less measurable (cf. Beske and Seuring, 2014; Rajeev et al., 2017; Seuring and Müller, 2008). As the reduction of waste and minimizing the use of resources often accompanies cost savings, critics sometimes doubt the intentions of such sustainable initiatives (Waller et al., 2015). Issues concerning child labour and poor working conditions have revealed the negative consequences for the company and product image through public disapproval of such practices. Addressing social concerns (when visible) at the supplier level can help improve sustainability performance further upstream in the supply chain (Mani et al., 2016, 2018; Zailani et al., 2012). Traceability, which provides openness and transparency, ensures that each party in the supply chain is treated correctly (Pagell and Wu, 2009). We expect that sharing traceability data contributes positively to corporate social performance.

H1c. The sharing of traceability data by suppliers has a positive effect on the corporate social performance of the buyers' company.

Aside from content about the information shared, the quality of the information is of considerable importance. Information quality refers to the extent to which information is fit for use for the receiving party (Flores and Sun, 2018; Zhou et al., 2014). To assess whether information is fit for use, several quality components can be considered. For this study, the accuracy, the adequacy, the completeness, the reliability and the timing of the information shared will be assessed to measure the quality (Li and Lin, 2006). Research on the effects of poor data quality on sustainability performance remains limited, although data quality has been identified as a barrier for sustainability performance and traceability systems by several qualitative studies. Low-quality information has been found to cause unexpected fluctuations in prices and production quantities, decreasing environmental performance (Beske and Seuring, 2014; Bosona and Gebresenbet, 2013; Galappaththi et al., 2016). Sustainable decision making is furthermore impacted in cases where the information provided is unusable or incomplete (Wu and Pagell, 2011). Although no measurements were performed on all three dimensions of sustainability, it is expected that higher quality data leads to more sustainable performance for each dimension.

H2a. The quality of the traceability data shared by suppliers has a positive effect on economic performance of the buyers' company.

H2b. The quality of the traceability data shared by suppliers has a positive effect on environmental performance of the buyers' company.

H2c. The quality of the traceability data shared by suppliers has a positive effect on social performance of the buyers' company.

2.3. Buying power and sharing of traceability data

Power in business-to-business relationships refers to “the potential to affect another's behavior” (Cowan et al., 2015, p. 142) as “one party is recognized as being more influential and able to exercise control over the other party” (Siemieniako and Mitrega, 2018, p. 91). The possession or use of power in a business-to-business relationship can influence the relationship (Chaex et al., 2017) and other aspects such as operational performance (Huo et al., 2017). Six sources of power are commonly used in literature, based on early research of bases for social power (cf. French and Raven, 1959).

Coercive power is the ability to punish the target party in case they fail to comply with desired action (French and Raven, 1959). Because coercive power is based on the ability to punish, it is often considered a negative form of power, although studies show inconsistent results (e.g. Pulles et al., 2014). Some studies report negative effects of coercive power on relationships aspects such as trust and commitment (Benton and Maloni, 2005; Chaex et al., 2017; Pulles et al., 2014), while others show a positive effect on supplier integration and instrumental relationship commitment (Yeung et al., 2009; Zhao et al., 2008). The same is true for the impact of coercive power on information sharing. Gelderman et al. (2020) found no (indirect) negative effect of coercive power, where Chen et al. (2016) did find a significant negative effect. Differences in these outcomes might be related to measurement: possession of power (Gelderman et al., 2020) versus actual use of power (Chen et al., 2016). This study measures the actual use of power, therefore we expect a negative effect on information sharing.

Reward power is the ability to reward the target party in case of desired behaviour (French and Raven, 1959). Incentives such as providing long-term contracts and bonuses show that the dominant party is willing to share the gains from the partnership, which can improve the relationship (Nyaga et al., 2013; Pulles et al., 2014). When one party feels a legitimate right to influence the other, which can be on the basis of formal contracts or values and beliefs that are accepted by the source party, this is known as legitimate power (French and Raven 1959). Expert power arises in cases where one party has certain expertise or knowledge that is valuable to the target party (French and Raven, 1959). When the target party desires to identify with the source party, it is described as referent power (French and Raven, 1959). Information power was added in 1965 by Raven as the ability to influence the source party because of the value of the information given.

Chen et al. (2016) claim to use the mediated versus non-mediated classification for their research on power and information sharing, but actually measure only two power types (i.e., coercive and expert power), disregarding the other types within this classification. Hence, the results are difficult to generalize to the classification of mediated versus non-mediated power, as recent studies show that the use of reward power tends to lead to significantly more positive outcomes than does the use of coercive power. Recent literature posits that reward and coercive power should be viewed separately (Chaex et al., 2017; Nyaga et al., 2013; Pulles et al., 2014).

In this study, we have included coercive and reward power. Since this study is set up from the buyers perspective, use of mediated forms of power makes sense, because these forms are deliberately introduced to force action. For example, expert or referent power exists because the other party (in this case the supplier) feels that the focal firm deserves this type of power, as they see the firm's members as the experts or examples in certain fields. It is therefore less reliable to measure non-mediated forms of power from the buyers' perspective, as the buyers would have to decide on the suppliers' conception of their relationship. Also, within the group of mediated forms of power, legitimate power is not always intended. In case of contract arrangements it is, but in case of shared values and beliefs, legitimate power depends on the perceptions of the supplier. Therefore, this power type is excluded. Coercive and reward power have been known to produce conflicting results in different studies. The coercive versus non-coercive classification of Hunt and Nevin (1974) was originally set up with reward power as part of the classification. Researchers later added reward power to the coercive group, on the belief that withdrawing a (potential) reward could be seen as a form of punishment (Yeung et al., 2009). As recent studies argue that reward power and coercive power should not be combined, this study separates the two and aims to further clarify the previously mixed findings found in the literature (Chaex et al., 2017; Nyaga et al., 2013; Pulles et al., 2014).

While most studies acknowledge the impact of collaboration on sustainability, Touboulic et al. (2014) emphasize that power can directly affect organizational responses to the implementation and the outcomes of sustainability initiatives. Powerful buying companies are in position to demand sustainability requirements, and also to demand the sharing of (traceability) data. In our study we posit an indirect effect of power use on sustainability through the sharing of traceability data by suppliers. Although to our knowledge no direct research has been done on the effects of power on information quality, some indirect results were obtained from a study executed in healthcare industry. Flores and Sun (2018) found that healthcare employees were willing to follow procedures to ensure data quality to avoid being punished and to receive rewards, although too much pressure caused an opposite effect of resistance. This result was found in a setting that differs from the regular profit-based supply chain, but did relate to the general assumption that pressured coercive methods (i.e., pressure and punishment) have a negative effect, as compared to reward power. Therefore, we hypothesize:

H3a. Buyers' use of coercive power has a negative effect on supplier traceability data sharing,

H3b. Buyers' use of coercive power has a negative effect on supplier traceability data quality.

H4a. Buyers' use of reward power has a positive effect on supplier traceability data sharing.

H4b. Buyers' use of reward power has a positive effect on supplier traceability data quality.

Taken together, the hypotheses result in the following conceptual model (Fig. 1):

3. Material and methods

3.1. Data collection and sample characteristics

The collection of data took place through an electronic survey amongst a sample of purchasing professionals, employed by Dutch industrial companies. A survey is suggested to be an appropriate strategy when applying a deductive research approach designed to collect quantitative data about how a population thinks or behaves in relation to a particular issue (Saunders et al., 2012). We selected purchasing professionals as the survey population, since purchasers are in direct contact with suppliers and have the knowledge needed to complete the questionnaire. Although sustainability is also a recent topic in the service sector, most papers tend to focus on manufacturing industry because this industry is viewed as more polluting and often has presence in emerging and developed countries. This paper adopts this view and collects data from professional purchasers operating in manufacturing industry based in the Netherlands, a developed country where sustainability ranks high on the political agenda (e.g., Sustainable Development Goals). A total number of 585 professional purchasers located in the Netherlands were invited by e-mail to participate in the survey. In order to stimulate response a small incentive was offered in the form of the chance to win a €50 voucher, to be given to five randomly selected respondents. This encouragement resulted in an effective response rate of 136/585 = 23.2%. To detect a minimum $R2$ value of 0.10 for a significance level of 5% and a commonly used level of statistical power of 80% the minimum sample size is 90 (Hair et al., 2017).

The respondents' job positions consisted mainly of buyers, with regular and assistant buyers representing 24.3% of the sample composition, and senior buyers representing 28.7%. Additionally, purchasing managers and directors both represented an equivalent of 11.8%. Logistics and supply chain managers were responsible for 4.4% and 6.6% of the sample, respectively. The category "other" accounted for 12.5% of the sample and included supply chain coordinators, technical buyers, business owners, and category managers. A small group of all respondents is employed in companies with less than 10 employees (5.9%). The main group was represented by companies with 251–1000 employees (30.9%) followed by more than 1000 employees (20.6%). Employees employed in companies with 11–50, 51–100, and 101–250 employees represented 11%, 13.2% and 18.4%, respectively. An overview of the industry in which the respondents operate, is presented in Table 1. As can be seen in Table 2, most respondents are employed in companies with high turnover.

Table 1
Frequencies of the type of industry.

Industries	Absolute frequencies	Relative frequencies
Building materials	6	4.4
Chemicals & petrochemicals	25	18.4
Electronic & high tech	13	9.6
Food & Beverage	29	14.7
Metals, mechanical & engineering	13	9.6
Other	25	18.4
Pharmaceuticals & medical	14	10.3
Publishing & printing	2	1.5
Rubbers & plastic	5	3.7
Textiles & apparel	6	4.4
Transportation & logistics	5	3.7
Wood & furniture	2	1.5
Total	**136**	**100**

Table 2
Frequencies for the company size.

Yearly turnover	Absolute frequencies	Relative frequencies
Less than €700K	5	3.7
Between €700K and €12 million	29	14.7
Between €12 and €40 million	24	17.6
Between €40 and €100 million	23	16.9
More than €100 million	64	47.1
Total	**136**	**100**

3.2. Measures

We used multiple item constructs, adopted from other studies, to measure the seven variables in the conceptual model. *Coercive power* is the ability to punish the target party in case they fail to comply with desired action (French and Raven, 1959). The scale to measure coercive power is adopted from Harness et al. (2018) and includes statements about financial or non-financial penalties given by the buyer to demand information. *Reward power* is the ability to reward the target party for desired behaviour (French and Raven, 1959). The scale is adopted from Harness et al. (2018) and asks respondents whether the benefits and rewards are given to major suppliers that follow the information requests.

The *sharing of traceability data* items refer to the extent to which suppliers share data on operations, planning and design, and strategy, facilitating the buying company to trace products and materials in the

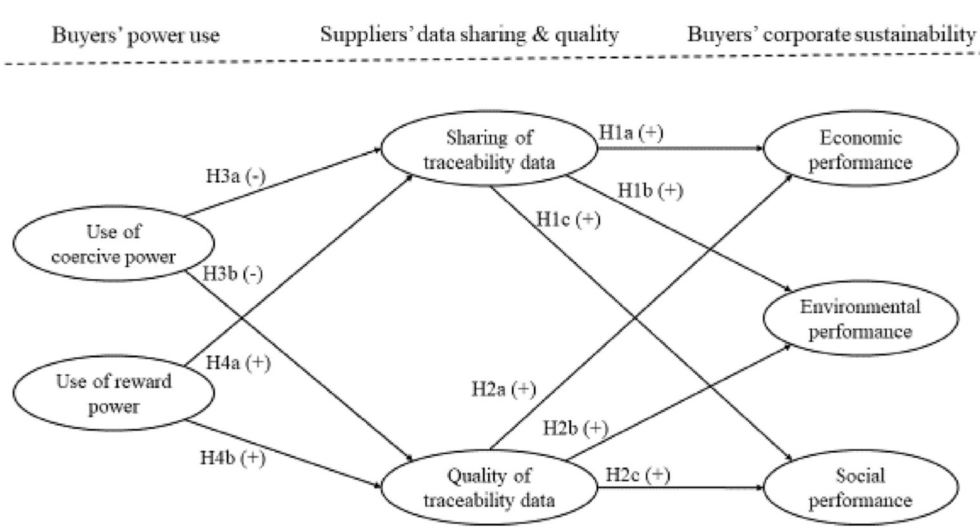

Fig. 1. Conceptual model.

supply chain (cf. Morgan et al., 2018). Operational information refers to batch sizes, quality issues, and production information, which help tracing product routes in the production process. Planning and design information relates to operational performance and topics as rework. The strategic information such as expertise from suppliers or information deals with government regulations to improve traceability when shared by the supplier (Morgan et al., 2018). Data quality can be defined as the extent to which it is fit for use for the receiving party (Flores and Sun, 2018; Zhou et al., 2014). In our study we follow Li and Lin (2006) to measure the *quality of traceability data* which means that information should be timely, accurate, complete, adequate, and reliable.

The *environmental performance* refers to the extent to which the ecological impact of business and aims to reduce the use of natural resources and to minimize negative outputs such as pollution and waste (Mani et al., 2016). This scale is adopted from Lai et al. (2015) and includes environmental aspects as reduction of electricity use and packaging. The items to measure corporate *economic performance* are derived from Lai et al. (2015) and raises questions about economic performance improvements such as increased market share and profit. *Social performance* refers to the human dimension and addresses human rights, equity, and health and safety (Mani et al., 2016). The scale measures relations with stakeholders, products, and the organizational image, and it is adopted from Zailani et al. (2012).

Although our measures were adopted from previous studies, they were slightly adjusted to fit the context of our study. The survey was available in both Dutch and English at the choice of the respondent. Moreover, the measures were pre-tested on a small scale and examined with respect to construct reliability before entering the final version of the questionnaire.

3.3. Data analysis and methodological issues

Quality of our final dataset containing 136 records is assessed by checking for monotone responses, reversed items, outliers, missing values, and normality of data distribution. Since our sample size is relatively small and contains non-normally distributed data, partial least squares structural equation modelling (PLS-SEM) is a more adequate approach than covariance based SEM. Moreover, PLS-SEM is to be preferred over CB-SEM when the main goal is to identify key drivers (Hair et al., 2017). In our study we are looking for key drivers to assess buyers' corporate sustainability. Therefore, to analyse the data and to test our hypotheses we used PLS-SEM, running the SmartPLS 3 software (Ringle et al., 2015).

The survey was made available in both English and Dutch language, as international companies in Dutch industry in some cases have employees who are not familiar with Dutch language (e.g. long-term expats). Specifically regarding the Dutch version of the survey, construct validity is ensured by performing back and forward translations which have been checked by three researchers (e.g. in accordance with Brislin, 1986; Wong and Poon, 2010). The internal validity of the study is ensured by the measures (explained in section 3.2), as well as focusing on companies operating in the manufacturing industry. International research tends to focus on manufacturing industry because this industry is viewed as more polluting and often has presence in emerging countries. This paper adopts this view and collects data from professional purchasers based working manufacturing industry (Khan et al., 2018; Rajeev et al., 2017; Schaltegger and Burritt, 2014). Within this segment of companies, no specific manufacturing industries are selected, because research on sustainability is relevant for all types of industries (Pagell and Wu, 2009), thus supporting external validity of our research.

4. Results

After the preliminary screening and cleaning our data analysis as outlined in section 3.3 we follow the two-step procedure as described by e.g. Sarstedt et al. (2017), starting with the evaluation of the measurement models, followed by an assessment of the structural model.

4.1. Examining the results of the measurement models

As an indicator for internal consistency reliability of our reflective measurement models we use composite reliability (CR). As indicated in Appendix A, CR values range from 0.805 to 0.938 and all exceed the threshold value of 0.70 as recommended by Hair et al. (2017) and Sarstedt et al. (2017). This study, therefore, concludes the scales are reliable. Convergent validity of our constructs has been ascertained since the average variance extracted (AVE) exceeds the threshold value of 0.50 (Hair et al., 2017). Convergent validity is further supported by investigating the significance of the standardized loadings (Hair et al., 2017). Appendix A includes the item loadings and their significances, confirming convergent validity.

When assessing discriminant validity the Fornell Larcker Criterion is a frequently used and widely accepted measure (Fornell and Larcker, 1981). According to the Fornell Larcker Criterion the square root of each construct's AVE (as listed on the diagonal in Table 3) must be larger than the correlations between the latent variables in the corresponding rows and columns (as shown in the lower left part of Table 3). Our evaluation of the Fornell Larcker Criterion suggests acceptable levels of discriminant validity. A more recent and more reliable alternative for assessing discriminant validity is the Heterotrait-Monotrait (HTMT) ratio (Henseler et al., 2015). The HTMT criterion suggests that all HTMT values should be below the threshold value of 0.85 in order to reach a sufficient level of discriminant validity (Hair et al., 2017). The HTMT values for our study are shown in the upper right part of Table 3, supporting an adequate level of discriminant validity.

4.2. Examining the results of the structural model

Next we examine the results of our structural model. The structural path coefficients of the hypothesized relationships as well as their t-values and levels of significance are shown in Table 4. The R^2 coefficients of the constructs in our structural model range from 0.020 (for Quality of traceability data) to 0.149 (for Economic performance) and are considered weak. Based on the t-values and significance levels hypotheses H1a, H1b, H1c and H4a are supported.

The results of our structural model analysis, as presented in Table 1, are reproduced in Fig. 2 and complemented with the R2-values.

5. Discussion

Traceability systems are seen as important drivers to improve (environmental) sustainability (Germani et al., 2015). As with other corporate environmental systems, traceability systems heavily rely on input data from suppliers, hence the importance of buyer-supplier relationships to obtain reliable traceability data. The literature has shown the benefits of traceability data exchange in fields as customer satisfaction and tracing possibilities in case of quality issues. The effect on corporate sustainability, however, remains relatively unexplored (Bosona and Gebresenbet, 2013; Morgan et al., 2018). Several studies have indicated the possible effects of other types of information shared on improved sustainability (Khan et al., 2018; Mangla et al., 2018). It was therefore proposed that suppliers' sharing traceability data would positively affect the buyers' corporate sustainability, more specifically the environmental, social and economic dimensions. The results of our study show a significant relationship between sharing of traceability data and sustainability performance. This finding is in line with earlier studies that found that information sharing could positively contribute to sustainability performance in supply chain context (e.g. Khan et al., 2018), and furthermore complements the current body of knowledge by specifying and measuring the type of information shared, focusing on the exchange of traceability data. Furthermore, in line with a number of authors who have stated the necessity for studies on sustainability that include all

Table 3
Discriminant validity of latent variables.

	1	2	3	4	5	6	7
1. Quality of traceability data	*0.868*	**0.245**	**0.282**	**0.230**	**0.230**	**0.064**	**0.149**
2. Sharing of traceability data	0.229	*0.835*	**0.463**	**0.392**	**0.391**	**0.212**	**0.399**
3. Economic performance	0.234	0.352	*0.714*	**0.444**	**0.645**	**0.282**	**0.308**
4. Environmental performance	0.219	0.340	0.378	*0.759*	**0.759**	**0.270**	**0.242**
5. Social performance	0.223	0.342	0.518	0.650	*0.869*	**0.328**	**0.418**
6. Use of coercive power	0.020	0.193	0.187	0.254	0.263	*0.837*	**0.579**
7. Use of reward power	0.134	0.326	0.223	0.205	0.345	0.415	*0.816*

Note: Numbers shown in *italics* denote the square root of the AVE; below the diagonal the correlations between the latent variables; above the diagonal the HTMT values in ***bold***.

Table 4
Structural path coefficients and hypothesis testing.

Hypothesis	Path	Beta	t-value	Significance	Supported
H1a	Sharing of traceability data -> Economic performance	0.315	3.920	***	Yes
H1b	Sharing of traceability data -> Environmental performance	0.306	4.161	***	Yes
H1c	Sharing of traceability data -> Social performance	0.307	3.877	***	Yes
H2a	Quality of traceability data -> Economic performance	0.162	1.459	n.s.	No
H2b	Quality of traceability data -> Environmental performance	0.149	1.195	n.s.	No
H2c	Quality of traceability data -> Social performance	0.153	1.283	n.s.	No
H3a	Use of coercive power -> Sharing of traceability data	0.070	0.634	n.s.	No
H3b	Use of coercive power -> Quality of traceability data	−0.043	0.398	n.s.	No
H4a	Use of reward power -> Sharing of traceability data	0.297	3.017	**	Yes
H4b	Use of reward power -> Quality of traceability data	0.152	1.345	n.s.	No

Note:***$p < 0.001$, **$p < 0.01$, *$p < 0.05$, n.s. = non-significant.

three dimensions (Beske and Seuring, 2014; Rajeev et al., 2017; Seuring and Müller, 2008; Waller et al., 2015; Wu and Pagell, 2011), we have included the environmental, social and economic dimensions of corporate sustainability. Our results show that sharing of traceability data positively affects all three dimensions of corporate sustainability. Zhou and Benton (2007) found that information quality had a positive effect on company performance. Information quality has also been identified as a barrier in traceability systems, which are supposed to improve sustainability in the food industry (Bosona and Gebresenbet, 2013). As such, our study proposed the hypotheses that the quality of the information shared would show a positive link with corporate sustainability performance. However, the results show no significant relationship between the two, for all three dimensions of sustainability. This outcome contradicts expectations and is not in line with earlier research from Li and Lin (2006), who found that information quality led to better company efficiency and responsive performance. A study from Gorla et al. (2010) shows that quality of provided information largely depends on the quality of the IT system used. In addition, the type of information shared can determine the quality, as more formal and frequently provided information is often automatically generated through IT systems, where more informal and non-routine information requires more manually performed actions (Myrelid and Jonnson, 2019). Interpreting the outcome of these studies (Gorla et al., 2010; Myrelid and Jonnson, 2019), routine information provided through IT systems seems to have higher quality in general. Our study includes both routine (e.g. operational information as batch information) and non-routine information (e.g. strategic information). Other studies, such as that of Li and Lin (2006), included more routine information. One possible explanation for our study's unexpected findings could be that the quality of the various levels of traceability information should be measured separately, which was not done in our research approach. Another explanation for the non-significant results might be that we used rather broad, global measures for the buying firm's actions with all suppliers, instead of in a specific supplier relationship. Results might thus differ, depending on the type of buyer-supplier relationship, which could be further investigated following the purchasing portfolio approach (e.g. Caniëls and Gelderman, 2007).

As supply chains nowadays are complex and involve many actors, companies are becoming more dependent on (external) stakeholders. Companies should understand relational aspects that enhance or constrain suppliers to disclose traceability data (Morgan et al., 2018). Trust is known to enable information sharing by suppliers in general, but little is known of the effect of power use in the buyer–supplier relationship and previous studies have yielded inconsistent results (Gualandris and Kalchschmidt, 2016; Kumar and Rahman, 2016; Wong, 2013). One of the objectives of our study was therefore to measure whether the actual use of coercive and reward power would encourage suppliers to share (qualitative) traceability data. The results show that, as expected, there is a positive relationship between the use of reward power and the extent of traceability information disclosure. The expected negative effect of coercive power, on the other hand was insignificant in our results. This result confirms the findings of Gelderman et al. (2020), who also did not find a negative effect, but it is contrary to the findings of Chen et al. (2016), who did find a significant negative relationship by also measuring the actual use of power. The reason for the differences in outcome could be that Chen et al. (2016) measured only one coercive aspect, namely the withdrawal and moving of orders them to another supplier; by contrast, our study considers more aspects of coercive power. The aim of our hypotheses regarding the use of coercive power was to clear mixed findings in the body of knowledge, yet unfortunately, this goal was not fully achieved. It was expected that the actual use or the threat of using power would prompt different outcomes, which was not the case, based on the results of our research. The results do, however, contribute to the existing literature by confirming that reward and coercive power show different outcomes and should be viewed as separate variables, as they cause different effects (Chaex et al., 2017; Nyaga et al., 2013; Pulles et al., 2014).

The quality of shared traceability data can be considered a necessary, but not a sufficient condition for an impact on sustainability performance. In other words, the sharing and quality of traceability data can

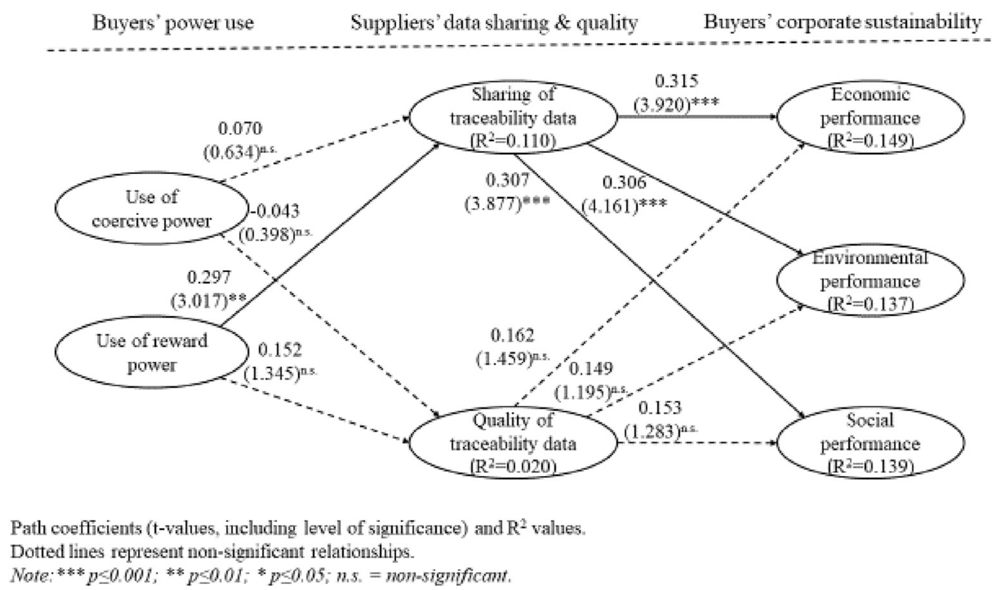

Fig. 2. Results of the structural model analysis.

only contribute to a company's own sustainability performance if the data can and will be used to restructure the supply chain or to put in place mitigating practices (e.g. with the aim to improve environmental performance). Limited research is available on sustainability effects of information quality, although information quality is identified as a barrier in traceability systems (Bosona and Gebresenbet, 2013). Information quality refers to the reliability and completeness of that information and indicates whether the shared information is accurate and in time. Hence, information quality is an important indicator of the actual usefulness of the shared information, and studies report positive relationships with efficiency, responsiveness, and performance (Li et al., 2014; Marshall, 2015; Najjar et al., 2018). Regarding the effect of both forms of power use on the quality of the traceability data, no significant relationship was found, although it was expected that coercive power would reduce the quality, whereas reward power would improve the quality of the data. Relationship aspects and supplier collaboration in dyadic relationships have been shown to improve information quality, but power may not be importance determining factor for data quality (Myrelid and Jonnson, 2019). Additionally, as mentioned before, data quality in this study is measured on all three levels of traceability information, which vary from operational to strategic information. Following our results indicating no significant relationship, it might be that these three levels should be viewed separately when measuring traceability data quality.

6. Conclusion and recommendations

Although sustainability research is becoming more important due to globalization, industrial growth and increasing consumer awareness of the negative environmental effects of business, we still know little of the dynamics and influencing factors of corporate sustainability. Traceability systems, as other environmental systems, are used to assess environmental sustainability performance in corporate, as well as supply chain context. Previous research on sustainability has tended to focus on only one dimension of sustainability (economic, ecological, or social elements). The results of our study show, as expected, a positive relationship between sharing of traceability information and performance on all three dimensions of corporate sustainability (economic, environmental, and social). Surprisingly, the quality of that traceability does not correlate significantly to these three dimensions. The use of reward or coercive power is also unrelated to the quality of traceability data, indicating that data quality has other antecedents and effects than expected in this study. Despite that coercive power is often associated with negative effects, no empirical evidence was found for this in this research. However, reward power did show a significant relationship with the extent of traceability data shared, so this form of power could be a tool to encourage suppliers to share traceability data.

This study has several limitations. First, it focussed on the sustainability of the focal (buyers') company, despite the acknowledgement that there is a lack of research available measuring the entire chain (Montabon et al., 2016). Measurement of sustainability throughout an entire supply chain remains scarce because of its complexity, but is needed to extend the knowledge of the effects of traceability in the complete chain (Pagell and Shevchenko, 2014). Future research could study the effect of sharing traceability information on supply chain sustainability as a whole. Alternatively, research should be conducted at a deeper level, beyond tier 1 suppliers, including traceability data exchange with customers (Quarshie et al., 2016; Wong, 2013). Companies all over the world struggle with the impact of the COVID-19 crisis on their supply chains, causing simultaneous disruptions in supply and demand (Ivanov, 2020; Sengupta and Bose, 2020). 94% of the Fortune 1000 companies reported supply chain disruptions, driven by the COVID-19 pandemic (Fortune, 2020). The strategy of global single sourcing in China has resulted in high levels of dependency and a call for more resilient supply chains (e.g. Ivanov and Dolgui, 2020). Scenario planning, as a research methodology, could be used to identify critical drivers and uncertainties, as well as their potential impacts. In relation to the COVID-19 pandemic, research could focus on supply chain mapping, identifying scarce ingredients, revealing hidden dependencies, and fast tracking supplier evaluation (Knight et al., 2020). Another limitation of this study is the possibility of socially desirable answers for economic, social, and environmental performance. Although anonymity for respondents was guaranteed, the perception of respondents on the company performance might turn out to be more positive than other stakeholders' perceptions would be (Pagell and Shevchenko, 2014). A possible solution to overcome this problem would be to study actual company data in a case study to measure the increase (or decrease) of the performance on all three dimensions. Another suggestion would be to include multiple stakeholders in the research so that various views could be observed. Future studies could also include non-financial data, to ensure that the triple bottom line is followed as originally intended, without emphasizing too much the financial and accounting aspects.

As this study followed a cross-sectional design, it is not possible to demonstrate causality. Longitudinal research could address this issue. Furthermore, this study has considered two main sources of power use. It would be interesting to see the effect of other power sources when it comes to requesting traceability data from major suppliers. Regarding data quality, none of the hypotheses were supported. This lack of support indicates that varying antecedents and effects are related to data quality, which could be examined through qualitative research. As recent literature shows that various types of information sharing can also trigger different results in information quality, this is something to be further investigated in the future (Myrelid and Jonnson, 2019).

The results of this study also have relevance for practitioners. Buying firms should acknowledge the positive effects of sharing traceability data by suppliers. The corporate sustainability, on all three dimensions (economic, environmental, social) benefits significantly from suppliers, sharing traceability information. Buyers may be tempted to use both coercive and reward power to stimulate information sharing in their supply chain. However, our study indicates that buyers should refrain from coercive strategies, emphasizing their reward powers toward suppliers. Top management should acknowledge the critical importance of suppliers' traceability data when it comes to strengthening the sustainability performance of their companies.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Variables, items, loadings, reliability and validity

Latent variable	Item	Loading	CR	AVE
Use of Coercive power	CoercP1	0.910***	0.874	0.700
	CoercP2	0.876***		
	CoercP3	0.710**		
Use of Reward power	RewardP1	0.842***	0.856	0.665
	RewardP2	0.766***		
	RewardP3	0.837***		
Sharing of traceability data	SharingD1	0.789***	0.873	0.697
	SharingD2	0.874***		
	SharingD3	0.840***		
Quality of traceability data	QualityD1	0.824***	0.938	0.753
	QualityD2	0.869***		
	QualityD3	0.876***		
	QualityD4	0.921***		
	QualityD5	0.847***		
Economic Performance	Ecperf1	0.818***	0.805	0.510
	Ecperf2	0.730***		
	Ecperf3	0.652***		
	Ecperf4	0.643***		
Environmental Performance	Envperf1	0.750***	0.915	0.576
	Envperf2	0.733***		
	Envperf3	0.778***		
	Envperf4	0.749***		
	Enverpf5	0.873***		
	Envperf6	0.776***		
	Envperf7	0.738***		
	Envperf8	0.657***		
Social Performance	Socperf1	0.844***	0.902	0.755
	Socperf2	0.901***		
	Socperf3	0.861***		

Note:***p ≤ 0.001; **p ≤ 0.01; *p ≤ 0.05 CR = Composite Reliability; AVE = Average Variance Extracted.

Luo et al., 2018.

References

Agrawal, T.K., Pal, R., 2019. Traceability in textile and clothing supply chains: classifying implementation factors and information sets via Delphi study. Sustainability 11 (6), 1698.
Ahi, P., Searcy, C., 2013. A comparative literature analysis of definitions for green and sustainable supply chain management. J. Clean. Prod. 52, 329–341.
Barros, M.V., Salvador, R., do Prado, G.F., de Francisco, A.C., Piekarski, C.M., , 2021. Circular economy as a driver to sustainable businesses. Clean. Environ. Syst. 100006.
Benton, W.C., Maloni, M., 2005. The influence of power driven buyer/seller relationships on supply chain satisfaction. J. Oper. Manag. 23, 1–22.
Beske, P., Seuring, S., 2014. Putting sustainability into supply chain management. Supply Chain Manag.: Int. J. 19 (3), 322–331.
Bosona, T., Gebresenbet, G., 2013. Food traceability as an integral part of logistics management in food and agriculture supply chain. Food Contr. 33, 32–48.
Brislin, R., 1986. The wording and translation of research instruments. In: Lonner, W., Berry, J. (Eds.), Field Methods in Cross-Cultural Research: Cross-Cultural Research and Methodology Series. Sage Publications, Thousand Oaks, CA, pp. 137–164.
Caniëls, M.C., Gelderman, C.J., 2007. Power and interdependence in buyer supplier relationships: a purchasing portfolio approach. Ind. Market. Manag. 36 (2), 219–229.
Chaex, S., Choi, T.Y., Hur, D., 2017. Buyer power and supplier relationship commitment: a cognitive evaluation theory perspective. J. Supply Chain Manag. 53 (2), 39–60.
Chen, T.B., Chai, L.T., 2010. Attitude towards the environment and green products: consumers' perspective. Manag. Sci. Eng. 4 (2), 27–39.
Chen, J., Zhao, X., Lewis, M., Squire, B., 2016. A multi-method investigation of buyer power and supplier motivation to share knowledge. Prod. Oper. Manag. 25 (3), 417–431.
Cheng, M.J., Simmons, J.E.L., 1994. Traceability in manufacturing systems. Int. J. Oper. Prod. Manag. 14 (10), 4–16.
Cowan, K., Paswan, A.K., van Steenburg, E., 2015. When inter-firm relationship benefits mitigate power asymmetry. Ind. Market. Manag. 48, 140–148.
de Haan-Hoek, J., Lambrechts, W., Semeijn, J., Caniels, M.C., 2020. Levers of control for supply chain sustainability: control and governance mechanisms in a cross-boundary setting. Sustainability 12 (8), 3189.
Eesley, C., Lenox, M.J., 2006. Firm responses to secondary stakeholder action. Strat. Manag. J. 27 (8), 765–781.
Elkington, J., 2018. 25 years ago *I* coined the phrase "Triple Bottom Line". Here's why it is time to rethink it. Harvard Business Review (accessed on 1 June 2021). https://hbr.org/2018/06/25-years-ago-i-coined-the-phrase-triple-bottom-line-heres-why-im-giving-up-on-it.
Engert, S., Baumgartner, R.J., 2016. Corporate sustainability strategy–bridging the gap between formulation and implementation. J. Clean. Prod. 113, 822–834.
Finnveden, G., Moberg, Å., 2005. Environmental systems analysis tools–an overview. J. Clean. Prod. 13 (12), 1165–1173.
Finnveden, G., Hauschild, M.Z., Ekvall, T., Guinée, J., Heijungs, R., Hellweg, S., Suh, S., 2009. Recent developments in life cycle assessment. J. Environ. Manag. 91 (1), 1–21.

Flores, J., Sun, J., 2018. Information quality awareness and information quality practice. J. Data Inform. Qual. 10 (1), 2–18.
Fornell, C., Larcker, D.F., 1981. Evaluating structural equation models with unobservable variables and measurement error. J. Market. Res. 18 (1), 39–50.
Fortune, 2020. https://fortune.com/2020/02/21/fortune-1000-coronavirus-china-supply-chain-impact/. (Accessed 19 May 2020).
French, J.R.P., Raven, B., 1959. The bases of social power. In: Cartwright, D. (Ed.), Studies in Social Power. University of Michigan, Oxford, England, pp. 150–167.
Galappaththi, E.K., Kodithuwakku, S.S., Galappaththi, I.M., 2016. Can environment management integrate into supply chain management? Information sharing via shrimp aquaculture cooperatives in north westerns Sri Lanka. Mar. Pol. 68, 187–194.
Garcia-Torres, S., Albareda, L., Rey-Garcia, M., Seuring, S., 2019. Traceability for sustainability–literature review and conceptual framework. Supply Chain Manag.: Int. J. 24 (1), 85–106.
Gardner, T.A., et al., 2018. Transparency and sustainability in global commodity supply chains. World Dev. 121, 163–177.
Gardner, T.A., Benzie, M., Börner, J., Dawkins, E., Fick, S., Garrett, R., Mardas, N., 2019. Transparency and sustainability in global commodity supply chains. World Dev. 121, 163–177.
Gavetti, G., Levinthal, D.A., Rivkin, J.W., 2005. Strategy making in novel and complex worlds: the power of analogy. Strat. Manag. J. 26 (8), 691–712.
Gelderman, C.J., Peeters, E.R., Semeijn, J., ter Avest, F., (11), 2020. Social capital, power and information sharing – evidence from the Dutch meat processing industry. Br. Food J. in progress.
Gelderman, C.J., Schijns, J., Lambrechts, W., Vijgen, S., 2021. Green marketing as an environmental practice: the impact on green satisfaction and green loyalty in a business-to-business context. Bus. Strat. Environ. 30 (4), 2061–2076.
Germani, M., Mandolini, M., Marconi, M., Marilungo, E., Papetti, A., 2015. A system to increase the sustainability and traceability of supply chains. Procedia CIRP 29, 227–232.
Giunipero, L.C., Hooker, R.E., Denslow, D., 2012. Purchasing and supply management sustainability: drivers and barriers. J. Purch. Supply Manag. 18 (4), 258–269.
Gorla, N., Somers, T.M., Wong, B., 2010. Organizational impact of system quality, information quality and service quality. J. Strat. Inf. Syst. 19, 207–228.
Griffith, D.A., Hoppner, J.J., Lee, H.S., Schoenherr, T., 2017. The influence of the structure of interdependence on the response to inequity in buyer–supplier relationships. J. Market. Res. 54 (1), 124–137.
Gualandris, J., Kalchschmidt, M., 2016. Developing environmental and social performance: the role of suppliers' sustainability and buyer-supplier trust. Int. J. Prod. Res. 54 (8), 2470–2486.
Hair, J.F., Hult, G.T.M., Ringle, C.M., Sarstedt, M., 2017. A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM), 2nd. Ed. SAGE, Thousand Oaks.
Harangozo, G., Zilahy, G., 2015. Cooperation between business and non-governmental organizations to promote sustainable development. J. Clean. Prod. 89, 18–31.
Harness, D., Ranaweera, C., Karjaluoto, H., Jayawardhena, C., 2018. The role of negative and positive forms of power in supporting CSR alignment and commitment between large firms and SMEs. Ind. Market. Manag. 75, 17–30.
Hassini, E., Surti, C., Searcy, C., 2012. A literature review and a case study of sustainable supply chains with a focus on metrics. Int. J. Prod. Econ. 140 (140), 69–82.
Henriques, I., Sadorsky, P., 1999. The relationship between environmental commitment and managerial perceptions of stakeholder importance. Acad. Manag. J. 42 (1), 87–99.
Henseler, J., Ringle, C.M., Sarstedt, M., 2015. A new criterion for assessing discriminant validity in variance-based structural equation modeling. J. Acad. Market. Sci. 43 (1), 115–135.
Hunt, S., Nevin, J., 1974. Power in a channel of distribution: sources and consequences. J. Market. Res. 11 (2), 186–193.
Huo, B., Flynn, B.B., Zhao, X., 2017. Supply chain power configurations and their relationship with performance. J. Supply Chain Manag. 53 (2), 88–111.
ISO, 2000. ISO 9000:2000. Quality Management Standards.
Ivanov, D., 2020. Predicting the impacts of epidemic outbreaks on global supply chains: a simulation-based analysis on the coronavirus outbreak (COVID-19/SARS-CoV-2) case. Transport. Res. E Logist. Transport. Rev. 136, 101922.
Ivanov, D., Dolgui, A., 2020. Viability of intertwined supply networks: extending the supply chain resilience angles towards survivability. A position paper motivated by COVID-19 outbreak. Int. J. Prod. Res. 58 (10), 1–12.
Johnson, G., Scholes, K., Whittington, R., 2005. Exploring Corporate Strategy. Prentice Hall, London, UK.
Kassinis, G., Vafeas, N., 2006. Stakeholder pressures and environmental performance. Acad. Manag. J. 49 (1), 145–159.
Khan, M., Hussain, M., Saber, H.M., 2016. Information sharing in a sustainable supply chain. Int. J. Prod. Econ. 181, 208–214.
Khan, M., Hussain, M., Papastathopoulos, A., Manikas, L., 2018. Trust, Information Sharing and Uncertainty: an Empirical Investigation into Their Impact on Sustainability in Service Supply Chains in the United Arab Emirates. Sustainable Development, pp. 1–9.
Knight, L., Meehan, J., Tapinos, E., Menzies, L., Pfeiffer, A., , 2020. Researching the future of purchasing and supply management: the purpose and potential of scenarios. J. Purch. Supply Manag. 100624.
Kros, J.F., Liao, Y., Kirchoff, J.F., Zemanek Jr., J.E., 2019. Traceability in the supply chain. Int. J. Appl. Logist. 9 (1), 1–22.
Kumar, D., Rahman, Z., 2016. Buyer supplier relationship and supply chain sustainability: empirical study of Indian automobile industry. J. Clean. Prod. 131, 836–848.
Lai, K.H., Wong, C.W.Y., Lam, J.S.L., 2015. Sharing environmental management information with supply chain partners and the performance contingencies on environmental munificence. Int. J. Prod. Econ. 164, 445–453.
Lambrechts, W., 2021. Ethical and sustainable sourcing: toward strategic and holistic sustainable supply chain management. In: Leal Filho, W., Azul, A., Brandli, L., Salvia, A.L., Wall, T. (Eds.), Encyclopedia of the UN Sustainable Development Goals. Decent Work and Economic Growth. Springer. Cham Available online: https://link.springer.com/referenceworkentry/10.1007/978-3-319-71058-7_11-1. (Accessed 27 March 2021).
Li, S., Lin, B., 2006. Accessing information sharing and information quality in supply chain management. Decis. Support Syst. 42, 1641–1656.
Li, Y., Ye, F., Sheu, C., 2014. Social capital, information sharing and performance: evidence from China. J. Oper. Prod. Manag. 34 (11), 1440–1462.
Linton, T., Vakil, B., 2020. Coronavirus is proving we need more resilient supply chains. Harvard Bus. Rev., March 5, 2020.
Luo, J., Ji, C., Qiu, C., Jia, F., 2018. Agri-food supply chain management: bibliometric and content analyses. Sustainability 10 (5), 1573.
Mangla, S.K., Luthra, S., Rich, N., Kumar, D., Rana, N.P., Dwivedi, Y.K., 2018. Enablers to implement sustainable initiatives in agri-food supply chains. Int. J. Prod. Econ. 203, 379–393.
Mani, V., Agarwal, R., Gunasekaran, A., Papadopoulos, T., Dubey, R., Childe, S.J., 2016. Social sustainability in the supply chain: construct development and measurement validation. Ecol. Indicat. 71, 270–279.
Mani, V., Gunasekaran, A., Delgado, C., 2018. Enhancing supply chain performance through supplier social sustainability: an emerging economy perspective. Int. J. Prod. Econ. 195, 259–272.
Marshall, D.A., 2015. Assessing the value of supply chain information sharing in the new millennium. Int. J. Supply Chain Manag. 4 (4), 10–21.
Matanda, M.J., Ndubisi, N.O., Jie, F., 2016. Effects of relational capabilities and power asymmetry on innovativeness and flexibility of Sub-Sahara Africa small exporting firms. J. Small Bus. Manag. 54 (1), 118–138.
Meacham, J., Toms, L., Green, K.W., Bhadauria, V.S., 2013. Impact of information sharing and green information systems. Manag. Res. Rev. 36 (5), 478–494.
Mejías, A.M., Bellas, R., Pardo, J.E., Paz, E., 2019. Traceability management systems and capacity building as new approaches for improving sustainability in the fashion multi-tier supply chain. Int. J. Prod. Econ. 217, 143–158.
Mitchell, R.K., Agle, B.R., Wood, D.J., 1997. Towards a theory of stakeholder identification and salience: defining the principle of who and what really counts. Acad. Manag. Rev. 22 (4), 853–886.
Mohammad, W.M.W., Wasiuzzaman, S., 2021. Environmental, Social and Governance (ESG) disclosure, competitive advantage and performance of firms in Malaysia. Clean. Environ. Syst. 2, 100015.
Montabon, F., Pagell, M., Wu, Z., 2016. Making sustainability sustainable. J. Supply Chain Manag. 52 (2), 11–27.
Morgan, T.R., Richey Jr., R.G., Ellinger, A.G., 2018. Supplier transparency: scale development and validation. Int. J. Logist. Manag. 29 (3), 959–984.
Myrelid, P., Jonnson, P., 2019. Determinants of information quality in dyadic supply chain relationships. Int. J. Logist. Manag. 30 (1), 356–380.
Najjar, M.S., Dahabiyeh, L., Nawayse, M., 2018. Share if You Care: the Impact of Information Sharing and Information Quality on Humanitarian Supply Chain Performance - a Social Capital Perspective. Information Development, pp. 1–14.
Nyaga, G.N., Lynch, D.F., Marshall, D., Ambrose, E., 2013. Power asymmetry, adaption and collaboration in dyadic relationships involving a powerful partner. J. Supply Chain Manag. 49 (3), 42–56.
Olsen, P., Borit, M., 2013. How to define traceability. Trends Food Sci. Technol. 29 (2), 142–150.
Pagell, M., Shevchenko, A., 2014. Why research in sustainable supply chain management should have no future. J. Supply Chain Manag. 50 (1), 44–55.
Pagell, M., Wu, Z., 2009. Building a more complete theory of sustainable supply chain management using case studies of 10 exemplars. J. Supply Chain Manag. 45 (2), 37–56.
Pfeffer, J., Salancik, G.R., 1978. The external control of organizations: a resource dependence perspective. Harper & Row, New York, pp. 167–199.
Pulles, N.J., Veldman, J., Schiele, H., Sierksma, H., 2014. Pressure or pamper? The effects of power and trust dimensions on supplier resource allocation. J. Supply Chain Manag. 50, 16–36.
Quarshie, A.M., Salmi, A., Leuschner, R., 2016. Sustainability and corporate social responsibility in supply chains: the state of research in supply chain management and business ethics journals. J. Purch. Supply Manag. 22, 82–97.
Rajeev, A., Pati, R.K., Padhi, S.S., Govindan, K., 2017. Evolution of sustainability in supply chain management: a literature review. J. Clean. Prod. 162, 299–314.
Rashed, C.A.A., Azeem, A., Halim, Z., 2010. Effect of information and knowledge sharing on supply chain performance: a survey based approach. J. Oper. Supply Chain Manag. 3 (2), 61–77.
Reuter, C., Goebel, P., Foerstl, K., 2012. The impact of stakeholder orientation on sustainability and cost prevalence in supplier selection decisions. J. Purch. Supply Manag. 18 (4), 270–281.
Ringle, C.M., Wende, S., Becker, J.-M., 2015. SmartPLS 3. Boenningstedt: SmartPLS GmbH. http://www.smartpls.com.
Sarstedt, M., Ringle, C.M., Hair, J.F., 2017. Partial least squares structural equation modeling. In: Homburg, C., Klarmann, M., Vomberg, A. (Eds.), Handbook of Market Research. Springer, Heidelberg, pp. 1–40.
Saunders, M., Lewis, P., Thornhill, A., 2012. Research Methods for Business Students, 6th. Ed. Pearson Education.
Schaltegger, S., Burritt, R., 2014. Measuring and managing sustainability performance of supply chains: review and sustainability supply chain management framework. Supply Chain Manag.: Int. J. 19 (3), 232–241.
Schneider, L., Wallenburg, C.M., 2012. Implementing sustainable sourcing—does purchasing need to change? J. Purch. Supply Manag. 18 (4), 243–257.

Sengupta, G., Bose, P., 2020. Preparing for post COVID-19 sustainable supply chain. Int. J. Manag. IT & Engineering, **10** (05).
Seuring, S., Müller, M., 2008. From a literature review to a conceptual framework for sustainable supply chain management. J. Clean. Prod. 16, 1699–1710.
Siemieniako, D., Mitrega, M., 2018. Improving power position with regard to non-mediated power sources - the supplier's perspective. Ind. Market. Manag. 70, 90–100.
Sodhi, M.S., Tang, C.S., 2019. Research opportunities in supply chain transparency. Prod. Oper. Manag. 28 (12), 2946–2959.
Susanty, A., Sirait, N.M., Bakhtiar, A., 2018. The relationship between information sharing, informal contracts and trust on performance of supply chain management in the SMEs of batik. Meas. Bus. Excell. 22 (3), 292–314.
Svensson, G., Wood, G., Callaghan, M., 2010. A corporate model of sustainable business practices: an ethical perspective. J. World Bus. 45 (4), 336–345.
Swift, C., Guide Jr., V.D.R., Muthulingam, S., 2019. Does supply chain visibility affect operating performance? Evidence from conflict minerals disclosures. J. Oper. Manag. 65 (5), 406–429.
Touboulic, A., Chicksand, D., Walker, H., 2014. Managing imbalanced supply chain relationships for sustainability: a power perspective. Decis. Sci. J. 45 (4), 577–619.
Veit, C., Lambrechts, W., Quintens, L., Semeijn, J., 2018. The impact of sustainable sourcing on customer perceptions: association by guilt from scandals in local vs. offshore sourcing countries. Sustainability 10 (7), 2519.
Vluggen, R., Gelderman, C.J., Semeijn, J., Van Pelt, M., 2019. Sustainable public procurement—external forces and accountability. Sustainability 11 (20), 5696.
Walker, H., Di Sisto, L., McBain, D., 2008. Drivers and barriers to environmental supply chain management: lessons from the public and private sectors. J. Purch. Supply Manag. 14 (1), 69–95.
Waller, M.A., Fawcett, S.E., Johnson, J.L., 2015. The luxury paradox: how systems thinking and supply chain collaboration can bring sustainability into mainstream practice. J. Bus. Logist. 36 (4), 303–305.
Wieland, A., Handfield, R.B., Durach, C.F., 2016. Mapping the landscape of future research themes in supply chain management. J. Bus. Logist. 37 (3), 205–212.
Williams, W., Lewis, D., 2008. Strategic management tools and public sector management. Publ. Manag. Rev. 10 (5), 653–671.
Wolf, J., 2014. The relationship between sustainable supply chain management, stakeholder pressure and corporate sustainability performance. J. Bus. Ethics 119 (3), 317–328.
Wong, C.W.Y., 2013. Leveraging environmental information integration to enable environmental management capability and performance. J. Supply Chain Manag. 49 (2), 114–136.
Wong, J.P.H., Poon, M.K.L., 2010. Bringing translation out of the shadows: translation as an issue of methodological significance in cross-cultural qualitative research. J. Transcult. Nurs. 21 (2), 151–158.
Wong, C.W.Y., Lai, K.H., Shang, K.C., Lu, C.S., Leung, T.K.P., 2012. Green operations and the moderation role of environmental management capabilities of suppliers on manufacturing firm performance. Int. J. Prod. Econ. 140, 283–294.
Wu, Z., Pagell, M., 2011. Balancing priorities: decision-making in sustainable supply chain management. J. Oper. Manag. 29, 577–590.
Yeung, J.H.Y., Selen, W., Zhang, M., Huo, B., 2009. The effects of trust and coercive power on supplier integration. Int. J. Prod. Econ. 120, 66–78.
Zailani, S., Jeyaraman, K., Vengadasan, C., Premkumar, R., 2012. Sustainable supply chain management (SSCM) in Malaysia: a survey. Int. J. Prod. Econ. 140, 330–340.
Zhang, T., Choi, T.M., Zhu, X., 2018. Optimal green product's pricing and level of sustainability in supply chains: effects of information and coordination. Ann. Oper. Res. 1–26.
Zhao, R., Chen, S.-Z., 2012. Willingness of farmers to participate in food traceability systems: improving the level of food safety. For. Stud. China 14 (2), 92–106.
Zhao, X., Huo, B., Flynn, B.B., Yeung, J.H.Y., 2008. The impact of power and relationship commitment on the integration between manufacturers and customers in a supply chain. J. Oper. Manag. 26, 368–388.
Zhou, H., Benton Jr., W.C., 2007. Supply chain practice and information sharing. J. Oper. Manag. 25 (6), 1348–1365.
Zhou, H., Shou, Y., Zhai, X., Li, L., Wood, C., Wu, X., 2014. Supply chain practice and information quality: a supply chain strategy study. Int. J. Prod. Econ. 147, 624–633.