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Design of Multi-Criteria Decision Framework for Supplier Evaluation and Supply Chain Sustainability Risk (SCSR) Management

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Abstract

This study aims to design a supplier evaluation framework to proactively manage the supply chain risk on three sustainability dimensions: environmental, social, and economic. Over the last few decades, multiple studies have focused on supplier evaluations, but very few have addressed them from a sustainability perspective in the supply chain. Using responses from the executives of a case company that manages a short food supply chain and sources black tea from various suppliers, we developed a multi-criteria decision framework to evaluate and analyze suppliers based on their performance against supply chain sustainability risks. The framework is operationalized using the Analytical Hierarchy Process (AHP) method. Literature reviews and expert opinions were used to identify criteria and sub-criteria for evaluating three suppliers, representing approximately 70% of the total tea sourced by the case company in the UK. The data was collected from the executives working in a tea procurement and supply chain division of the chosen company. The responses were processed to rank three leading suppliers based on performance in three dimensions of sustainability. The study helped the company effectively and efficiently prioritize supply chain sustainability risks in this division. The proposed framework provides a powerful tool for making SCSR decisions in similar contexts.

Keywords: Sustainability, Supply Chain, Multi-Criteria Decision, Analytic Hierarchy Process

1. INTRODUCTION

Risk is among the most researched topics in the Supply Chain literature (e.g., Tang, 2006; Wu and Blackhurst, 2009). Most of the literature focused on addressing one or more of the operational issues, such as demand risk, manufacturing risk, financial risk, macro risk, information risk, and transportation risk (Ho et al., 2010). Literature has focused on managing sustainability-related risks associated with supplier quality problems, delivery failures, and supplier financial defaults (Manuj and Mentzer, 2008). Hoffman et al. (2014) highlighted that literature has largely neglected sustainability issues within supply chain risks, aside from a few notable exceptions. Very recently, researchers started to point out that the nature of sustainability-related risks is distinctive, and therefore, traditional risk management approaches may not be adequate to deal with it (Hoffmann et al., 2014; Giannakis and Papadopoulos, 2016; Rafi-Ul-Shan et al., 2018). In addition, common sustainability-related risks such as environmental damages during logistics and transportation, boycotts against a company's products, non-compliance with laws, unethical behaviour, social justice risks, business scandals, unethical

treatment of animals, environmental malpractice, price fixing, bribery allegations, and fraud, etc. are rarely addressed in supply chain risk literature (Anderson, 2005; Hoffmann et al., 2014). It is, therefore, important to fully understand the unique nature of sustainability-related supply chain risks to design and develop effective risk management practices. Researchers studied sustainable supply chain management, focusing on one of a mix of three pillars of sustainability, viz. environmental, social, and economic (Khan et al., 2021; Sharma et al., 2020). In recent years, Short Food Supply Chains (SFSCs) have received attention from researchers due to local characteristics (Hendry et al., 2019) and ecological, environmental, and social dimensions (Enjolras and Aubert, 2018). SFSC can help achieve various objectives of the United Nations Agenda for Sustainable Development (Ilieva, 2017; UNIDO 2020). There are three types of SFSCs (Marsden et al., 2000). First is Direct-to-consumer SFSCs, wherein trust and authenticity are ensured via personal interactions because the consumer directly buys the product from the producer. Second is Proximate Intermediate SFSCs, wherein local intermediaries move products from the local producer to the consumer. Third is Spatially Extended Intermediate SFSC, where the producer and the consumer or point of sale are not necessarily local. However, information about the producer and the facility is communicated to the consumer. In this study, our focus is on the third type of SFSC. Renkema and Hilletofth (2022) suggested that intermediate SFSCs can play an important role in creating sustainable food supply chains. They also highlighted a significant gap in the literature in this direction. Further, various studies covered the environmental, economic, and social impact of SFSC but did not investigate it through empirical research (Doernberg et al., 2022). There are a few empirical studies, but they either focused on the specific type of SFSC or one of the dimensions of sustainability and lack the integration of all the dimensions together (Michel-Villareal et al., 2019; Luo et al., 2022 -Table 8: Cluster 6). For example, according to Krishnan et al. (2020), the food supply chain must be redesigned to improve environmental sustainability. Sellitto et al. (2018) suggested shortening the food supply chain to improve the quality and traceability of products. The environmental dimension is studied extensively compared to social and economic dimensions, neglecting the social dimension that covers the safety of workers, labour rights, personal welfare, etc. (Luo et al. 2022). The study of Michel-Villarreal (2023) calls for more case studies to develop an understanding of the interaction between sustainability and resilient SFSCs. Using semi-structured interviews, Michel-Villarreal (2023) found that sustainability can positively enhance the resilience of SFSC and vice versa. During disruptions like COVID-19, supply chain resiliency determines its capacity to sustain its performance on the three dimensions of sustainability (Negri et al., 2021). Sustainability was the enabler of resilience in food supply chains during COVID-19 (Kazancoglu et al., 2021).

This study aims to design a supplier evaluation framework to proactively manage the supply chain risk pertaining to sustainability across its environmental, social, and economic dimensions. Workshops and discussions were conducted with the executives of a case company that manages an intermediate short food supply chain. The framework can be used to describe and explain "how" any buying firm can design and implement a proactive decision-making framework to manage sustainability-related supply chain risk. The buying firm (or Focal organization), especially from Western countries, faces substantial stakeholder pressure to ensure sustainability across its supply chain (Busse et al., 2017). They risk reputational loss, adverse publicity, and investment loss if found to be associated with a supplier not following sustainable practices (Bregman et al., 2015). The buying firm is supposed to take ownership beyond its operations and include tier-I (Foerstl et al., 2010) and tier-II suppliers (Hartman and Moeller, 2014). The stakeholders expect them to monitor and manage these suppliers through various influencing strategies and governance mechanisms (Jeppesen and Hansen, 2004; Welford and Frost, 2006; Kortelainen, 2008). They are also expected to go beyond supplier self-declaration and encompass effective identification, assessment, and monitoring measures (Green et al., 1996; Jiang, 2009). Buying firms are over-exposed to sustainable supply chain risk in today's global sourcing era with ubiquitous information availability (Busse, 2016). Thus, non-compliance to sustainability poses a risk to buying firms, referred to here as SCSR, and is defined as "*a condition or a potentially occurring event*" residing "*within a focal firm's supply chain*" which can "*provoke harmful stakeholder reaction*" (Hofmann et al., 2014, p. 168). Although many companies appear to have recognised the importance of SCSR, managing the issue can be very difficult. Even in simple dyadic buyer-supplier relations, a buying firm does not have complete knowledge about its suppliers (Busse et al., 2017). Global supply chains are complex entities, and buying firms are often unaware of sustainability misconduct by their Tier-I or Tier-II suppliers in this complex network (Meinlschmidt et al., 2016). In order to avoid reputation and financial losses, the buying firms have to proactively manage sustainable supply chain risks (Hutchins and Sutherland, 2008). Therefore, these risks emphasize the need for companies to adopt and develop sustainable supply chain management approaches to minimize brand and financial damage (Hutchins and Sutherland, 2008). This study tries to operationalize the following questions using a problem faced by a case company managing a short food supply chain.

1. What are the most important and applicable SCSR evaluation criteria under the three dimensions of sustainability, viz. environmental, social, and economic?
2. How can a buying firm select relevant SCSR evaluation criteria?

3. How can a buying firm rank suppliers using selected SCSR evaluation criteria and a multi-criteria decision framework?

To address the research questions, a comprehensive review was conducted to identify the sustainability-related supply chain risk evaluation criteria from the literature. We then adopted a case-study approach, where we collected data from senior executives in a Tea procurement and supply company based in the UK to identify the sustainability-related supply chain risk evaluation criteria. Through a real case problem from a single company, this study uses a common research strategy (Ghauri and Gronhaug, 2002) in the business discipline. A common research strategy is defined as "*a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon into its real-life context*" (Robson, 1993: p52). The case study technique has a unique benefit in scenarios with a "how," "which," and "what" inquiry (Yin, 2014). The case study approach is also relevant when researchers respond to descriptive or explanatory questions. We analysed the data using AHP (a multi-criteria decision-making method) to prioritize the risks and rank key suppliers.

This research makes three main contributions to the literature. The first is identifying the criteria that can be used in the decision-making process considering SCSR and the design of the MCDM framework. The second contribution consists of applying the proposed framework, in combination with experts' opinions within a case company, and assessing key suppliers. Finally, the proposed study reinforces the literature on MCDM application, providing a tool to make more accurate decisions while considering SCSR and risk management, fostering sustainable development.

The following section (Section 2) discusses the relevant literature to identify criteria and sub-criteria for supplier evaluation. Details of the case company are provided in Section 3. The details related to the operationalization of the supplier evaluation in the case company are provided in Section 4. Section 5 discusses the results and their implications. Section 6 covers the limitations of the study and future research directions. Section 7 concludes the paper.

2. LITERATURE REVIEW

Risks in the supply chain have been investigated in various contexts (e.g., Hallikas et al., 2002; Tang, 2006; Wu and Blackhurst, 2009). Ho et al. (2010) identified seven categories of supply chain risks from the literature. They found that supply risk is the most widely studied risk type, followed by demand risk, manufacturing risk, financial risk, macro risk, information risk, and transportation risk. These events causing supply risk can originate within a company, such as workforce strikes, equipment breakdowns, or facility fires. They may also originate outside the company, such as natural disasters,

political crises, or supply shortages (Shrivastava et al., 1988). It is true that as the dependency of companies increases on external entities, risk type and its magnitude also depend on the functioning of external entities and their environment (Pfeffer and Salancik, 1978). Hoffmann et al. (2014) and Rafi-Ul-Shan et al. (2018) argue that the nature of sustainability-related risks is distinctive; therefore, traditional risk management approaches may not be adequate to deal with them.

Sustainable Supply Chain Management (SSCM) reduces exposure to certain types of risks and improves company performance (Mani et al., 2018). 'Our Common Future' (WCED, 1987), or the 'Brundtland Report,' as commonly known, marked a significant shift to connect environmental, social, and economic policy goals. Many scholars refer to the keyword 'sustainability' and draw upon the definition of sustainable development provided by the Brundtland Report, which is "*Development that meets the needs of the present without compromising the ability of future generations to meet their own needs*" (WCED, 1987, p. 40). Although the studies on SSCM focus on the three dimensions of sustainability – economic, environmental, and social, the social aspect is not given adequate attention because of the complex human issues involved (Seuring and Muller, 2008; Luo et al., 2022).

The social and environmental criteria within SSCM are often embraced to tackle other and related risks in the supply chain, such as human rights abuse or pollution litigation and its subsequent reputational damage (Roehrich et al., 2014). The topic of SSCM is increasingly linked to supply chain risk management (SCRM) (da Silva et al., 2020). This is also evident from early remarks made by Matten (1995) in his work on environmental risk management in business and the work of Teusher et al. (2006), which examined social risk management in the soybean supply chain. However, much of the work in SCRM has focused on managing risks associated with supplier quality problems, delivery failures, and supplier financial defaults (Manuj and Mentzer, 2008).

Hoffman et al. (2014) highlighted that other than a few notable exceptions, the discussion of SCRM has largely neglected sustainability issues within supply chain operations. They identify that current supply chain risk management frameworks do not provide insight into how sustainability issues materialise as risks. In addition, the framework also fails to delineate specific risk management approaches with identification and assessment focussing on operational and financial criteria. Anderson (2005) and Anderson and Anderson (2009) provided seminal articles advocating that any risk management strategy should incorporate sustainability-related risks. However, their work focused on minimizing the adverse effects of poor performance of sustainable practices purely from a financial perspective. Companies may experience severe losses from social, ecological, or ethical problems that exist in their supply chain, as was evident from a recent case of British Retailer Boohoo when allegations of long hours and low wages in their supply chain sparked a £1bn hit to its share price (Sillars, 2021). A more prominent example is Apple, a revered supply chain master, which has also

suffered because of poor sustainability standards in its supply chain. Considering supply chain accolades, such examples underscore that traditional risk management approaches fail to effectively address and tackle sustainability issues in supply chains (Hoffman et al., 2014). Therefore, it is important to understand the unique nature of SCSR and the associated typical risks to design and develop effective management practices to manage these risks.

Hoffmann et al. (2014) proposed a four-stage process of SCSR management starting with a negative sustainability-related condition or event within the upstream supply chain, followed by the development of awareness among stakeholders, stakeholders ascribing to the buying firm enough responsibility to prevent such events or conditions, and stakeholders decide to take punitive action. It is more likely for an SCSR to materialise and become prominent when communicated by sources such as the media or NGOs (Busse et al., 2016a). For the first stage, Hofmann et al. (2014) consider various conditions related to negative sustainability, viz. "*(i) social issues (relating to working conditions and compensation); (ii) ecological issues (input-related aspects, such as energy consumption, or resource utilization, as well as production output-related aspects, such as emissions and recycling) and (iii) ethical business conduct issues (corruption and business connections to dubious individuals or firms)"* (p. 168). They also highlighted a series of business scandals related to social-risk events such as child/forced labor, animal cruelty, environmental malpractice, price fixing, bribery allegations, and fraud. Giannakis and Papadopoulos (2016) distinguish between typical supply chain risks and those specifically related to sustainability. They additionally separated the sustainability risks into two main categories: endogenous risks caused by the company's activities and exogenous risks brought about by a company's interaction with its external environment. They elaborate that these sustainability-related risks consider consequences on the natural ecosystem, corporate reputation, financial exposure, and compliance with laws rather than disruptions in the supply chain operations. They also explained that a distinctive characteristic of these types of risks is that they may damage companies without causing (or the cause of) any significant disruption in the operation.

A few research studies have also drawn the essence from the report by the United Nations Global Compact and BSR (2010) that outlined common sustainability-related risks, viz. greenhouse gas emissions, natural disasters, accidents, energy consumption, packaging waste, and environmental damages during logistics and transportation. Anderson (2005) highlighted other "sustainability" risks, including boycotts against a company's products, non-compliance with laws or unethical behavior, social justice risks arising from unfair employment and working practices, and increases in commodities and energy prices due to fuel shortage. Researchers have pointed out that stakeholders hold buying firms accountable as they possess gatekeeper instruments (i.e., supplier codes of conduct, contracts) and processes (i.e., supplier selection, evaluation, development) to influence their suppliers'

behaviour (Klassen and Vereecke, 2012; Busse et al., 2016b). da Silva et al. (2020) undertook an extensive literature review concerning risk management and sustainability and identified three primary topics: supplier selection, supplier development, and supplier evaluation for sustainability-related supplier risk management (SSRM). Similarly, Sawik (2013) concluded that supplier selection, development, and evaluation are essential in designing effective risk mitigation strategies.

Hoffman et al. (2014) claim that although sustainability-related risks are easy to identify, an initial assessment of their impact on corporate performance is a complex process because assigning a monetary value to human capital, the environment, and corporate reputation is difficult. Considering this, Rao and Goldsby (2009) suggest inductive methods that use expert opinions, which is a more appropriate technique than operational or financial performance. However, sustainability-related risk treatment focuses on eliminating the negative consequences to a company's brand, image, or shareholder value (Anderson, 2005). For instance, in the typical risk management framework, risk can be managed in four different ways, viz. avoid (e.g., drop or not select suppliers), control (prevent risk through reduction of the probability of a risk occurring, e.g., supplier development program), share (risk pooling with suppliers, e.g., multilateral supply chain agreement) and retain (acceptance of the potential damage that will be incurred by risk event, in cases where the actual cost of treatment would be higher than damage) (Giannakis and Papadopoulos, 2016). The first three treatments are acceptable considering SCSR. However, it is possible that the last mitigation option, "retain," may not be acceptable for certain types of risks, like risks related to child labour, even if the cost of risk mitigation is too high.

Using the supply chain risk management framework of Ritchie and Brindley (2007), Foerstl et al. (2010) integrated the established approaches to SCRM, with particular attention to SCSR. Similarly, Hofmann et al. (2014) and da Silva et al. (2020) focused on stakeholders and the role they play when identifying and assessing the risk (i.e., the initial two phases). To identify, assess, and manage SCSR, companies must recognise stakeholders' differing perspectives, values, and expectations (Wu et al., 2014). It is challenging for the buying firm to address all the issues related to sustainability because firms often have to manage large portfolios of suppliers spread around the globe (Bode and Wagner, 2015). Therefore, prioritizing SCSR in this context is paramount for the buying firm to constrain excessive complexity. Busse et al. (2017) offer guidance for identifying SCSR priorities with a procedural model. Their idea behind the procedural model is to identify SCSR through iterative supply chain processes and stakeholder analysis to reduce the complexity associated with numerous stakeholders.

A starting step in the prioritization of SCSR is to determine the scope of the supply chain, followed by identifying which stakeholders should be given consideration. After that, specific criteria

needed to be identified to mitigate SCSR. Busse et al. (2017) suggest that pragmatic assumptions need to be made about those supply chain stages that need to be considered as potential sources of SCSR. After determining the scope of the supply chain, stakeholder analysis is required. The buying company might have many stakeholders, so it is necessary to prioritize the stakeholders (Gualandris et al., 2015). Stakeholder theory views the company as an enterprise from which numerous participants with different interests obtain benefits (Hoffman et al., 2014). Commonly cited stakeholder groups include owners, managers, employees, suppliers, customers, competitors, local communities, activist groups, the media, governmental actors, and the planet's environment (Donaldson and Preston, 1995). Busse et al. (2017) expanded and proposed a differentiation between two critical types of stakeholders that should be considered together. The authors label them "deprived" and "advocating" stakeholders. The notion of "deprived stakeholders" is used to refer to powerless stakeholders with urgent and legitimate claims within the supply chain, such as a case of child labor. The term "advocating stakeholders" refers to the influential stakeholders who do not possess any urgent or legitimate claims of their own and whose position is only adjacent to the supply chain, such as NGOs and media, but use their power to support them and have their claims considered. These claims may trigger punishing reactions from reciprocal and dominant stakeholders such as consumers. Busse et al. (2017) believe that focusing on deprived stakeholders is the first step in stakeholder analysis because the buying company is often deemed responsible for any wrongdoing by deprived stakeholders.

Research has found that firms also leverage the expertise and skills of stakeholders, resulting in informed managerial decision-making (Roloff, 2008; Sarkis et al., 2011). Wong et al. (2015) argued that the feedback from stakeholders is critical because sometimes they know more about the environmental problems facing part of the supply chains than the focal firm. Stakeholders can aid and develop policies, engage in evaluation and monitoring, and identify potential improvements regarding sustainability. In the context of SCSR, leading companies proactively search for valuable information that helps them identify their SCSR by constantly scanning the environment or by conducting regular stakeholder consultations and round-table discussions (Foerstl et al., 2010; Meinlshmidt et al., 2016). Companies must be responsive to changes in regulations and stakeholder demands to identify sustainability risks and adapt risk assessments to the resulting risk management responses. Researchers believe that considering stakeholders' perceptions may demand more proactive anticipation of risks based on social psychology and not merely mathematical rationalism (da Silva et al., 2020). Within decision theory, considering psychological bias alongside rational analysis is referred to by French et al. (2009) as prescriptive decision modeling. SCSR is important for companies, and prior SCSR research mostly ignored stakeholders as valuable resources for SCSR identification (Busse et al., 2017). Our study embraces stakeholder involvement as critical to the management of SCSR.

After completing these three steps (determining the scope of the supply chain, identifying which stakeholders should be considered, and identifying specific criteria applicable in mitigating SCSR), suppliers needed to be evaluated using the identified criteria and/or sub-criteria. da Silva et al. (2020) undertook an extensive literature review concerning risk management and sustainability. They identified three major activities, viz. supplier selection, supplier development, and supplier evaluation for sustainability-related supplier risk management. da Silva et al. (2020) further explained that supplier evaluation involves rating suppliers' compliance, while supplier selection involves screening suppliers. In addition, supplier development activity needed to be initiated if there were compliance issues with a few/all suppliers. The objectives of evaluating and ranking suppliers are articulated well by Govindan et al. (2018) which are as follows.

- Assess supplier's performance to reward suppliers who meet expectations with ongoing and future supply relationships.
- Provide accurate feedback to suppliers to identify their strengths and weaknesses, which can be used as an effective and continuous improvement tool.
- Providing feedback to suppliers from all aspects and specific action could be taken to identify the performance weaknesses.
- To identify weak suppliers for further development.

The quality of the supplier evaluation process depends on selecting the appropriate criteria (Rezaei et al., 2016). Ho et al. (2010) undertook a literature review on 78 articles between 2000 and 2008 and identified frequently used criteria like quality, delivery, price/cost, manufacturing capability, service, management, technology research and development, finance, flexibility, reputation, relationship, risk, and safety and environment. Researchers and practitioners have extended the list further in recent years by including criteria reflecting sustainability, green practices, and risk (Kara & Firat, 2018).

In particular to the short food supply chain, Enjolras and Aubert (2018) investigated interactions between SFSCs and ecological, environmental, and social dimensions of sustainable development in French fruit production. They estimated a simultaneous equations model using three different composite indicators for each dimension and evaluated the degree of sustainability at the farm level. They found that the conflict between economic sustainability and environmental and social sustainability challenges supply chain design in the agriculture sector. According to Renkema and Hilletofth (2022), the main idea of SFSC is to have the closest relationship between producer and consumer. Conversely, SFSCs are different from conventional agri-food systems in the supply of

organic and local food, small-scale production, and social and spatial information (Thome et al., 2021). According to Sellitto et al. (2018), there are nine critical success factors that characterize SFSC. They are 1) origin identification of products; 2) food safety and traceability; 3) organic production; 4) environmentally friendly operations; 5) cultural heritage; 6) specificity of territorial brands; 7) consumer health; and 8) local work, co-operation, and pride; 9) direct and ethical relationships between producers and consumers.

To improve the sustainability aspect of the food supply chain, SFSC is emerging as a better alternative to the industrialized agri-food supply systems (Wang et al., 2022). Studies explored the relationship between SFSCs and sustainability, but mainly on the theoretical front and lack empirical investigations. In addition to the traditional three dimensions of sustainability, Wang et al. (2022) considered two additional dimensions, viz. governance and culture, while exploring sustainability in the food supply chain systems.

Researchers carefully recognized sustainability's economic, environmental, and social dimensions while evaluating suppliers (Wetzstein et al., 2016; Govindan et al., 2018). The current research cross-referenced the factors from the academic literature against SEDEX (a leading commercial supply chain sustainability management agency that the case company has recently engaged to help progress its SCRM). The results confirmed that the main factors in the academic literature correspond with those currently being used in practice. In line with the work of Giannakis and Papadopoulos (2016), the objective of this research is not to give an exhaustive list of sustainability-related risks. However, it provides a breadth of sustainability-related issues that must be considered for managing supply chain sustainability risks. Additionally, in line with the work of Busse et al. (2017), although sustainability performance levels and expectations vary substantially around the globe (e.g., concerning the question of which level of resource scarcity or which frequency of operational hazards is socially acceptable or not), the points listed in Table 1 represents the most widely accepted sustainability-related issues. From the literature (Giannakis and Papadopoulos, 2016; Anderson, 2005; Hoffman et al., 2014; Busse et al., 2017; United and BSR, 2010; SEDEX, 2021), our research has compiled a list of possible risks associated with SCSR under the three main categories which are given in Table 1.

After identifying the criteria for supplier evaluation, any MCDM method can be used to evaluate the suppliers based on these criteria. MCDM methods are suitable for evaluating discrete alternatives based on qualitative and quantity criteria and using the decision maker's expertise. Dickson (1966), in his seminal work, recognises the suitability of MCDM methodologies in addressing supplier evaluation problems. The MCDM methodologies assist in making optimal decisions and satisfying predefined criteria (Azadfallah, 2017). The literature is filled with the usage of a combination of

various MCDM methods in supplier evaluation and selection (Kara and Firat, 2018) like Analytical Hierarchy Process (AHP), Analytic Network Process (ANP), Data Envelopment Analysis (DEA), Technique for Order Performance by Similarity to Ideal Solution (TOPSIS), Mathematical Programming Models such as linear programming, integer programming, multi-objective programming and goal programming, Neutral Network (NN) and Fuzzy Logic. All methodologies differ in their axiomatic foundations and can be applied in different contexts. Sonmez (2006) examined different decision-making methods and identified the AHP method as one of the most used methods for the supplier evaluation problem. Similarly, Yahya and Kingsman (1999) found that the AHP method is more practical and flexible than any other method for solving complex decision-making problems. AHP was proposed by Saaty (1980). AHP helps to simplify a complex problem by dividing it into a multilevel structure. The method allows factors/variables to be weighted in terms of importance, and several studies have used AHP to produce robust results in different applications for the prioritization of factors/criteria and risk (Khan et al., 2018). Mangla et al. (2015) applied AHP to prioritise the green supply management risks. Mani and Sharma (2014) successfully applied AHP to prioritise social sustainability criteria for selecting the best supplier. These studies provide sufficient details on how the AHP method is employed in supplier evaluation and rank order. AHP simplifies the complex multi-criteria problem into a hierarchical structure with multiple levels (Cebi and Bayrakar, 2003). There are many MCDM methods that can be used to evaluate suppliers on given criteria. However, these MCDM methods are either complex or iterative in terms of expert preference elicitation (Dhurkari, 2022). Contrary to this, the AHP method is simple to understand and easy to use. As most of the criteria are qualitative in our case, without specific performance measures of suppliers on those criteria, the AHP method is suitable to gauge experts' opinions and preferences. The pairwise comparisons of the AHP method foster credibility in the prioritisation process. As AHP is a popular MCDM method, we are not going to discuss the details and operationalisation of AHP in solving an MCDM problem.

=======INSERT TABLE 1 HERE=======

3. THE CASE COMPANY – DINGDONG INC

Dingdong Inc. (the name has been disguised for privacy reasons) is a UK-based family business procuring, manufacturing, supplying, and retailing tea and associated products. The company retails tea to over 250,000 customers through its brand via a unique direct-to-consumer doorstep model. The business also has long-term supply relationships with some of the UK's leading supermarkets for their label tea products. Dingdong has built a strong reputation on quality and trust. The tea they source is of the highest quality, allowing them to retain major customers over long periods. However, as with

many other industries, increasing awareness of environmental protection and increasing attention to social problems requires Dingdong to closely consider these aspects along with the typical economic factors while evaluating suppliers and managing the associated risks.

This requirement is compounded for Dingdong because a few suppliers control the geographical origins of producing certain tea leaves, which are critical to Dingdong's unique quality and flavor profile. Therefore, dropping suppliers and looking elsewhere is not always possible (or is only considered a last resort). At the same time, there is a need to focus on sustainability-related risks because of stakeholders' growing awareness and expectations. Kara and Firat (2018) showed that increasing awareness about sustainability and rising risk exposure levels drive companies to consider risk factors and the three pillars of sustainability in their supplier evaluation process. Similarly, Dingdong must thoroughly evaluate its suppliers on sustainability-related risk criteria. Dingdong is facing the serious question of "How Should Dingdong Design and Implement a Supplier Evaluation Framework to Manage Supply Chain Sustainability-related Risks?". AHP is a suitable method for Dingdong to evaluate suppliers. Supplier evaluation using AHP will likely help Dingdong proactively manage sustainability-related risks and reduce the chances of irresponsible supplier behavior being projected onto them and the negative consequences. Applicable criteria for evaluating Dingdong's suppliers can be identified in Table 1.

Finally, we would like to highlight that some studies in this field have used the AHP and Delphi methods to identify the criteria and sub-criteria. Our study relied on workshops and experts' consensus when analysing and identifying relevant criteria and sub-criteria. The Delphi method is often used to obtain expert opinion by repeating steps until there is a consensus (Mitchell, 1991). The Delphi method overcomes the potential disadvantage of an outspoken person or collective group thinking dominating the outcome by allowing experts to respond anonymously (Kim et al., 2013). In contrast, in our study, experts met in one place to reach a consensus. The detailed operationalization of the AHP method for the supplier evaluation of Dingdong is provided in the next section.

4. SUPPLIER EVALUATION AT DINGDONG USING AHP

We used a mixed research method (a combination of qualitative and quantitative methods). The qualitative method explored SCSR and Dingdong's problems and context. This was administered using semi-structured interviews and workshops, which led to the design of the decision hierarchy. The quantitative method was administered through a questionnaire to elicit preference using the decision hierarchy and the AHP method.

This research draws upon the work of Busse et al. (2017), which involved mapping the supply chain and analyzing the stakeholders to prioritize and constrain excessive complexity. In this step, an

interview with Dingdong's Chief Operating Officer (COO) was conducted to understand if any stages of the supply chain needed to be considered as potential sources of SCSR and which stakeholders should be identified considering SCSR and potential damage. The literature review established the unique nature of these risks and appropriate management.

According to Kara and Firat (2018), studies in the literature either use a single decision maker or multiple decision makers for the supplier evaluation problem. The COO of Dingdong selected three other experts from the procurement and sustainability departments. Four decision-makers (one souring assurance and sustainability manager and two tea-buying managers) were finally selected to prioritize the elements of the decision hierarchy.

The first step in supplier evaluation is identifying and establishing the criteria (Farzad et al., 2008). Using Table 1, a list of widely used criteria for SCSR was prepared. Next, all potential risks in the context of Dingdong's supply chain system were discussed. Multiple actors from within Dingdong were carefully chosen to obtain an in-depth perspective on the subject. We used systematic sampling because it is important to identify and select individuals based on their roles, positions, or profiles. A group of experts from Dingdong were invited to a workshop. The list of SCSRs were presented, and experts were requested to discuss and consider these risks in the context of Dingdong's supply chain system. The workshop was conducted with four experts. Initially, the experts were asked to rate each criterion using the four-point scale of “Not important (1 to 3)”, “Some-what important (4 to 5)”, “Important (6 to 7)”, and “Very important (8 to 9)” (Farzad et al., 2008). The goal of the process was to establish the final list of important SCSR criteria that can be used in the AHP framework and analysis. Figure 1 shows the results of this exercise.

After that, experts were given practice sessions to consider and determine the priority weight of each criterion using the pair-wise comparison of AHP. The participants were asked to define their preferences on the relative importance of different criteria and sub-criteria. Moreover, the questionnaire and workshop questions highlighted the primary purpose of the current study and an example to explain how to answer the survey questions, as recommended by Rattray and Jones (2007) and Finset et al. (2002).

After the initial round of interviews and workshops, a decision hierarchy was constructed comprising the goal, criteria, sub-criteria, and alternatives. In the case of Dingdong, the goal is to evaluate the risk exposure of the key suppliers, considering SCSR, and rank-order the suppliers based on their risk exposure. As identified in Section 2, the criteria for evaluation can be broadly divided into three, viz. environmental, social, and economic/financial, thus covering the three main pillars of sustainability. The alternatives (suppliers) are placed at the lowest level of the hierarchy.

=======INSERT FIGURE 1 HERE=======

Dingdong retails and supplies several major supermarkets with blended black tea, covering a significant business. The application context matches the ideal context conceived theoretically because stakeholders, such as consumers, first scrutinize food and agriculture supply chains for sustainability and react very sensitively to grievances (Beske et al., 2014). Second, the major supermarkets, particularly one key partner, have recently emphasised supply chain visibility as a major concern. The problem of low visibility is common in retail (Barrat and Oke, 2007). Intermediary supply chain steps, such as import, trade, or wholesale, were neglected in the SCSR screening when it became evident that they presumably did not involve deprived stakeholders. Since the case company is managing a short food supply chain, packaging or labelling materials were excluded as any sustainability-related issues concerning these products would unlikely be attributed to Dingdong, given that the production of such products is primarily out of their control and simultaneously used by many other companies.

During the stakeholder analysis, the COO confirmed one current scenario where they have significant pressure from a powerful stakeholder (a major customer) who, in turn, was reacting to the pressures of another powerful stakeholder (consumers). These consumers were reacting to a newspaper article about serious human rights abuses at a major supplier of black tea in Malawi. This scenario follows the theory of Busse et al. (2017) when a "deprived" stakeholder (tea farmers in Malawi) has their claims communicated by an "advocating" stakeholder (media), triggering a reaction from "dominant" stakeholders (major customers/consumers). The dominant stakeholder reaction was initially to boycott supply from the origin until the matter was resolved, which is not an uncommon response (Beske et al., 2014). Given the relevance of this scenario, it was decided to use the specific dominant stakeholder as the major customer for this research, considering several relevant factors discovered. In addition to the factors described above, this major customer business partnership with Dingdong equated to approximately 33% of total KG tea production and 28% of revenue within the tea packing division, representing a critical and strategic partnership. They were also the largest and longest-serving customer with more than 30 years of association. The customer also represents a typical supply relationship, providing black tea to core supermarkets. Therefore, the supply origins and, thus, the suppliers under assessment are also supplying to other business units of Dingdong. In addition, this point is further enhanced when the COO explains another critical reason. This customer is seen as an industry leader concerning sustainability across the business. Therefore, if Dingdong can align itself with the "best in class" within the industry, its confidence will be boosted as it will exceed the other customers' expectations and gain a competitive advantage. This customer's total tea volume in 2020 was 1.5m KG. Figure 2 shows the share of different origins in total tea production. Almost 90% of tea is sourced from three key origins: Kenya, Assam (India), and Malawi. Almost 86% of the tea business's revenue is connected with suppliers from these three origins (Figure 2). In addition,

these three origins also represent approximately 70% of Dingdong's total KG tea production for all customers, including Dingdong's brand. Therefore, it is an area that requires attention. The other origins were intentionally discarded because they represent only 10% (approximately) of the remaining tea sourcing. However, Kenya, Assam, and Malawi are key to the core black tea ranges, which have derived quality profiles in tea taste for Dingdong for decades. The supply of tea from these origins is largely controlled by three suppliers, one in each origin. It is critical to manage these relationships to ensure continuity of supply. These countries are also developing countries with many sustainability issues. All three regions rank low within the UN Human Development Index 2019, a statistical composite index of life expectancy, education, and per capita income. Among 189 countries, the rank of these three countries is Kenya - 143, India - 131, and Malawi -174 (United Nations HDI, 2021).

=======INSERT FIGURE 2 HERE=======

Initially, a list of 32 sub-criteria was presented to the experts during the first workshop for consideration and discussion. The results of the first workshop and survey with the four experts resulted in the shortlisting of 16 sub-criteria. Six sub-criteria were placed under environmental, six under social, and four under economic criteria. We have grouped these 32 criteria based on overall importance defined by the experts (scores 7+ are better). After determining the sub-criteria and the alternatives (three suppliers: Kenya, Malawi, and Assam), we devised the decision hierarchy provided in Figure 3. The reference list for sub-criteria is provided in Table 2.

After developing the decision hierarchy, the second workshop was scheduled, during which the AHP model and pairwise comparison were explained to the four experts. The experts were then asked to complete the pairwise questionnaire by reaching a consensus and using the ratio scale of 1 to 9. In the first step, experts compared the three criteria in a pair-wise manner, viz. Environmental, Social, and Economic. The normalised principal Eigenvector of the pair-wise comparison matrix resulted in the priority for each of the criteria, which are Environmental (0.429), Social (0.429), and Economic (0.143). The second step was to compare the sub-criteria pairwise under each main criterion. The normalised principal Eigen-vector for the paired comparisons between various sub-criteria listed in different criteria is provided in Tables 3, 4, and 5.

=======INSERT FIGURE 3 HERE=======

=======INSERT TABLE 2 HERE=======

=======INSERT TABLE 3 HERE=======

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After finding the local weights of each criterion and sub-criteria, the global weights of each sub-criteria are computed by multiplying the local weight of the sub-criteria with the local weight of the respective criteria. The multiplication gives the global weight of each sub-criteria (Table 6). The importance given to human rights (0.161) sub-criteria is highest, followed by water scarcity (0.153), child/forced labor (0.188), and heatwaves/droughts (0.118).

After that, a third workshop was conducted to elicit the experts' preferences on different alternatives concerning each of the 16 sub-criteria, separately and independently. In this step, suppliers were assessed using the AHP pairwise comparison with respect to each of the 16 sub-criteria, resulting in local priorities of alternatives with respect to each of the 16 sub-criteria. The sum-product of local priorities of alternatives with the global priorities of sub-criteria (Table 6) gives global priorities of alternatives (Table 7). The actual names of the suppliers are disguised in this paper in order to maintain confidentiality.

=======INSERT TABLE 6 HERE=======

=======INSERT TABLE 7 HERE=======

During the workshop, one of the authors was present to guide the participants on the preference elicitation process and how to control the inconsistency in preference structures. The final priorities of alternatives (Table 7) outrank supplier A, followed by suppliers B and C. Supplier A carries the least risk among the three suppliers, considering all SCSR. Figure 4 provides the suppliers' scores against all SCSR sub-criteria on a plotted graph, indicating the strengths and weaknesses of suppliers across different sub-criteria. If we analyze the performance of suppliers independently in three sets of sub-criteria, the results are different. Tables 8, 9, and 10 provide the performance of suppliers on each front, viz. Environmental, Social, and Economic respectively. From an environmental perspective, Supplier B is the best performing (0.228), but when we consider the social perspective, Supplier B is the weakest (0.072). This relationship is mirrored by Supplier A, which performs best (0.208) from a social perspective but is poor (0.096) from an environmental perspective (Figure 5). Considering these criteria separately, the rank order is (B, C, A) on the environmental front, (A, C, B) on the social front, and (A, B, C) on the economic front (Table 11). The rank order is (A, B, C) when all the criteria are considered together.

=======INSERT FIGURE 4 HERE=======

=======INSERT TABLE 8 HERE=======

=======INSERT TABLE 9 HERE=======

=======INSERT TABLE 10 HERE=======

=======INSERT TABLE 11 HERE=======

=======INSERT FIGURE 5 HERE=======

5. DISCUSSION AND IMPLICATIONS

This study tried to identify important criteria and sub-criteria for evaluating suppliers along the three dimensions of sustainability. This study also demonstrated the application of the AHP method in a specific case of a company (Dingdong, UK) that was facing difficulty in ranking the suppliers on various factors associated with sustainability. It is observed that the AHP method effectively addresses Dingdong's problems by clearly determining priority weights and ranking the key suppliers against SCSR. It is also observed that although Supplier A is the overall top-ranked supplier, it performs poorest on the environmental front in isolation with a score of (0.0962) vs Supplier B (0.2281) and Supplier C (0.1407). Similarly, Supplier B ranked second in the overall assessment but performed better than others on the environmental front. Further, supplier B (0.0724) is the lowest-scoring supplier in terms of social risks compared to Supplier A (0.2083) and Supplier C (0.1483). With the help of this information, Dingdong can be proactive in managing certain aspects of sustainability risks. For example, Supplier B should receive more attention on social risk than the other two suppliers. If required, the supplier can also be re-assessed on specific indicators to adjust to the dynamic environment in which businesses operate.

Further, the results of the supplier evaluation indicate that Dingdong's Indian supplier is ranked lowest in terms of SCSR. The COO also initially raised concerns about their inability to influence Dingdong's Indian suppliers on sustainability. Indeed, sustainability performance and expectations vary substantially around the globe (Busse et al., 2017). During the second workshop, a few experts also raised concerns over the differences between the supplier's expectations about their local market and those of entities based in the export market. This is important because approximately 90% of tea produced in supplier markets is consumed locally, and customers are not concerned about sustainability. This lowers the bargaining power of companies like Dingdong. According to 2019 data compiled by the World Bank (World Bank, 2022), the total tea exports of the country of Supplier A (i.e., Kenya) are approximately equal to 20% of that country's total exports. Similarly, it is 9% in the case of Supplier B (Malawi) and just 0.2% in the case of the most notable Supplier C (India).

The results obtained are useful for the case company to understand the risk associated with each of their suppliers. Also, it helps them develop a proactive plan to address those risks. The results also show that the overall country-level indices may not accurately reflect the individual supplier level, and specific information may help to make better judgments. This also helps them proactively address stakeholder concerns via internal communications early and avoid the risk of negative media attention. The results are useful for other companies procuring from multiple suppliers across the globe.

Policymakers can also use the proposed framework to help SMEs deal with sustainability within their supply chains.

However, big corporates with high bargaining power can enforce sustainability parameters into their supplier selection and monitoring, which not only increases their performance but also helps improve the social development of stakeholder countries (Mani et al., 2014). It will be interesting to investigate the determinants of stakeholder's bargaining power. According to the UN Human Development Index, India is better placed than the countries of the other two suppliers. However, the lack of bargaining power of companies like Dingdong can stifle developments on the sustainability front. In contrast, Kenya and Malawi are lower on the Human Development Index. However, their high reliance on tea exports forces them to comply with the industry standards and meet stakeholder's expectations.

One of the important benefits of this exercise is that Dingdong can now prepare and align itself with key customers and stakeholders, who are "best in class" on the sustainability front. By aligning themselves and meeting the expectations of the "best in class" customers, Dingdong can develop its internal sustainability capabilities and ensure it satisfies the expectations of other customers and the industry. Although this specific strategy was not identified in the literature review provided in section 2, it is consistent with the findings of Roloff (2008) and Sarkis et al. (2010) that companies leverage the expertise and skills of stakeholders and improve their managerial decision-making capabilities. We also believe such a strategy can enhance Dingdong's sustainability capabilities and better manage SCSR.

We also observed from the results that the social criterion related to human rights (0.161) was highest in Dingdong's priority, followed by child labour (0.118). This fact adds value to the proposition made by da Silva et al. (2020) that although social sustainability has been featured less in academia, it is unclear whether this is apparent in practice. da Silva et al. (2020) recognise that social sustainability issues such as child labour, unsafe working conditions, and modern slavery are mainstream issues in commercial supply chain management, and practice may be running ahead of theory in this matter. Therefore, we believe that this area demands more research and effort. Social issues in supply chain management research require exaggerated attention with increased awareness by various stakeholders. One of the reasons for the lack of research on the social front is the complexity inherent in social-human interactions, as highlighted by Mani and Sharma (2014). During one of the workshops, Dingdong experts also highlighted that although they can assess and prioritize the social criteria, they find it difficult to identify specific issues because some labourers are unaware that certain conditions are unacceptable and need reporting. Meinlschmidt et al. (2016) also highlighted that many supply chains have developed substantial complexity, and buying firms are unaware of sustainability

misconduct in their complex network of suppliers. Similarly, many stakeholders may be unaware that they are the victims of sustainability misconduct, which further increases the complexity of sustainable supply chains. Dingdong works closely with NGOs, mainly fair-trade organizations, to constantly scan the environment and ensure that the code of conduct is continuously followed and updated. Many leading companies search for valuable information that helps them identify their SCSR by constantly scanning the environment or conducting regular consultations with stakeholders (Foerstl et al., 2010; Meinlshmidt et al., 2016).

The study also confirms the findings of Renkema and Hilletofth (2022) that intermediate SFSCs can be a solution to overcome the limitations of direct-to-consumer SFSCs. Intermediaries like Dingdong Inc. also share their commitment to sustainability with producers, customers, and consumers. Practitioners and policymakers can refer to our study to develop suitable types of SFSC in other regions, thus helping improve supply chain governance.

6. LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

It is well known that most of the sustainability-related problems lie beyond the closet supplier (tier-one), and therefore, it is vital to the SCSR process (Tachizawa and Wong, 2014). The study only demonstrates the evaluation of tier-one suppliers. There are different layers in the supply chain (tier two and tier three suppliers), and there could be missing or inadequate information about these next-level suppliers that augments SCSR substantially. Further, we focussed on the countries of three specific suppliers, and sustainability parameters are highly contextual and vary from country to country (Mani et al., 2014). In this study, we considered three suppliers from three countries; it is sometimes difficult to separate what is relevant or essential with that specific country or supplier. Future applications of the proposed decision hierarchy and model can strive to distinguish between country-specific issues and those specific to supplier conduct. From the initial literature review, we identified 32 SCSR criteria for supplier evaluation but later restricted to just 16 criteria based on the inputs from the executives of the case company. Future research can explore a specific set of criteria applicable to various kinds of food products and the number of intermediaries in the SFSC.

Future research should also investigate the position and roles of various intermediaries in managing SCSR in intermediate SFSCs. This is important because much of the literature deals with the direct-to-consumer and intermediate SFSC in the same category (Renkema and Hilletofth, 2022). There is a greater opportunity to explore this from the perspective of different types of intermediaries because the diversity in SFSCs is an unexplored area. Investigating how trust is built and maintained on the sustainability front across the network of intermediate entities in SFSCs would be interesting.

It would also make sense if future research could focus differently on food products with different shelf lives because the three dimensions of sustainability might receive different importance while managing SCSR for food products having different shelf lives. Future research can also delve into sustainability impact assessment while changing the importance of various dimensions of sustainability. In addition, the majority of studies were conducted considering the SFSCs in developed nations, and therefore, future research can explore SCSR management in the context of SFSCs in developing nations. Because of differences in infrastructure, social, and economic conditions, the likely importance of the three dimensions of sustainability might change, thus affecting supplier evaluation and counter-actions.

7. CONCLUSION

By considering SCSR in the evaluation process, the case company Dingdong (which is in the business of intermediate short food supply chain) is able to prioritise prevailing risks, analyse suppliers' positions against these risks, and initiate appropriate risk management strategies. This study identified important criteria for supplier evaluation with respect to SCSR. This study also demonstrates the identification and development of an MCDM model for supplier evaluation considering SCSR. The model was successfully developed using AHP to assess three key suppliers of black tea. The devised three-level decision hierarchy allowed the efficient management and analysis of the various criteria associated with the context. The developed MCDM model was tested with an expert evaluation of three key suppliers of Dingdong. It is clear from the application that AHP-based decision-making can assist the decision-makers or experts in evaluating the strengths and weaknesses of suppliers by comparing them using applicable SCSR criteria and sub-criteria. The AHP-based model is flexible enough to be adapted to suit new situations and the evolving and dynamic nature of SCSR.

CONFLICT OF INTEREST DECLARATION

All authors have no conflicts of interest

REFERENCES

Anderson, D.R. (2005), *Corporate Survival: The Critical Importance of Sustainability Risk Management*, iUniverse Publishing, New York.

Anderson, D.R. and Anderson, K.E., (2009), "Sustainability risk management", *Risk Management Insurance Review,* Vol. 12(1), pp. 25–38.

Azadfallah, M. (2017), "Multi criteria supplier selection using PROMETHEE outranking procedures", *Journal of Supply Chain Management Systems*, Vol. 6(1), pp. 24-32.

Barratt, M. and Oke, A. (2007), "Antecedents of supply chain visibility in retail supply chains: a resource-based theory perspective", *Journal of Operations Management*, Vol. 25(6), pp. 1217-1233.

Beske, P., Land, A. and Seuring, S. (2014), "Sustainable supply chain management practices and dynamic capabilities in the food industry: a critical analysis of the literature", *International Journal of Production Economics*, Vol. 152, pp. 131-143.

Bode, C. and Wagner, S.M. (2015), "Structural drivers of upstream supply chain complexity and the frequency of supply chain disruptions", *Journal of Operations Management*, Vol. 36, pp. 215-228.

Bregman, R., Peng, D.X. and Chin, W. (2015), "The effect of controversial global sourcing practices on the ethical judgments and intentions of US consumers", *Journal of Operations Management*, Vol. 36, pp. 229-243

Busse, C. (2016), "Doing well by doing good? The self-interest of buying firms and sustainable supply chain management", *Journal of Supply Chain Management*, Vol. 52(2), pp. 28-47.

Busse, C., Kach, A.P. and Bode, C. (2016a), "Sustainability and the false sense of legitimacy: how institutional distance augments risk in global supply chains", *Journal of Business Logistics*, Vol. 37(4), pp. No. 4. Pp. 312-328.

Busse, C., Schleper, M.C., Niu, M. and Wagner, S.M. (2016b), "Supplier development for sustainability: contextual barriers in global supply chains", *International Journal of Physical Distribution & Logistics Management*, Vol. 46(5), pp. 442-468.

Busse, C., Schleper, M.C., Niu, M. and Wagner, S.M. (2017), "Extending the supply chain visibility boundary: Utilizing stakeholders for identifying supply chain sustainability risks", *International Journal of Physical Distribution & Logistics Management*, Vol. 47(1), pp. 18-40.

Çebi, F. and Bayraktar, D. (2003), "An integrated approach for supplier selection", *Logistics Information Management*, Vol. 16(6), pp. 395-400.

da Silva, E.M., Ramos, M.O., Alexander, A. and Jabbour, C. J. C. (2020), "A systematic review of empirical and normative decision analysis of sustainability-related supplier risk management", *Journal of Cleaner Production*, Vol. 244, pp. 118808.

Dhurkari, R. K. (2022), " MCDM methods: practical difficulties and future directions for improvement", RAIRO-Operations Research, Vol. 56, pp. 2221–2233.

Dickson, G. W. (1966) "An analysis of vendor selection systems and decisions", *Journal of Purchasing,* Vol. 2(1), pp. 5-17.

Doernberg, A., Piorr, A., Zasada, I., Wascher, D. and Schmutz, U. (2022), "Sustainability assessment of short food supply chains (SFSC): Developing and testing a rapid assessment tool in one African and three European city regions", *Agriculture and Human Values*, Vol. 39, pp. 885-904.

Donaldson, T. and Preston L. E. (1995), "The stakeholder theory of the corporation: concepts, evidence and implications", *The Academy of Management Review*, Vol. 20(1), pp. 65–91.

Enjolras G. and Aubert M. (2018), "Short food supply chains and the issue of sustainability: a case study of French fruit producers", *International Journal of Retail & Distribution Management*, Vol. 46(2), pp.194-209.

Farzad, T., Osman, M., Rasid, A. A., Yusuff, R. and Esfandiary, A. (2008), "AHP approach for supplier evaluation and selection in a steel manufacturing company", *Journal of Industrial Engineering and Management*, Vol. 1(2), pp. 54-76.

Finset, A., Steine, S., Haugli, L., Steen, E. and Laerum, E. (2002), "The brief approach/avoidance coping questionnaire: Development and validation", *Psychology, Health & Medicine*, Vol. 7(1), pp. 75-85.

Foerstl, K., Reuter, C., Hartmann, E. and Blome, C. (2010), "Managing supplier sustainability risks in a dynamically changing environment – sustainable supplier management in the chemical industry", *Journal of Purchasing and Supply Management*, Vol. 16(2), pp. 118-130.

French, S., Maule, J. and Papamichail, N. (2009), *Decision Behaviour, Analysis and Support,* Cambridge University Press, Cambridge.

Ghauri, R. and Gronhaug, K. (2002), *Research methods in business studies: a practical guide,* Harlow: FT/Prentice Hall.

Giannakis, M. and Papadopoulos, T. (2016), "Supply chain sustainability: a risk management approach", *International Journal of Production Economics*, Vol. 171, pp. 455-470.

Govindan, K., Shankar, M. and Kannan, D. (2018), "Supplier selection based on corporate social responsibility practices", *International Journal of Production Economics,* Vol. 200, pp. 353-379.

Green, K., Morton, B. and New, S. (1996), "Purchasing and environmental management: interactions, policies, and opportunities". *Business Strategy and the Environment,* Vol. 5(3), pp. 188–197.

Gualandris, J., Klassen, R.D., Vachon, S. and Kalchschmidt, M. (2015), "Sustainable evaluation and verification in supply chains: aligning and leveraging accountability to stakeholders", *Journal of Operations Management*, Vol. 38(1), pp. 1-13.

Hartmann, J. and Moeller, S. (2014), "Chain liability in multitier supply chains? Responsibility attributions for unsustainable supplier behaviour", *Journal of Operations Management*, Vol. 32(5), pp. 281-294.

Hendry, L.C., Stevenson, M., MacBryde, J., Ball, P., Sayed, M. and Liu, L. (2019), "Local food supply chain resilience to constitutional change: the Brexit effect", International Journal of Operations & Production Management, Vol. 39, pp. 429-453.

Ho, W., Xu, X. and Dey, P. K. (2010), "Multi-criteria decision-making approaches for supplier evaluation and selection: A literature review", *European Journal of Operational Research*, Vol. 202(1), pp. 16-24.

Hofmann, H., Busse, C., Bode, C. and Henke, M. (2014), "Sustainability-related supply chain risks: conceptualization and management", *Business Strategy and the Environment*, Vol. 23 (3), pp. 160-172.

Hutchins, M. J. and Sutherland, J. W. (2008), "An exploration of measures of social sustainability and their application to supply chain decisions", *Journal of Cleaner Production*, Vol. 16(15), pp. 1688–1698.

Ilieva, R.T. (2017), "Urban food systems strategies: A promising tool for implementing the SDGs in practice", *Sustainability*, Vol. 9(10), pp. 1707.

Jeppesen, S. and Hansen, M. W. (2004), "Environmental upgrading of third world enterprises through linkages to transnational corporations. Theoretical perspectives and preliminary evidence". *Business Strategy and the Environment*, Vol. 13(4), pp. 261–274.

Jiang, B. (2009), "The effects of interorganizational governance on supplier's compliance with SCC: an empirical examination of compliant and non-compliant suppliers". *Journal of Operations Management,* Vol. 27(4), pp. 267–280.

Kara, M. E. and Firat, S. (2018), "Supplier risk assessment based on best-worst method and k-means clustering: a case study", *Sustainability*, Vol 10(4), pp. 1066.

Kazancoglu, Y., Sezer, M.D., Ozbiltekin-Pala, M., Lafçı, Ç. and Sarma, P.R.S. (2021), "Evaluating resilience in food supply chains during COVID-19", *International Journal of Logistics Research and Applications*, Vol. 27, pp. 1-17.

Khan, S.A.R., Yu, Z., Golpira, H., Sharif, A. and Mardani, A. (2021), "A state of-the-art review and meta-analysis on sustainable supply chain management: Future research directions", *Journal of Cleaner Production*, Vol, 278, pp. 123357.

Khan, S. A., Kusi-Sarpong, S., Arhin, F. K. and Kusi-Sarpong, H. (2018), "Supplier sustainability performance evaluation and selection: A framework and methodology", *Journal of Cleaner Production,* Vol. 205, pp. 964-979.

Kim, M., Jang, Y. C. and Lee, S. (2013), "Application of Delphi-AHP methods to select the priorities of WEEE for recycling in a waste management decision making tool", *Journal of Environmental Management*, Vol. 128, pp. 941-948.

Klassen, R. D. and Vereecke, A. (2012), "Social issues in supply chains: Capabilities link responsibility, risk (opportunity), and performance", *International Journal of Production Economics*, Vol. 140(1), pp. 103-115.

Kortelainen, K. (2008), "Global supply chains and social requirements: Case studies of labour condition auditing in the People's Republic of China", *Business Strategy and the Environment*, Vol. 17(7), pp. 431–443.

Krishnan, R., Agarwal, R., Bajada, C. and Arshinder, K. (2020), "Redesigning a food supply chain for environmental sustainability e an analysis of resource use and recovery", *Journal of Cleaner Production*, Vol. 242, pp. 118374.

Luo, J., Liang, Y. and Bai, Y. (2022), "Mapping the intellectual structure of short food supply chains research: A bibliometric analysis", *British Food Journal,* Vol. 124(9), pp. 2833-2856

Mangla, S.K., Kumar, P. and Barua, M.K. (2015), "Flexible decision modelling for evaluating the risks in green supply chain using fuzzy AHP and IRP methodologies", *Global Journal of Flexible Systems Management*, Vol. 16(1), pp. 19–35.

Mani, V. Gunasekaran, A. and Delgado, C. (2018), "Enhancing supply chain performance through supplier social sustainability: An emerging economy perspective", *International Journal of Production Economics*, 195, pp. 259-272.

Mani, V., Agrawal, R. and Sharma, V. (2014), "Supplier selection using social sustainability: AHP based approach in India", *International Strategic Management Review*, Vol. 2(2), pp. 98-112.

Manuj, I. and Mentzer, J.T. (2008), "Global supply chain risk management". *Journal of Business Logistics*, Vol. 29(1), pp. 133–155.

Marsden, T., Banks, J. and Bristow, G. (2000), "Food supply chain approaches: exploring their role in rural development", *Sociologia Ruralis,* Vol. 40, pp. 424-438.

Matten, D. (1995), "Strategy follows structure: Environmental risk management in commercial enterprises", *Business Strategy and the Environment*, Vol. 4(3), pp. 107–116.

Meinlschmidt, J., Foerstl, K. and Kirchoff, J. (2016), "The role of absorptive capacity and desorptive capacity (ACDC) in sustainable supply management – a longitudinal analysis", *International Journal of Physical Distribution & Logistics Management*, Vol. 46(3), pp. 177-211.

Michel-Villarreal, R. (2023), "Towards sustainable and resilient short food supply chains: A focus on sustainability practices and resilience capabilities using case study", *British Food Journal*, Vol. 125(5), pp. 1914–1935.

Michel-Villarreal, R., Hingley, M. Canavari, M. and I. Bregoli. (2019), "Sustainability in alternative food networks: A systematic literature review", *Sustainability*, Vol. 11(3), pp. 859.

Mitchell, V.W. (1991), "The Delphi technique: an exposition and application", *Technology Analysis and Strategic Management*, Vol. 3(4), pp. 333–358.

Negri, M., Cagno, E., Colicchia, C. and Sarkis, J. (2021), "Integrating sustainability and resilience in the supply chain: a systematic literature review and a research agenda", *Business Strategy and Environment*, Vol. 30(7), pp. 2858-2886.

Pfeffer, J. and Salancik, G. R. (1978), *The External Control of Organizations: A Resource Dependence Perspective*, Harper & Row, New York.

Rafi-Ul-Shan, P. M., Grant, D. B., Perry, P. and Ahmed, S. (2018), "Relationship between sustainability and risk management in fashion supply chains: A systematic literature review", *International Journal of Retail and Distribution Management*, Vol. 46(5), pp. 466–486.

Rao, S. and Goldsby, T.J. (2009), "Supply chain risks: A review and typology", *International Journal of Logistics Management*, Vol. 20(1), pp. 97–123.

Rattray, J. and Jones, M. C. (2007), "Essential elements of questionnaire design and development", *Journal of clinical nursing*, Vol. 16(2), pp. 234-243.

Renkema, M. and Hilletofth, P. (2022), "Intermediate Short Food Supply Chains: A Systematic Review", *British Food Journal*, Vol. 124(13), pp. 541–558.

Rezaei, J., Nispeling, T., Sarkis, J. and Tavasszy, L. (2016), "A supplier selection life cycle approach integrating traditional and environmental criteria using the best worst method", *Journal of Cleaner Production*, Vol. 135, pp. 577–588.

Ritchie, B. and Brindley, C. (2007), "Supply chain risk management and performance: A guiding framework for future development", *International Journal of Operations & Production Management*, 27(3), pp. 303–322.

Robson, C. (1993), *Real World Research: A resource for social scientists and practitioners' researchers,* Oxford: Blackwell Publishers Ltd.

Roehrich, J.K., Grosvold, J. and Hoejmose, S.U. (2014), "Reputational risks and sustainable supply chain management: decision making under bounded rationality", *International Journal of Operations & Production Management*, Vol. 34(5), pp. 695-719.

Roloff, J. (2008), "Learning from multi-stakeholder networks: issue-focused stakeholder management", *Journal of Business Ethics*, Vol. 82(1), pp. 233-250.

Saaty, T. L. (1980), *The analytic hierarchy process: planning, priority setting, resource allocation,* McGraw-Hill: New York.

Sarkis, J., Gonzalez-Torre, P. and Adenso-Diaz, B. (2010), "Stakeholder pressure and the adoption of environmental practices: The mediating effect of training", *Journal of Operations Management*, Vol. 28(2), pp. 163–176.

Sarkis, J., Zhu, Q. and Lai, K. (2011), "An organizational theoretic review of green supply chain management literature", *International Journal of Production Economics*, Vol. 130, pp. 1-15.

Sawik, T. (2013), "Selection of resilient supply portfolio under disruption risks", *Omega*, Vol. 41(2), pp. 259-269.

SEDEX (2021). Risk assessment tool. [Online] https://www.sedex.com/our-services/risk-assessment-tool/?gclid=Cj0KCQiAosmPBhCPARIsAHOen-PHEH3c169-uDrjfekE4n1VkxZaUFxYAcz5MIXVOsMNjgEiD_zx6UIaAhcKEALw_wcB [Accessed 13 December 2021]

Sellitto, M.A., Antonio, L., Vial, M., Vial, L.A.M. and Viegas, C.V. (2018), "Critical success factors in Short Food Supply Chains: case studies with milk and dairy producers from Italy and Brazil", *Journal of Cleaner Production,* Vol 170, pp. 1361-1368.

Seuring, S. and Müller, M. (2008), "From a Literature Review to a Conceptual Framework for Sustainable Supply Chain Management", *Journal of Cleaner Production*, Vol. 16, pp. 1699-1710.

Sharma, R., Kamble, S. S., Gunasekaran, A., Kumar, V. and Kumar, A. (2020), A systematic literature review on machine learning applications for sustainable agriculture supply chain performance. *Computers & Operations Research*, Vol. 119, pp. 104926.

Shrivastava, P. I. I., Mitroff, D. Miller and Miglani, A. (1988), "Understanding industrial crises", *Journal of Management Studies*, Vol. 25(4), pp. 285–303.

Sillars, (2021) Boohoo cuts hundreds of suppliers to fashion new future after factory scandal. [Online] Available:https://news.sky.com/story/boohoo-cuts-hundreds-of-suppliers-to-fashion-new-future-after-factory-scandal-12256064 [Accessed 1 January 2022].

Sonmez, M. (2006), "A review and critique of supplier selection process and practices", Occasional Papers Series, Loughborough University, UK.

Tachizawa, E. M. and Wong, C. Y. (2014), "Towards a theory of multi-tier sustainable supply chains: A systematic literature review", *Supply Chain Management: An International Journal*, Vol. 19(5/6), pp. 643-663.

Tang CS. (2006), "Perspectives in supply chain risk management". *International Journal of Production Economics*, Vol. 103(2), pp. 451–488.

Teuscher, P., Grüninger, B. and Ferdinand, N. (2006), "Risk management in sustainable supply chain management (SSCM): lessons learnt from the case of GMO-free soybeans", *Corporate Social Responsibility and Environmental Management*, Vol. 13(1), pp. 1-10.

Thomé, K. M., Cappellesso, G., Ramos, E. L. A. and de Lima Duarte, S. C. (2021), "Food supply chains and short food supply chains: Coexistence conceptual framework", *Journal of Cleaner Production*, Vol. 278, pp. 123207.
UNIDO – United Nations Industrial Development Organization 2020. Short food supply chains for promoting local food on local markets. Vienna. https:// tii. unido. org/ sites/ defau lt/ files/ publi catio ns/ SHORT% 20FOOD% 20SUP PLY% 20CHA INS. pdf. Accessed 01 November 2024.

United Nations Global compact and BSR, (2010), *Supply Chain Sustainability: A Practical Guide for Continuous Improvement,* United Nations (UN).

United Nations HDI (2021). Human Development Index. [Online] Available: http://hdr.undp.org/en/content/latest-human-development-index-ranking [Accessed 1 January 2022]

Wang, M., Kumar, V., Ruan, X., Saad, M., Garza-Reyes, J. A. and Kumar, A. (2022), "Sustainability concerns on consumers' attitude towards short food supply chains: an empirical investigation", *Operations Management Research*, Vol. 15(1), pp. 76-92.

WCED, S.W.S. (1987), "World commission on environment and development", *Our Common Future*, Vol. 17, pp. 1-91.

Welford, R. and Frost, S. (2006), "Corporate social responsibility in Asian supply chains", *Corporate Social Responsibility and Environmental Management*, Vol. 13(3), pp. 166-176.

Wetzstein, A., Hartmann, E., Benton Jr, W. C. and Hohenstein, N. O. (2016), "Systematic assessment of supplier selection literature – state-of-the-art and future scope". *International Journal of Production Economics*, Vol. 182, pp. 304–323.

Wong, C.Y., Wong, C.W. and Boon-Itt, S. (2015). "Integrating environmental management into supply chains: a systematic literature review and theoretical framework", *International Journal of Physical Distribution & Logistics Management*, Vol. 45(1/2), pp. 43-68.

World Bank (2022) Country Exports [Accessed 4 January 2022]. https://wits.worldbank.org/trade/comtrade/en/country/ALL/year/2019/tradeflow/Exports/partner/WLD/product/090240

Wu, Q., He, Q. and Duan, Y. (2014), "Dynamic capabilities for CSR management: towards identifying common processes", *Society and Business Review*, Vol. 9(3), pp. 276-297.

Wu, T. and Blackhurst, J. (2009), *Managing Supply Chain Risk and Vulnerability: Tools and Methods for Supply Chain Decision Makers,* Springer, New York.

Yahya, S. and Kingsman, B. (1999), "Vendor rating for an entrepreneur development programme: A case study using the analytic hierarchy process method", *Journal of the Operational Research Society*, Vol. 50(9), pp. 916–930.

Yin Robert, K. (2014), *Case study research: Design and methods*, Los Angeles, CA: Sage.

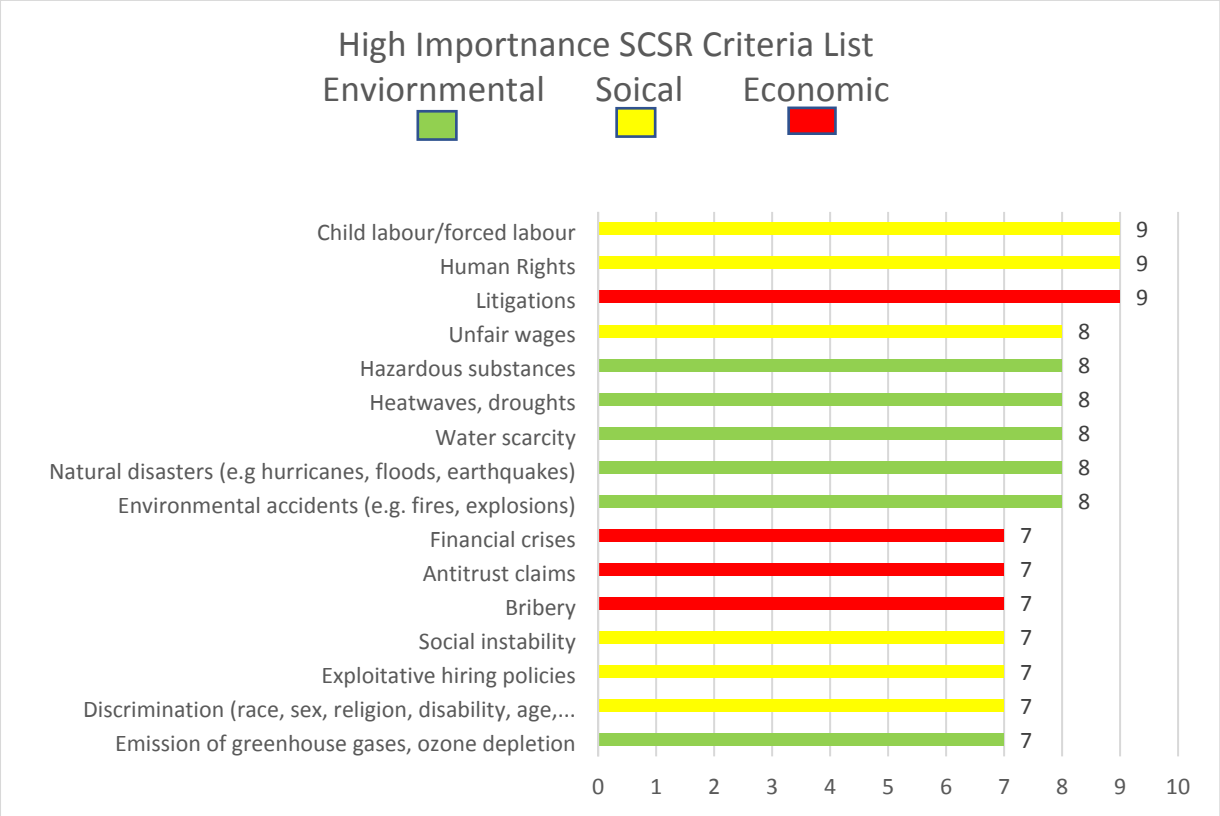

Figure 1: Important Sub-Criteria under three dimensions of sustainability

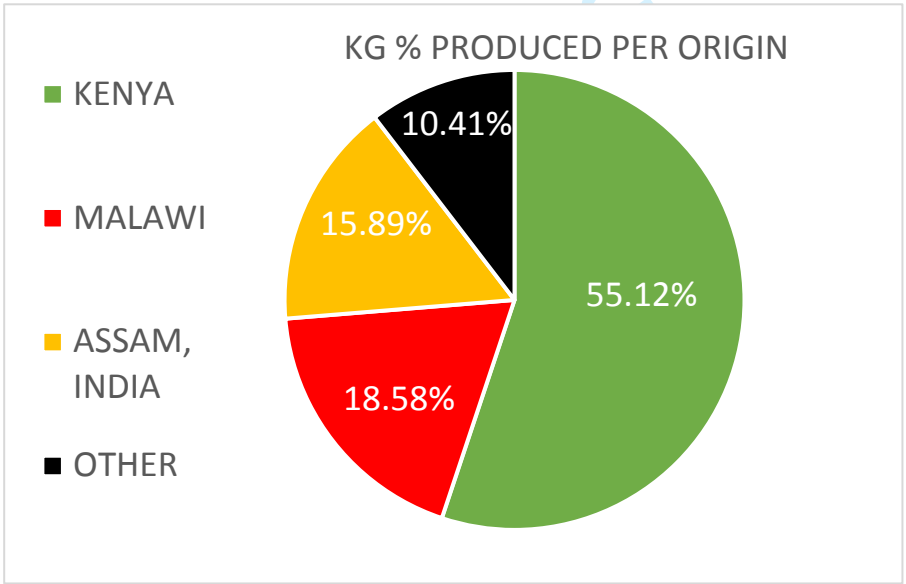

Figure 2: Share of Black Tea suppliers of Dingdong (in KG production percentage)

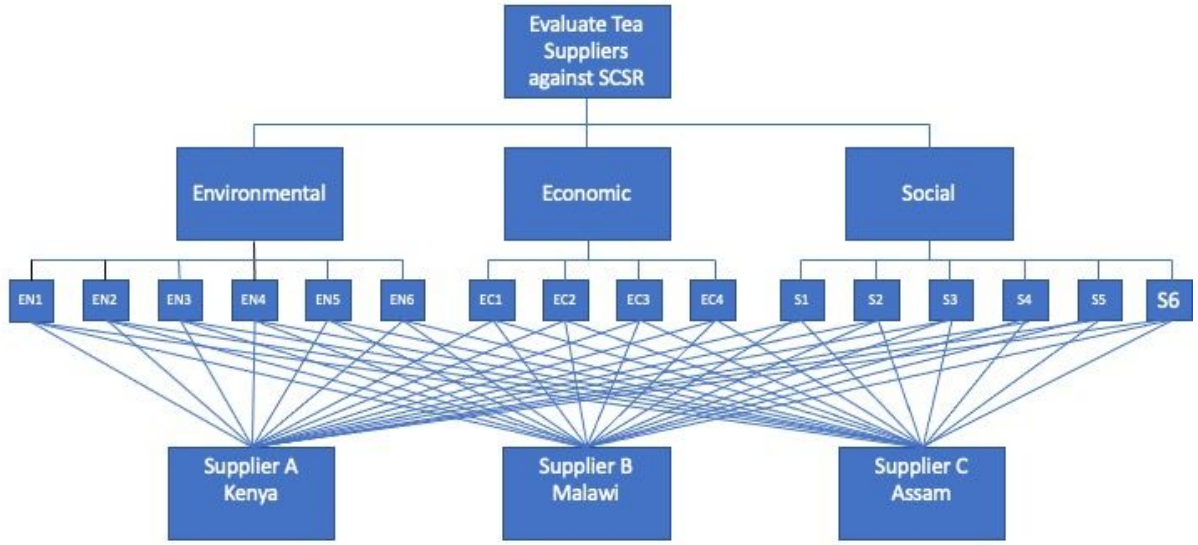

Figure 3: Decision Hierarchy

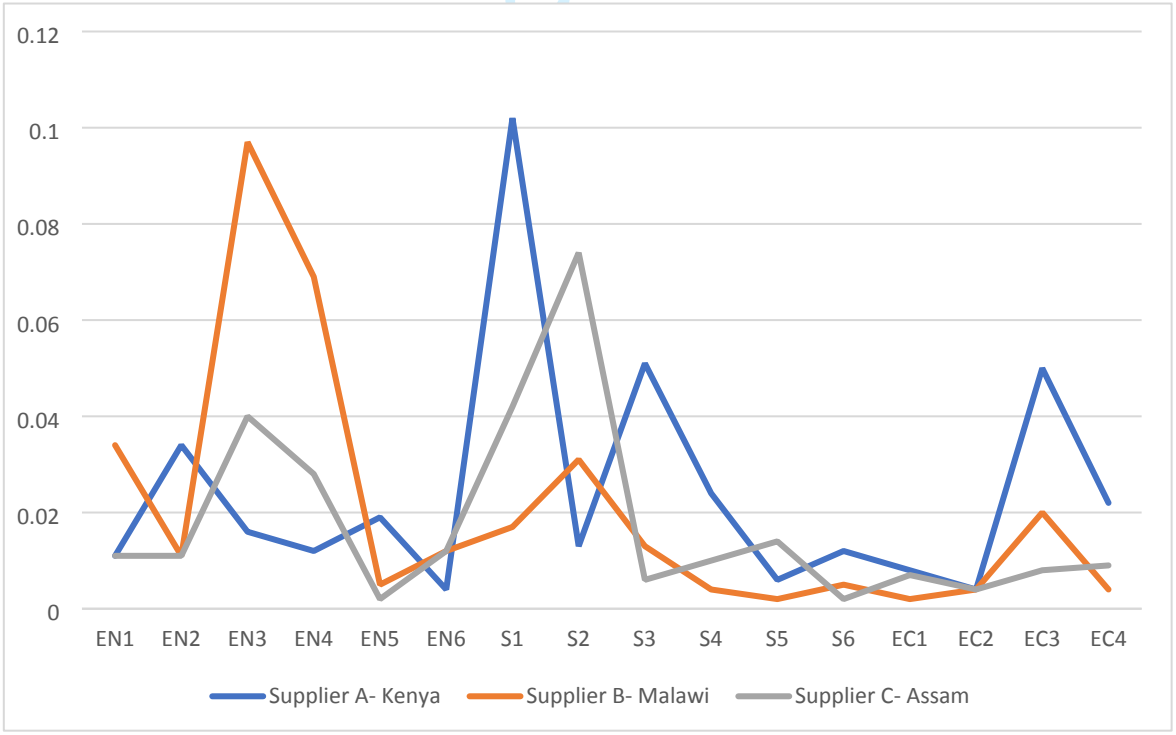

Figure 4: Scores of Alternative Suppliers in Different Sub-Criteria

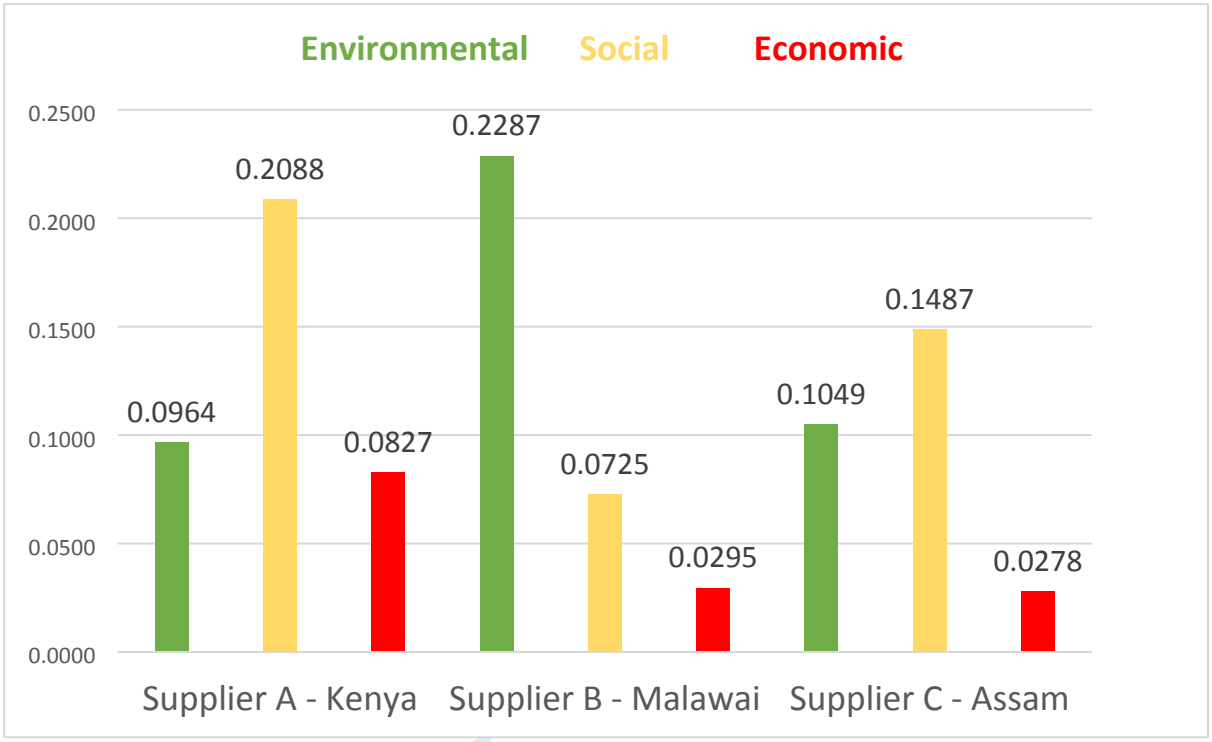

Figure 5: Supplier's performance on different criteria

	SCSR criteria
	Environmental
1	Environmental accidents (e.g., fires, explosions)
2	Pollution (air, water, soil)
3	Non-compliance with sustainability laws
4	Emission of greenhouse gases, ozone depletion
5	Energy consumption (unproductive use of energy)
6	Excessive or unnecessary use of packaging
7	Product waste
8	Natural disasters (e.g. hurricanes, floods, earthquakes)
9	Water scarcity
10	Heatwaves, droughts
11	Hazardous substances
	Social
12	Human Rights
13	Excessive working time: work-life imbalance
14	Unfair wages
15	Child labour/forced labour
16	Discrimination (race, sex, religion, disability, age, political views)
17	Healthy and safe working environment
18	Exploitative hiring policies
19	Unethical treatment of animals
20	Disciplinary practices
21	Pandemic
22	Social instability
	Economic
23	Bribery
24	False claims/dishonesty
25	Price fixing accusations
26	Antitrust claims
27	Patent infringements

28	Tax evasion
29	Boycotts
30	Litigations
31	Energy prices volatility
32	Financial crises

Table 1: List of Criteria and Sub-criteria

EN1	Environmental accidents (e.g., fires, explosions)
EN2	Natural disasters (e.g., hurricanes, floods, earthquakes)
EN3	Water scarcity
EN4	Heatwaves, droughts
EN5	Hazardous substances
EN6	Emission of greenhouse gases, ozone depletion
S1	Human Rights
S2	Child labour/forced labour
S3	Unfair wages
S4	Discrimination (race, sex, religion, disability, age, political)
S5	Exploitative hiring policies
S6	Social instability
EC1	Bribery
EC2	Antitrust claims
EC3	Financial crises
EC4	Litigations

Table 2: Sub-criteria Abbreviation and Description

	EN1	EN2	EN3	EN4	EN5	EN6		Priority
Environmental accidents (EN1)	1.00	1.00	0.33	0.33	3.00	3.00		0.133
Natural disasters (EN2)	1.00	1.00	0.33	0.33	3.00	3.00		0.133
Water scarcity (EN3)	3.00	3.00	1.00	2.00	5.00	5.00		0.356
Heatwaves, droughts (EN4)	3.00	3.00	0.50	1.00	5.00	2.00		0.253
Hazardous substances (EN5)	0.33	0.33	0.33	0.20	1.00	1.00		0.061
Greenhouse gases (EN6)	0.33	0.33	0.20	0.50	1.00	1.00		0.065
					Inconsistency			6.2%

Table 3 – Priority of four sub-criteria under "environmental" criteria

	S1	S2	S3	S4	S5	S6		Priority
Human Rights (S1)	1.00	3.00	3.00	3.00	3.00	5.00		0.37
Child Labour/Forced Labour (S2)	0.33	1.00	3.00	5.00	3.00	5.00		0.27
Unfair Wages (S3)	0.33	0.33	1.00	3.00	5.00	5.00		0.16
Discrimination (S4)	0.33	0.20	0.33	1.00	3.00	3.00		0.09
Exploitative Hiring Policies (S5)	0.33	0.33	0.20	0.33	1.00	0.33		0.05
Social Instability (S6)	0.20	0.20	0.20	0.33	3.00	1.00		0.04
					Inconsistency			8.9%

Table 4 – Priority of four sub-criteria under "social" criteria

	EC1	EC2	EC3	EC4		Priority
Bribery (EC1)	1.00	2.00	0.20	0.33		0.12
Antitrust Claims (EC2)	0.50	1.00	0.20	0.33		0.08
Financial Crisis (EC3)	5.00	5.00	1.00	3.00		0.55
Litigations (EC4)	3.00	3.00	0.33	1.00		0.25
			Inconsistency			3.7%

Table 5 – Priority of four sub-criteria under "economic" criteria

Criteria	Local weight	Sub-criteria	Local weights	Global weights
Environmental	0.429	Environmental accidents	0.133	0.0569
		Natural disasters	0.133	0.0569
		Water scarcity	0.356	0.1526
		Heatwaves, droughts	0.253	0.1086
		Hazardous substances	0.061	0.0262
		Greenhouse gases	0.065	0.0277
Social	0.429	Human Rights	0.375	0.1607
		Child labour/forced labour	0.274	0.1176
		Unfair wages	0.164	0.0705
		Discrimination	0.089	0.0384

		Exploitative hiring policies	0.053	0.0228
		Social instability	0.045	0.0191
Economic	0.143	Bribery	0.118	0.0169
		Antitrust claims	0.082	0.0118
		Financial crises	0.551	0.0787
		Litigations	0.248	0.0355

Table 6: Global weight of sub-criteria

Criteria	Global Weight	Supplier A - Kenya		Supplier B - Malawi		Supplier C – Assam	
		Local weight	Global weight	Local weight	Global weight	Local weight	Global weight
Environmental accidents	0.057	0.200	0.011	0.601	0.034	0.200	0.011
Natural disasters	0.057	0.601	0.034	0.200	0.011	0.200	0.011
Water scarcity	0.153	0.106	0.016	0.634	0.097	0.260	0.040
Heatwaves, droughts	0.109	0.106	0.012	0.634	0.069	0.260	0.028
Hazardous substances	0.026	0.724	0.019	0.193	0.005	0.083	0.002
Greenhouse gases	0.028	0.142	0.004	0.429	0.012	0.429	0.012
Human Rights	0.161	0.634	0.102	0.106	0.017	0.260	0.042
Child labour/forced labour	0.118	0.110	0.013	0.260	0.031	0.630	0.074
Unfair wages	0.070	0.720	0.051	0.190	0.013	0.090	0.006
Discrimination	0.038	0.630	0.024	0.110	0.004	0.260	0.010
Exploitative hiring policies	0.023	0.284	0.006	0.097	0.002	0.620	0.014
Social instability	0.019	0.634	0.012	0.260	0.005	0.106	0.002
Bribery	0.017	0.480	0.008	0.115	0.002	0.406	0.007
Antitrust claims	0.012	0.333	0.004	0.333	0.004	0.333	0.004
Financial crises	0.078	0.634	0.050	0.260	0.020	0.106	0.008
Litigations	0.035	0.634	0.022	0.106	0.004	0.260	0.009
Total score			**0.388**		**0.330**		**0.281**
Supplier Ranking			**1**		**2**		**3**

Table 7: Global Priority of Alternatives and Ranking

Sub-criteria under Environmental Criteria	Criteria Importance Weights	Supplier A - Kenya Value	Supplier B - Malawi Value	Supplier C - Assam Value
Environmental accidents	0.057	0.011	0.034	0.011
Natural disasters	0.057	0.034	0.011	0.011
Water scarcity	0.153	0.016	0.097	0.040
Heatwaves, droughts	0.109	0.012	0.069	0.028
Hazardous substances	0.026	0.019	0.005	0.002
Greenhouse gases	0.028	0.004	0.012	0.012
Relative Performance		**0.096**	**0.228**	**0.105**
Relative Performance Percentage		24.8%	69.4%	37.2%
Rank		3	1	2

Table 8: Relative Importance of suppliers on the environmental front

Sub-criteria under Social Criteria	Criteria Importance Weights	Supplier A - Kenya Value	Supplier B - Malawi Value	Supplier C - Assam Value
Human Rights	0.161	0.102	0.017	0.042
Child labour/forced labour	0.118	0.013	0.031	0.074
Unfair wages	0.070	0.051	0.013	0.006
Discrimination	0.038	0.024	0.004	0.010
Exploitative hiring policies	0.023	0.006	0.002	0.014
Social instability	0.019	0.012	0.005	0.002
Relative Performance		**0.208**	**0.072**	**0.148**
Relative Performance Percentage		53.6%	21.9%	52.7%
Rank		1	3	2

Table 9: Relative Importance of suppliers on the social front

Sub-criteria under Economic	Criteria Importance Weights	Supplier A - Kenya Value	Supplier B - Malawi Value	Supplier C - Assam Value
Bribery	0.017	0.008	0.002	0.007
Antitrust claims	0.012	0.004	0.004	0.004
Financial crises	0.078	0.050	0.020	0.008

Litigations	0.035	0.022	0.004	0.009
Relative Performance		**0.084**	**0.030**	**0.028**
Relative Performance Percentage		21.6%	9.1%	10.0%
Rank		1	2	3

Table 10: Relative Importance of Suppliers on the Economic front

Suppliers	Rank on Environmental Front	Rank on Social Front	Rank on Economic Front
Supplier A - Kenya	3	1	1
Supplier B - Malawi	1	3	2
Supplier C - Assam	2	2	3

Table 11: Rank order of suppliers across different criteria