Determining and evaluating socially sustainable supply chain criteria in agri-sector of developing countries: insights from West Africa cashew industry

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Abstract

Social sustainability issues such as labor rights concern in the agricultural sector receive significant attention from several stakeholders. The role of small and medium scale enterprises (SMEs) that dominate the sector's supply chain in developing countries remains critical in implementing initiatives to address these issues. Through a four-phase methodology, this study proposed the criteria of a socially sustainable supply chain (SSSC) guided by ISO 26000 and based on empirical evidence from the cashew industry. Subsequently, based on the Best worst method and Grey relational analysis, the criteria are evaluated by cashew manufacturing SME managers to determine how SSSC initiatives can be implemented. The study shows that food safety, labor and work condition, traceability, and child and force/prison labor emerge in order of importance as a pathway for implementation of SSSC. The study also provides insight into achieving SSSC among various manufacturing SMEs and understanding their assessed SSSC performance. The study suggests that agricultural sector SMEs that implement SSSC practices through social compliance or collaborations are more aware of the implementation challenges. On the other hand, SMEs that generate SSSC practices may perceive their social sustainability performance in the supply chain much higher than adopters who meet customers' sustainability requirements.

Keywords: Social Sustainability; Sustainable Supply Chain; Small and Medium Enterprises (SMEs)

1. Introduction

Agricultural supply chains face many social and environmental sustainability issues/concerns in the midst of increasing global production and consumption (Lalwani et al. 2018; Maloni and Brown 2006; Ghadge et al. 2020). These growing concerns include human rights, work conditions, food quality and safety, supply chain transparency, ethical issues, farmers well-being, among others (Ait Sidhoum 2018; Janker and Mann 2020; Mangla et al. 2018). These concerns are of particular interest because stakeholders expect actions to be taken by supply chain members to address them (Ghadge et al. 2020).

The outcome of the actions taken to address social issues has a potential effect on supply chain sustainability performance (Yawar and Seuring 2017). The upstream of African cashew supply chain exemplify agricultural supply chain in developing countries. As such, stakeholders including consumers, government and non-governmental organizations have expectations of the supply chain to address social sustainability concerns. For instance, retailers and kernel distributors are expected to take actions on consumer concerns of food safety and the risk of child or force labor in the supply chain upstream. Also, many governments and non-governmental organizations have raised concern regarding the benefits on the sustainable livelihood and income of over 2 million smallholder cashew farmers who produce Africa's raw cashew nuts (RCN).

Cashew farming, processing, and manufacturing in West Africa are characterized by many small and medium scale enterprises (SMEs), which are mostly labor-intensive (ACA 2012). In recent years, there have been reported incidences of forced labor in the global

cashew industry (Human Rights Watch 2011). In most rural and small-town communities where many Africa cashew farms and factories are located, women of all ages have limited economic opportunity regarding employment and are vulnerable to the traditional economic and social systems (Ingram et al., 2015; Pohlmann, 2012). Although West Africa cashew enterprises have started etching their space on the global market within the last decade, supply chain managers are expected to boost customers' confidence in cashew kernel's safety from the region (ACA, 2015). Social sustainability has become an increasingly sensitive concern in cashew supply chain that needs to be address in socially sustainable supply chain (SSSC) implementation. Many stakeholders recognize the need for supply chain managers to effectively take actions in the form of implementation of sustainability programs in the supply chain (ACA 2010; Red River Foods 2014). However, a clearer understanding of strategic implementation activities that can enhance social sustainability performance of supply chains in developing countries, which is dominated by SMEs, is limited.

SSSC seeks to address social issues within the organization's internal operations, inter-organization levels of upstream and downstream supply chains, and the broader concern of the communities within which the supply chain operates (Carter and Rogers, 2008;Mani et al., 2016). In the literature, SSSC has often been addressed from the perspective of corporate social responsibility (CSR) (Mani et al., 2016). In this paper, we used social responsibility or sustainability interchangeably. However, our focus is specifically on social sustainability or SSSC, which aims at social sustainability performance outcomes in the supply chain rather than a mere social expectation as it is considered in the concept of social responsibility (Carroll 1991). Thus, in accord with Yawar and Seuring's (2017)

literature review, we conceive social performance as the outcomes or goals, which buyers and suppliers aim to achieve while implementing different practices to address social issues in the supply chain.

SSSC has been especially problematic for organizations in emerging and developing countries. These organizations may face social issues that are unique and different from developed countries (Mani, Gunasekaran, et al. 2016b). Existing studies suggest considerable variance in the characterization of drivers, barriers, mechanisms, and outcomes in SSSC between these two regions (Jia et al. 2018). The differences are even echoed in how the concept has been predominantly shaped by scholarly work with less focus on analyzing specific issues and initiatives from the developing world, such as poverty concerns related to farmers income, which are generally considered as the base of the pyramid issues (Khalid et al. 2015). Golicic, Lenk, and Hazen (2019) observed that this creates a problem where many of the world's supply chains flow through developing countries, but the available social sustainability methods do not address the relevant social impact issues. As such, there is a need for more empirical research to understand the dynamics of developing countries. Also, to consider different actors, industries, and sizes of enterprises in SSSC implementation (Badri Ahmadi, Kusi-Sarpong, and Rezaei 2017; Rajeev et al. 2017; Silvestre 2015) to identify trends and pathways to achieve sustainability goals listed in the seventeen Sustainable Development Goals (SDGs).We argue that this is even more imperative for agricultural sector SMEs in the developing world, which receive far less attention.

Understanding SMEs' role in supply chains is useful to understand the implementation of SSSC in developing countries (Jia et al. 2018). SMEs tend to be more careful to consider

actions that can be compatible with their global strategy and expectation of stakeholders (Stekelorum, Laguir, and Elbaz 2019). Touboulic and Walker (2015) argued that the prevalent focus on large buyer enterprises in the current sustainable supply chain management (SSCM) literature tends not to question but validate the top-down approach to SSCM (Andersen and Skjoett-Larsen 2009; Soundararajan and Brown 2016). There is a need to expand the scope and concepts in SSCM beyond large enterprises' activities. This imperative is even more relevant in the light of the fact that the majority of global enterprises are SMEs (Graafland and Smid 2016). Moreover, due to the limited resources that characterize SMEs (Stekelorum 2020), strategic implementation of sustainability practices is crucial (Porter and Kramer 2006).

Although the general focus on CSR in SMEs is recent and not as common as larger enterprises (Ciliberti, Pontrandolfo, and Scozzi 2008), attention on SMEs in developing countries receives far less attention. While existing agricultural supply chain literature provides a list of criteria (León-Bravo, Caniato, and Caridi 2019; Ait Sidhoum 2018), the explicit consideration of SMEs' social sustainability criteria from a developing country's perspective and a practical view to achieve social sustainability performance in the supply chain are rare. We conceive that many studies and organizational documents provide several criteria in this field. However, previous literature has not given clarity to the development and implementation of social sustainability criteria considering agri-sector SMEs' role in developing countries.

To this end, this paper intends to address this gap and present criteria and strategic implementation that reflect the agricultural sector's context in the developing world, particularly in Africa countries. To help advance research and integrate social sustainability

into developing countries' agricultural supply chain, we focus on the West Africa cashew industry. The following research questions guide the study:

RQ1. What SSSC criteria and pathway can guide SSSC implementation, considering the role of cashew manufacturing SMEs in agricultural supply chain?

RQ2. What is the perceived social sustainability performance of cashew manufacturing SMEs based on SSSC criteria?

The next section is the literature review as foundational knowledge for our empirical analysis. Then, in the third section, the four-phase methodology proposed is described. Subsequently, in the fourth section, with the input from West Africa cashew manufacturing enterprises, we develop and evaluate the cashew supply chain's social sustainability framework. The discussion related to managerial and research implications are in fifth section. The sixth section focuses on the sensitivity analysis of the results from the model and managerial feedback. Finally, we conclude with a focus on contributions, limitations, and future research opportunities in the seventh section.

2. Research background

2.1 Sustainability concern in the cashew industry of West Africa

The cashew industry in West Africa is mainly characterized by internal (farmers, farmer groups, RCN traders, RCN processing enterprises, manufacturing enterprises, kernel distributors, retailers and consumers) and external (national governments and non-governmental organizations) supply chain members as its main stakeholders. Many of the predominately small and medium cashew processing and manufacturing enterprises in the

region have an installed capacity of less than 1000 tonnes and 10,000 tonnes, respectively. They produce for the local and international markets. However, they are keen on collaborating with potential international kernel distributors and retailers to export their products to developed economies where the total proportion of global consumption is high, and the price is competitive.

Attention to social sustainability issues in agricultural supply chains is gradually gaining currency. Sustainability has become a central theme in agri-food supply chain management (SCM) due to the conviction that sustainability practices can address emerging concerns (Ghadge et al. 2020; Luo et al. 2018). As such, there is a significant interest in food with provenance for economic development (Kemp et al. 2010; Soon and Wallace 2018), including cashew from Africa in developed countries (CBI 2018). Stakeholders, namely retailers, kernel distributors, government agencies and non-governmental organizations have raised concerns about the small percentage of RCN processed in Africa, especially in light of consumers need for kernel produced with less environmental impact (ACA 2010; Agyemang, Zhu, and Tian 2016; Agyemang et al. 2018). This scenario comes with additional concerns for social sustainability in the cashew supply chain (Red River Foods 2014). International media attention on social issues in the industry raises concerns for global cashew supply chain stakeholders. For instance, the infamous term "blood cashew," which was first used in the international media to describe the use of force labor in Vietnam cashew production reported by Human Rights Watch in 2013, remains a popular concern for downstream supply chain members (Wilson 2015). Also, concerns have been raised on how the industry treats women (Drewett 2019). Thus, partners in the supply chain have to simultaneously complement their environmental management practices with

further social responsibility programs to achieve holistic, sustainable supply chain performance (Ávila et al. 2013; Jenkins 2009).

SSSC is particularly important in the West Africa cashew industry due to many social expectations stakeholders have of the supply chain to address problems, such as unemployment among young people and women (Red River Foods 2014). Question on how the industry can respond to local economic development (Catarino, Menezes, and Sardinha 2015), address disadvantages for women in rural areas (Pohlmann 2012), and increase income (Bromley 2011) are of interest to various stakeholders. Against this background, enterprises need to prioritize sustainability activities considering stakeholder demands and capabilities to ensure their ability to create value for the different stakeholder groups (Michelon, Boesso, and Kumar 2013). SMEs who dominate the cashew industry need to understand the various SSSC factors or initiatives and their influences for an effective implementation of SSSC programs in their supply chain or when they need to collaborate in large global customers' supply chains. Additionally, external supply chain members that promote SSSC need to understand how they can tactically support the SSSC implementation.

Many social sustainability practices are important to cashew enterprises. Sustainability practice or related practices in the supply chain can be considered a criterion (Ashwani Kumar, A, and Gupta 2020). Likewise, supply chain managers taking action to execute/realize sustainable practices or criteria can be defined as the implementation of SSSC criteria (Badri Ahmadi, Kusi-Sarpong, and Rezaei 2017). Many studies have shown that it is important to systematically implement sustainability criteria by means of a well define approach in the form of pathway for sustainability implementation (Gupta, Kusi-

Sarpong, and Rezaei 2020; Rentizelas et al. 2019). The outcome of such a pathway can be define or lead to sustainability performance which determines the realization of sustainability goal (Thong and Wong 2018). Nonetheless, in practice and research, these initiatives are rarely studied to understand their influences and importance in the supply chain. Moreover, the perspective on the role of developing countries' agricultural SMEs in the process of determining these SSSC criteria and how the practices are strategically implemented is limited.

2.2 SSSC ***criteria and ISO26000 guidance for sustainability in the cashew industry***

In agricultural supply chains, many social sustainability criteria have been highlighted as important. For instance, food safety concern is deem as highly critical along all stages of the supply chain (Dabbene, Gay, and Tortia 2014; Lu et al. 2020). According to Aung and Chang (2014), food safety practices enhance the reputation of processors who produce it. In global market trade, it is a crucial prerequisite (Bloemhof et al. 2015), and customers may reject food products if they do not meet the food safety standard (Henson and Jaffee 2008). Therefore, enterprises and their supply chains are responsible for providing safe and healthy food to the final consumer to eat (Lu et al. 2020). Several studies have identified and categorized groups of agricultural supply chain criteria, as shown in Table 1. In a more recent and comprehensive approach, Santos et al. (2019), following the lead of Labuschagne and Brent (2005), categorized social sustainability of agri-food supply chains into four dimensions framework – internal human resources, external population, stakeholder participation, and macro-social performance. They show that many studies focus on the external population category, which considers issues and indicators related to the impact of an enterprise or supply chain's operation in communities. They also noted

that issues such as health, education, and local community development related to the indicator of human capital dominated many studies' attention.

Likewise, a couple of national bodies, international organizations, and industrial organizations have categorized social sustainability issues and practices (Zinenko, Rovira, and Montiel 2015). Among international social responsibility standards (Tsai and Chou 2009), ISO 26000 is among the most recent and was developed in 2010 to generate a global consensus on the definition, concepts, and core issues of social responsibility. It complement other predominant corporate social responsibility instruments such as UNGC and Global Reporting Initiative (GRI) (Toppinen et al. 2015). It constitutes seven core subjects and thirty-six issues; each of the seven core subjects is important to an organization (Ranängen, Zobel, and Bergström 2014).

Unlike many other social responsibility standards, ISO 26000 is a guideline document which seeks to guide any organization, irrespective of size and complexity, and their network to effectively operationalize social responsibility in their management processes and maximize their contribution to sustainable development (ISO 2010). It is presented as a comprehensive management approach for a practical approach rather than a strategic (UNGC) or reporting approach (GRI) to CSR in global business. Like other important international instruments, even though ISO 26000 has a practical approach to CSR, it cannot take into account, context and singularity which are essential for the strategic integration of sustainability into organizations (Toppinen et al. 2015). Nonetheless, ISO 26000 points out that organizations considering their context, conditions, resources, and stakeholder perceptions, can proactively identify the issues and impacts of greatest significance to sustainability (ISO 2010).

Table 1 Related sample literature on social sustainability criteria

Author(s)/ Name of document	Criteria of social sustainability
Maloni and Brown (2006)	Animal welfare, biotechnology, community, environment, fair trade, health and safety, labor, and procurement.
van Calker et al. (2007)	Food safety, animal welfare, and landscape quality
Shokri, Oglethorpe, and Nabhani (2014)	Consumer health, transparency, food safety and quality, animal welfare, labor and ethics
Lebacq, Baret, and Stilmant (2013)	Education, working conditions, quality of life, multi-functionality , acceptable agricultural practices and product quality
Zhu et al. (2018)	Fairness, safety, animal welfare and employment.
SA 8000 (SAI 2014)	Child labor, forced and compulsory labor, health and safety, and discrimination
UN Global Compact (UNGC) (UN 2020)	Human rights, labor standards, environment, and corruption
ISO 26000(ISO 2010)	Organizational governance, human rights, labor practices, the environment, fair operating practices, consumer issues, and community involvement and development issues

Despite the growing trend of studies to understand the diffusion of sustainability standards (Mueller, dos Santos, and Seuring 2009) and their benefits, the current impact of generation of standards on performance is not well understood especially within the context of developing countries (Tuczek, Castka, and Wakolbinger 2018). Also, studies on the strategic aspect of implementing social responsibility guided by international guidelines are emerging (Calabrese et al. 2019; Hahn 2013). However, little is known on the strategic implementation in the agricultural sector. Most studies on ISO 26000 are predominately conceptual. So far, limited studies focus on enterprises' actual adoption, especially at the micro-level of organizational practices (Balzarova and Castka, 2018). Although other empirical research may give suggestions to implementation of sustainability standards, it is not clearly known which type of organizations will find ISO 26000 relevant or the challenges they may encounter.

Depending on the industry, enterprise, and context, various studies highlight ISO 26000 core subjects and issues that stand out. Calabrese et al. (2019)indicated fair operating practice as the most important criteria for a CSR strategic implementation in a medium enterprise specialized in designing and manufacturing hydraulic valves and systems enterprise. Ávila et al.'s(2013) study of 70 organizations in Brazil regarding their CSR initiatives within ISO 26000points out that many organizations are committed to labor rights, environment, fair operating practices, and human rights. Regarding ISO 26000 usefulness, Toppinen et al. (2015) noted that many enterprises have already adopted practices recommended by ISO 26000. They argued that ISO 26000 standard did not have much potential for enterprises that already have some existing sustainability activities in their processes. However, in catering service enterprises, Del Baldo and Aureli (2019), indicate that even with an experience of implementing social sustainability practices, enterprises can still

benefit from ISO 26000 as it can provide an improvement in existing practices and give a greater integration of social sustainability in an organization.

Similarly, Ranängen, Zobel, and Bergström (2014) observed that ISO 26000 could be used to evaluate and improve enterprise social sustainability practices by means of advice when designing a sustainability program and effectively supporting management based standard such as ISO 18001and ISO 14001. Hasan's(2016) empirical investigation of manufacturing SMEs in Bangladesh, demonstrates that enterprises implement ISO 26000 in practice. However, only a few issues that suit the owner-managers' personal motives are implemented, while many others, such as environmental issues, are neglected. Indeed, the most important criteria considered by many social responsibility studies of SMEs in developing countries focus on employee welfare and community development (Tsoi 2010; Demuijnck and Ngnodjom 2013).

The extant literature suggests that enterprises need not act on well intention impulses or react to external pressures. However, they should clearly define how their supply chain design can enhance their sustainable performance by implementing sustainable practices (Hami, Muhamad, and Ebrahim 2015). Thus, SMEs such as those in the West Africa cashew supply chain need to have a strategy to deploy social sustainability practices that meet customers' requirements. Implementation of SSCM requires that SMEs work with others beyond their enterprise (Andersen and Skjoett-Larsen 2009).

Researchers have made calls to understand SMEs' role in supply chain (Touboulic and Walker 2015b). Thus, subsequent studies have made suggestion that CSR requirements of customers have a direct negative effect on SMEs' CSR requirements toward suppliers. However, the relationship becomes positive when taking into account the mediating role of the SMEs' own CSR activities (Stekelorum, Laguir, and Elbaz 2019).In an attempt to understand how SMEs in food processing

industries operationalize their CSR vision, El Baz et al. (2016) observed that SMEs may adopt different ways to manage CSR activities considering the meaning and role they assign it in their corporate strategy. Stekelorum (2020) pointed out that SMEs in CSR implementation in supply chains can play one or more of four categorized key roles: adopters, blockers, generators and transmitters. SME's role as adopters is expressed when SMEs are pressurized through compliance mechanisms or collaborate with their supply chain partners to implement CSR activities (Touboulic and Walker 2015a; Carrigan et al. 2017; Egels-Zandén 2017; Harness et al. 2018). The main disadvantage of the adopter role is the possibility for SMEs who do not meet their customers' social sustainability requirements to risk losing business. On the other hand, SMEs function as blockers when they do not implement CSR compliance they receive from downstream partners (Egels-Zandén 2017; Baden, Harwood, and Woodward 2011). As generators, SMEs may experience less customer pressure but focus on compliance and/or capacity-building approaches to implement CSR activities in the supply chains (Ciliberti, Pontrandolfo, and Scozzi 2008; Hall 2000). In a transmitting role, SMEs pass on CSR requirements from their customers to their suppliers (Ayuso, Roca, and Colomé 2013; Stekelorum, Laguir, and Elbaz 2019). This study mainly focuses on SMEs role as adopters and generators.

2.3 ***Sustainability criteria development and Multi-criteria decision-making methods***

Gracia and Quezada (2016) observed that SSCM goals are integrated into an organization through systematic coordination of critical business processes. In many instances, more than one conflicting criterion may characterize an enterprise or supply chain's goal, and decision-makers have to consider several issues that can simultaneously enhance the business process. Well defined criteria have the potency to provide organizational, supply chain, and overarching policy measures

to establish measurable goals and objectives (Manning and Soon 2016). Thus, both practitioners and researchers need to clearly define criteria to achieve sustainability goals (Pojasek 2011).

Multi-criteria decision-making (MCDM) methods can be used to develop sustainable criteria, balance a variety of criteria, and quantify trade-offs between criteria to identify the managers' preferences, in cases where there is more than one conflicting criterion (Sarkis and Talluri 2002; Banasik et al. 2018). Through the various MCDM methods, the ambiguity caused by vagueness and uncertainty can be reduced by qualifying each criterion's importance to make a better decision.

MCDM methods can improve the quality of decisions in an explicit, efficient, and rational manner by weighing various consideration and making judgments of its members into smaller units and then reassemble to show an overall picture to the decision-maker (Mardani et al. 2015). In a review of literature, Banasik et al. (2018) suggested that in terms of the three dimensions of sustainability, the most commonly considered sustainability criteria for MCDM evaluation are related to economic (e.g., total costs and profit) and environmental (GHG emissions, air pollution, and impact on global warming) criteria. However, many new sustainable criteria are considered, and extended stakeholders influence, input and considerations play a greater role in SSCM. Thus, social impact, and other intangible criteria draw much attention (Govindan et al. 2015).

3. Methodology

A four-phase methodology consisting of thirty-seven interviews at various phases is used to develop the SSSC criteria and evaluates the social sustainability performance of cashew manufacturing SMEs, as shown in Figure 1. Specifically, the methodology aids in respond to the research questions through its design. The focus of the first, second, and third phases of the methodology is to respond to the first research question on what SSSC criteria and pathway can

guide SSSC implementation. Subsequently, the fourth phase helps in respond to the second research question on the perceived social sustainability performance of cashew manufacturing SMEs based on SSSC criteria.

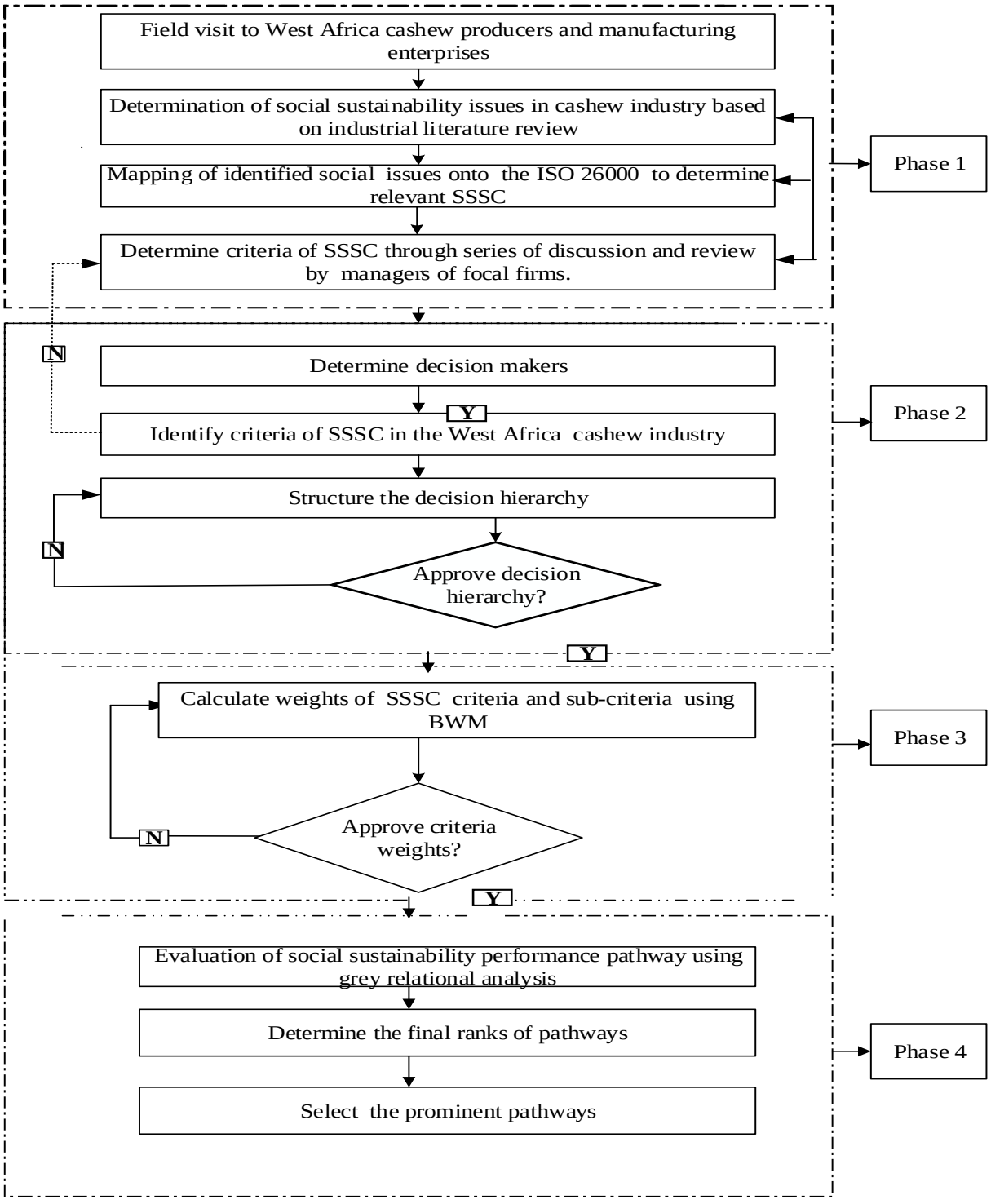

Figure 1. Four-phase methodology applied for the study

3.1. Study Design

The first phase involves initial field visits, industrial literature review, the seven dimensions of ISO 26000, and identifying focal firms' managers to determine the initial SSSC criteria for further evaluation. Based on the study objective, we sought to interview a sample of supply chain actors in the West Africa cashew industry interested in implementing SSSC practices. The field visits and interviews allowed a more in-depth understanding of the perspectives, motivation, orientation, and dynamic relations of supply chain members to achieve sustainability goals. Moreover, it gave the opportunity to secure a vivid understanding of the West Africa cashew industry, particularly regarding the nature and complexity of manufacturing enterprises seeking to achieve sustainability practices with their suppliers and customers.

After gaining a base understanding of the context, the next step involved the use of industrial literature, which shares insights into sustainability concerns of supply chain stakeholders to guide the identification and structuring of SSSC criteria. The identified concerns were then mapped against the seven core subjects and thirty-six issues of ISO 26000 to define the relevant social sustainability criteria in the industry.

As a well-grounded legitimate global standard, ISO 26000 is one of the three (GRI and UNGC) most widely used CSR management instruments (Toppinen et al., 2015), judged by many as the most practical guide to strategic implementation of social sustainability (Harazin and Kósi 2013; Chiarini and Vagnoni 2017). Unlike most large enterprises, SMEs need more specific activities to address CSR activities (Stekelorum 2020; Tilley 2010). Hence, ISO 26000 is considered a fit for this study's context, which seeks a practical approach for SMEs' role to the strategic management of social sustainability in the global Africa cashew supply chain. Direct stakeholder engagement

is vital for integrating sustainability into strategic decision-making (Calabrese et al., 2019; Wals and Schwarzin, 2012).

Next, the outcome of the analysis (potential SSSC criteria listing) was presented to five managers who represent managers of large focal firms in the global supply chain. They have deep knowledge into both the upstream and downstream global supply chain. Large enterprises may require or delegate the enforcement of sustainability standards to SMEs beyond the first-tier suppliers (Tachizawa and Wong 2014; Stekelorum 2020). Similar to many supply chain decision problems studied with MCDM (Agyemang et al. 2018; Kusi-Sarpong, Sarkis, and Wang 2016; Rostamzadeh et al. 2015), the decision-making process in this present study relied on managers to make an informed decision about the supply chain and to determine SSSC criteria.

In the second phase, a second group of decision-makers was identified to determine the social sustainability criteria pertaining to the West Africa cashew industry by either agreeing (accepting) or disagreeing (rejecting) the criteria. They were further consulted to add any missing criteria from the list that they deemed important. Thus, the initial SSSC framework, which is the first phase's outcome, was sent to fifteen manufacturing SME managers representing each of fifteen enterprises (See details in Table 2). Through this phase, we demonstrate the significant role of SMEs as generators, adopters, and transmitters in the decision-making process of SSSC.

Table 2 Characteristics of the 15 cashew manufacturing managers and brief profile of their firms

Manager	Position	Role	Years of experience	Organization	Country
M1	Assistant Factory and Administration Manager	General management of supply chain	4	Small sized factory	Burkina Faso
M2	Assistant Procurement Manager	Procurement of RCN and warehouse management	8	Small sized factory	Cote d'Ivoire
M3	Assistant Factory Manager	Procurement and quality control management	9	Small sized factory	Ghana
M4	General Manager	General management of supply chain	5	Medium sized factory	Benin
M5	Assistant Administration Manager	General management of factory and procurement contracts	4	Small sized factory	Nigeria
M6	Owner	General management of supply chain	6	Small sized factory	Cote d'Ivoire
M7	Senior Procurement Manager	General management of procurement and contracts	7	Medium sized factory	Nigeria
M8	Quality Assurance Manager	Implementation of quality assurance	5	Small sized factory	Ghana
M9	General Manager	General management of supply chain	5	Small sized factory	Gambia

M10	Assistant Supply Chain Manager	General management of the supply chain	5	Small sized factory	Nigeria
M11	Assistant Quality Control Manager	Implementation of quality assurance systems	6	Small sized factory	Nigeria
M12	Administration Manager	Assist in general management of the supply chain	8	Small sized factory	Gambia
M13	Procurement Manager	Sourcing of RCN for the factory	5	Small sized factory	Cote d'Ivoire
M14	Finance Manager	In charge of supply chain finance	9	Medium sized factory	Benin
M15	Quality Control Manager	Implementation of quality assurance system	4	Medium sized factory	Ghana

The third phase involves the first part of the MCDM quantitative analysis in the methodology, which is the Best-worst method (BWM) used to determine the level of importance among the SSSC criteria or rank the various criteria presented in the set. Since nearly every enterprise is constrained with resources, it may be necessary to choose or prioritize practices among the set of SSSC criteria. Therefore, these enterprises will have to tactically adopt and implement SSSC criteria, which can be modelled and set as the foundation for strategic implementation. This modeling effort and the problem of limited resources for strategic implementation of criteria can be considered as a MCDM problem (Badri Ahmadi, Kusi-Sarpong, and Rezaei 2017). BWM arguably requires less dataset and computational time compared to many other MCDM methods such as Analytical hierarchical process (AHP) (Chen, Faibil, and Agyemang 2020; Govindan, Mangla, and Luthra, 2017). This is important considering the potential for decision-makers to be fatigued and lose focus in providing useful information for assessment (Kusi-Sarpong, Gupta, and Sarkis 2019). Another reason for the choice of BWM and its advantage is that results are more consistent than those of the other MCDM approaches, which use a full pair-wise comparison matrix.

The final phase of the methodology assessed the level of social sustainability performance of the fifteen cashew manufacturing enterprises on the basis of the ranked criteria using Grey relation analysis (GRA) method. GRA is a prevalent MCDM method that is not based on pair-wise comparisons of criteria but that of alternatives with respect to the criteria. Similar to BWM, the method is especially relevant when the decision problem consists of many alternatives and criteria, and the number of necessary opinions becomes very large. Among MCDM methods, both BWM and GRA concepts are particularly useful approaches for assigning weights of criteria and performance of enterprises. This approach complements the evaluation's nuances to

enhance its rigorousness for decision-making in SSCS implementation. Thus, the study tests the usefulness of hybrid BWM and GRA methodology and its applicability in SSSC.

3.2 Best-Worst Method

BWM is a novel MCDM method proposed by Rezaei (2015).The goal of BWM is to determine the optimal weights of criteria through a simple linear optimization model (Zhao et al. 2017).The technique uses pair-wise comparisons that consider the best criterion to other criteria and then other criteria to the worst criterion. BWM was introduced as a more efficient and easy way for pair-wise comparisons than other MCDM (Gupta and Barua 2017).The BWM has been applied in many studies (Rezaei et al. 2016; Anil Kumar et al. 2019). Badri Ahmadi et al. (2017) were the first in the academic literature to apply BWM measures in SSSC. According to Rezaei (2015), the BWM is composed of five key steps as shown in Appendix A.

3.3 Grey Relational Analysis

GRA describes the measurement or the degree of similarity or difference in changing relations between two systems or between two elements that occur in a system over time (Ho 2006).There is a high degree of relation if two elements are consistent trend and a low level of relation if the trend is inconsistent. The fundamental idea behind GRA is to measure the relationships among elements when the trends of their development have either homogeneity or heterogeneity(Deng 1989). The major advantage of GRA is the ability to process a relatively small amount of data to provide analysis of the key correlation factors in a system with incomplete or unknown information, which is the element of "grey"(Wang, Ho, and Oh 2010). Another advantage of GRA is the in-built distinguishing coefficient, which offers some flexibility to decision-makers to adjust their decisions based on a range of values. It is suitable in this study as it investigates and collects

data from a few sample managers in the manufacturing sector. Wu(2002) pointed out the key steps of GRA as shown in Appendix B.

4. Empirical study

This section shows the application of the four-phase methodology on case enterprises selected and the study results.

4.1 Case enterprises, interviewees, managers of focal firms and SME decision-makers' background

This study adopted a purposive sampling technique that involves a selection process based on specialist knowledge or specific criteria (Walliman, 2011). Thus, we selected participants interested in the implementation of SSSC in the West Africa cashew industry. The first batch of interviews in Phase 1was selected from a global cashew supply chain traceability initiative. The program was introduced to capture and measure data that can enable supply chain actors and stakeholders to monitor, evaluate, and facilitate sustainability practices in the supply chain. Also, reports by the African Cashew Alliance (ACA), the largest industrial body of the Africa cashew industry stakeholders, were used to identify the industrial sustainability concerns.

In 2011 and 2012, ACA reported its annual conferences as one of the largest meetings of cashew industrial stakeholders in the world (ACA 2011; 2012), representing members of the supply chain from farmers to retailers. Additionally, managers of focal firms engaged in the discussion on ISO 26000 to reach the consensus on SSSC criteria and had no less than ten years' experience. The managers have been actively involved in activities of different organizations, shaping the Africa cashew industry to be sustainable and competitive. As representative managers of large enterprise

customers or managers of focal firms, SMEs are expected or pressurized to keep their social sustainability requirements or meet their expectations(Jorgensen and Knudsen, 2006). The fifteen surveyed manufacturing SMEs in Phase 2 are from different countries in West Africa, including Nigeria, Ghana, Benin, Ivory Coast, Gambia, and Burkina Faso. Similar to the sample population in Phase 1, they have an interest in implementing SSSC practices. However, they receive varying levels of pressure from their customers for social compliance, which influence them to meet the social sustainability demand of existing customers or enhance their social sustainability practices to attract new customers. Industrial processing and manufacturing of cashew in West Africa has been gradually emerging within the last decade. Thus, the SME managers selected had between 3- and 10-years' experience. Table 2 gives brief characteristics of these managers.

4.2 Case methodological application

Phase 1: Field visits, open interviews, documentation, and ISO 26000 for determining** SSSC **criteria

The first author conducted seventeen interviews (see interview guide in Appendix C) in Ghana, Benin, Cote d'Ivoire, and Burkina Faso. Cluster of managers (managing director, farm manager, factory manager, and warehouse manager) for each of the five cashew manufacturing SMEs in the global supply chain traceability initiative were interviewed. Also, two leaders of three farmer groups in each participating West Africa country of the scheme were interviewed. At the end of the second farmer group interview in each country, additional interviews (the third group farmer group leaders) could not provide any further information signaling theoretical saturation.

After an initial review of several ACA documents from 2010 to 2018, three categories of documents were considered and utilized to characterize the key sustainability concerns in the

cashew supply chain. First, the ACA Maputo declaration, which was the outcome of the 2010 annual conference and agreed by Africa industrial stakeholders to be a roadmap for the sustainable growth of the industry. Secondly, since 2011 and 2012 were significant years for global industrial stakeholder participation in ACA annual conference, the conference presentations and annual reports were considered the most significant documents to identify supply chain members and stakeholders' sustainability concerns. The first author mapped social sustainability issues from ACA industrial material to the seven core subjects and thirty-six issues of ISO 26000 (see Appendix D). The outcome was presented to five managers of focal firms (Appendix E). Since ISO 26000 has a broad management approach to social sustainability (Ranängen, Zobel, and Bergström 2014), the managers of focal enterprises were asked to focus on core subjects and issues relevant to operationalizing social dimension of sustainability in the supply chain. Initially, different core subjects and issues were selected by each manager of a focal firm. However, after several rounds of discussions and presentations, a consensus was reached. All the managers of focal firms agreed to the final selection of criteria as most relevant to operationalize social sustainability in the supply chain (See Tables 3 and 4).

Table 3 ISO 26000 important core subjects and issues and Social sustainability criteria

Initial	ISO 26000 Core Subject	ISO 26000 Core Issues	Decision Framework (SSSC Criteria)
SOC1	Community involvement and development	6.8.5 Employment creation and skills development	Employment
		6.8.7 Wealth and income creation	
SOC2	Consumer issues	6.7.4 Protecting consumers' health and safety	Food safety
SOC3	Human rights	6.3.3 Due diligence	Labor/work condition

		6.3.4 Human rights risk situations	
		6.3.5 Avoidance of complicity	
		6.3.7 Discrimination and vulnerable groups	
		6.3.10 Fundamental principles and rights at work	
	Labor practices	6.4.3 Employment and employment relationships	
		6.4.6 Health and safety at work	
SOC4	Human rights	6.3.3 Due diligence	Child labor and forced/prison labor
		6.3.4 Human rights risk situations	
		6.3.5 Avoidance of complicity	
SOC5	Consumer issues	6.7.4 Protecting consumers' health and safety	Traceability and management information system
SOC6	Human rights	6.3.7 Discrimination and vulnerable groups	Women empowerment
		6.8.5 Employment creation and skills development	
SOC7	Community involvement and development	6.8.3 Community involvement	Rural Development

Table 4 Detail description of the Decision framework and brief explanation

Sustainability Criteria	**Explanation of the criteria**	**Focal firm outcome measure**
SOC1 Employment	Initiative to improve the living conditions of people through the provision partial or full time job in the supply chain.	Records of employees in the supply chain.

SOC2	Food Safety	Practices to ensure cashew kernel safety from RCN stage to kernel stage for the customer/consumer.	Proof with acceptable verifications that meet customer requirement (e.g., ACA sustainability seal).
SOC3	Labor/work condition	Practices to ensure that labor standards throughout the supply chain are ensured, particularly on how processing enterprises undertake labor management practices in compliance with national policies and ILO convention on fundamental principles and rights at work.	Proof with acceptable verifications that meet customer requirement (e.g., ACA sustainability seal).
SOC4	Child labor and forced/Prison labor	Initiatives along the supply chain to avoid the use of child labor and forced and prison labor.	Proof with acceptable verifications (e.g., ACA sustainability seal).
SOC5	Traceability	Practices that ensures tracing of the history, application or location of cashew product using recorded identifications.	Implementing traceability system with supply chain partners.
SOC6	Women empowerment	Initiatives that ensures that the welfare and social wellbeing of women in the supply chain are addressed.	Records of initiatives to empower women in the supply chain.
SOC7	Rural/Local development	The commitment of processing enterprises and other supply chain actors to support community initiatives that enhance the development of local communities of farming and processing communities.	Records of community development initiatives.

Phase 2: BWM methodology for determining the SSSC criteria set

The BWM methodology starts with the decision framework identified in Table 4. The fifteen manufacturing SME managers (Table 2) identified as decision-makers were presented with the decision framework in Tables 3 and 4, to agree or disagree with the proposal of the managers of focal firms. They review the criteria and the structure for the decision evaluation and approve the criteria as relevant and adequate to integrate SSSC in the West Africa cashew supply chain. The phase fulfills the first step of BWM described in Appendix A, and SMEs' role in the decision process.

Phase 3: BWM methodology for determining SSSC criteria weights

The decision framework was further applied in the subsequent four stages of BWM to determine the criteria optimal weights, as described in Appendix A. After the decision framework was approved, all fifteen managers were sent a questionnaire (Appendix F) to determine the most and least important criteria; compare the most important criterion to the other criteria; and the other criteria to the least important criteria. However, such preference information is often characterized by ambiguity due to vagueness and uncertainty. The reason for this is that decision-makers do not make decisions based solely on cognitive factors, and the decision-making process has a complicated and often unclear configuration. Therefore, the data from the survey questionnaire (Appendix G) was used to compute the optimal weights of the criteria in Table 5.

Phase 4: GRA methodology for ranking of manufacturing enterprises

The approved weights of the criteria from Phase 3 are applied in the GRA procedure in Appendix B to rank the social sustainability performance of the fifteen manufacturing SMEs in their supply

chain. The managers were asked to rate their enterprise's supply chain social sustainability performance in reference to the seven SSSC criteria (See Table 4, Appendix F Question 2C, and Appendix H) using a scale of 1-9 (1: very low performance, 9: extremely high performance).Therefore, in the first step, the referential series and compared series are generated. In Step 2, both referential and compared series datasets are normalized using equations (4) for the larger-is-better. In the third step, the distance between the reference series and the standard series are calculated using equation (8) and in the fourth step, the grey relational coefficient is calculated using grey relational equation - equation (9). In the fifth and final step, the grey relational coefficient for each enterprise is calculated applying equation (10) using the output from step 4 and criteria weights determined in Phase 2.

4.3Result section

Phase 1

We identified the relevant themes in the interview data generated in the first phase. The main themes show that cashew manufacturing SMEs are interested in enhancing their sustainability performance to meet the highly competitive demand of global market. They realize that based on economic efficiency or economic dimension of sustainability, the Africa cashew manufacturing sector had a weaker economic position in the global market. As such, enhancing social sustainability performance in the supply chain presents one competitive potential to the Africa cashew supply chain. This perspective was succinctly expressed by one SME manager in Burkina Faso.

We cannot compete with them (India and Vietnam) on price. They are so much more efficient than we are. But we have certain advantages. We try to differentiate ourselves in the market by

sustainable practices, which are very important with our clients. [Managing Director, medium manufacturing enterprise, Burkina Faso]

However, to enhance their supply chain social sustainability performance, SMEs managers argue that they could make informed decisions. Information from other supply chain members and stakeholders can enable collaboration to achieve sustainability goal; as such, they joined the traceability initiative. Another theme generated was the varied level of farmer groups' orientation towards the implementation of sustainability practices. The weak groups have short-term vision for the relations with manufacturers and less understanding and commitment towards sustainability initiatives. In contrast, the strongest farmer groups have strong group leadership with long-term vision for the relations with manufacturers. Appendix D shows the outcome of the identified sustainability concerns from the industrial literature mapped against ISO 26000. After the initial round of discussion in Appendix D, all the managers of focal firms agreed on four of ISO 26000 core subjects (i.e., Human rights, labor practices, consumer issues, and community involvement and development) as important to operationalize SSSC criteria but with variance in the related ISO 26000 issues (See Table 3).

The four out of seven selected core subjects of ISO 26000, was deemed by the managers of focal firms, as the main social concerns to operationalize SSSC. Environmental core subject and issues (6.5 Environment) were eliminated from the list by all the managers of focal firms (See Appendix D and Table 3). They considered it as environmental sustainability dimension concern in relation to the strategic implementation of SSSC. Also, fair operating practices (6.6) core subject and issues were considered by two managers of focal firms 2 and 5 as more related to economic sustainability. Moreover, the core subject and issues of organizational governance (6.2) were considered by two managers of focal firms 1 and 4 as more embedded in the four core subjects.

The identified issues from the ACA industrial material linked to the consensus on four core subjects and seventeen related issues of ISO 26000 (See Table 3) generated twelve criteria. These twelve criteria include child labor/prison labor, labor rights issues and work conditions, global social compliance, health and safety, women empowerment, traceability, food safety, certification, rural development, employment, enhance livelihood of farmers through increase income, and supplier development. However, the final review of the managers of focal firms resulted in seven SSSC criteria agreed by all to constitute the SSSC framework, as shown in Table 4.

Phase2

All fifteen SME managers agreed with the set of criteria and did not remove or add any new criteria. Thus, based on the opinion of the fifteen West Africa manufacturing SMEs, the SSSC decision framework was approved.

Phase3

In response to the BWM questionnaire, the SME managers provided preference information (Appendix G). Table 5 shows the outcome of the computation to obtain the single weight vector for each criterion. The outcome is highly consistent with an almost zero consistency ratio. The weights attributed to the various criteria represent criterion's importance in the assessment procedure and directly produce effects on the ranking order of alternatives.

Table 5: Results of BWM

Criteria	Average weight	Rank
Employment (SOC1)	0.075074	6
Food safety (SOC 2)	0.37347	1

Labor/work condition (SOC3)	0.153554	2
Child labor and forced labor/prison labor (SOC 4)	0.106823	4
Traceability (SOC5)	0.138428	3
Women empowerment (SOC 6)	0.091957	5
Rural/local development (SOC7)	0.060693	7
Average Consistency	0.032389	

Phase4

Based on the preferences (Appendix H) of SME managers, the grey relational grade for each enterprise is calculated with respect to the overall criteria. The ranking of each enterprise in reference to the seven SSSC criteria of their supply chain social sustainability performance is shown in Table 6.

Table 6: Results of GRA Ranking

Manufacturing enterprise	Score	Rank
M1	0.73793444	5
M2	0.67114698	12
M3	0.49764575	14
M4	0.76817942	4
M5	0.79172871	2
M6	0.70949373	7
M7	0.69086979	9
M8	0.71282589	6
M9	0.8067655	1
M10	0.69394329	8
M11	0.78615331	3
M12	0.50883073	13

M13	0.67865146	10
M14	0.49764575	15
M15	0.67336719	11

5. Discussion

The evaluation outcome of the ISO 26000 guided SSSC framework, aided by the BWM in the cashew industry, revealed a meaningful ranking of the seven criteria (employment, food safety, labor/work condition, child labor and force labor/prison labor, traceability, women empowerment, and rural/local development) in a socially sustainable cashew supply chain. The weights of criteria from BWM show that an increase in value means an increase in the importance of criterion towards achieving the goal of SSSC. According to the ranking, as shown in Table 5, food safety (SOC 2) had the highest weight (0.37347) in terms of its importance to social sustainability. Labor/work condition (SOC 3), traceability (SOC 5), child labor and force labor/prison labor (SOC 4), women empowerment (SOC 6), employment (SOC 1) and rural /local development (SOC 7) rank second (0.153554), third (0.138428), fourth (0.106823), fifth (0.091957), sixth (0.075074) and seventh (0.060693) respectively in order of importance.

The outcomes of the ranking suggest that the pathway for West Africa cashew manufacturing enterprises to implement SSSC initiatives, which highlights the need to focus on consumer issues related to food safety and traceability, enhanced labor practices through improved labor and work conditions, and implement practices linked to human rights specifically related to child labor issues. However, much more attention and resources should focus on food safety initiatives as an urgent or important social sustainability concern in the implementation program of a sustainable cashew supply chain. Food safety is a significant prerequisite for trade on the global cashew market

(Red River Foods 2014).Customers may reject cashew products if they do not meet the food safety standard. Increasing food safety legislation(Olsson and Skjöldebrand 2008; Ringsberg 2010) such as the European commission regulation 178/2002 on food law and the new United States food safety and modernization act has heightened the need for downstream cashew supply chain members to apply robust quality and compliance program to enhance food safety. The highlight of this study outcome on food safety is in tandem with the predominant focus on stakeholders issues of agri-food supply chain related to human development indicators (Santos et al. (2019). Many studies suggest that food safety is the primary concern of food supply chain stakeholders (e.g., Verbeke and Viaene, 2000). Even more so in the case of cashew processing and manufacturing stage (Red River Foods 2014). Cashew manufacturing and processing enterprises need to focus on producing safe food for consumers.

Additionally, consumer concern closely related to food safety initiative is traceability, which is the third vital SSSC criterion in BWM (0.138428). Implementation of traceability system in sustainable supply chain can enhance food safety practices (Wognum et al. 2011). In West Africa, cashew manufacturing enterprises usually record information such as the source location of the RCN, farmers or farmer groups who produce the RCN, and the conditions of the RCN production. Some enterprises have initiated programs to present this information through RFID technology to their customers. Also, initiative such as the global supply chain traceability initiative considered in this study (Phase 1) seeks to add management information of the supply chain to the traceability system. Traceability system can facilitate the potential for a trace back if the need arises. It can boost the reputation of food manufacturing enterprises and enhance customers' confidence in the food supply chain for a safe product.

Enterprises and their supply chains play a vital role in promoting human development. As such, ISO 26000 considers labor practices as a core subject for any responsible enterprise. Labor and work condition ranked second in BWM (0.153554). Interestingly, child labor and force labor emerge in the fourth position with 0.106823. Compared to similar agriculture commodities such as cocoa, there has not been a major international media report on child labor in West Africa. Again, no major international media has reported force labor in the West Africa cashew supply chain. Nonetheless, child labor and force labor are of general concern in agricultural industries especially in developing countries (Bhalotra and Heady 2003; Oehmen et al. 2010). It is a delicate social issue for cashew downstream supply chain members (Olam, 2015). Cashew manufacturing enterprises have a high sense of awareness of the issue and consider practices to safeguard the supply chain from this negative social impact.

ISO 26000 specifies the importance of enterprises' role in affirming and supporting the full and active participation of members in the society, which leaves no grounds for discrimination. The concern of women employment is critical in the cashew industry. Women often make up the majority of employees at the processing stage (Kanji 2004). Therefore, cashew manufacturing and processing enterprises are often committed to practices that empower women as an economically vulnerable group. For instance, some processing and manufacturing enterprises have initiatives to train and employ young women living rural areas, as well as provide daycare services within their premises for employees with infant children (Cashewomen 2019).

The BWM results show that women development (SOC7) and employment (SOC 1) are in the lower order of ranking. Many processing and manufacturing enterprises emphasize on their public documents (e.g., Mim Cashew 2020), their contribution to women empowerment initiatives and employment. However, it is surprising that they rank less than the first four criteria. A possible

reason could be that many manufacturing enterprises already focus seriously on women empowerment practices and do not consider this initiative more important than the first four criteria. Alternatively, this reflects the fact that although women dominate the workforce, most management position of the supply chain is still predominantly occupied by men.

ISO 26000 sheds light on the relationship an enterprise and its supply chain have with the communities in which they operate. Cashew enterprises are expected to be involved with the communities within its area of impact as a good organizational citizen of the community. Through these commitments, they demonstrate their common interest with members of the community. Rural/local development, which is rank the least among the seven criteria in BWM (0.060693), suggests that other initiatives have a much higher influence on the goal of social sustainability. Nonetheless, it could also mean that other sustainability initiatives in the supply chain, such as providing employment and women empowerment practices, lead to the realization of local development objectives. Many cashew processing enterprises and other downstream members may support activities that aim to improve the wealth and income generating activities such as microfinance, diversification of sources of farmers' income through the promotion of cashew apple processing in the communities they operate (Red River Foods 2014; Olam 2015).

Among the fifteen cashew manufacturing SMEs, M9 represented by its manager is the highest scoring enterprise in supply chain social sustainability performance (80%) considering the various weights of the SSSC criteria, as shown in Table 6.The other 2 top-ranking enterprises are M5 and M11.These top performing enterprises are not so dependent on international customers. However, they focus on building their capacity with their suppliers to meet such large enterprises' expectation as potential customers. They do not implement many formal and verifiable social sustainability standards such as the ACA sustainability seal (i.e., an industry-accepted mark),

which is one of the most important verifications for sustainability in the Africa cashew industry. Their current social sustainability requirements are not so demanding, so they reckon implementing social sustainability activities and verifying with the standards of potential customers will draw new clients or maintain existing ones. For instance, M9 enterprise hopes to attract or gain new customers outside the country and understands that one minimal expectation to achieve such an objective is a verifiable implementation of social sustainability activities.

Also, M5 noted that "*social sustainability practice is important to the way we do our business. We have the passion for responsible business, and we value our customers and suppliers, but we do not have all the certificates required by some big customers for verification*." Thus, SMEs may implement social sustainability practices because of their passion for social responsibility (Spence, Ben Boubaker Gherib, and Biwolé 2011; Hasan 2016). Nonetheless, without formalized process for verification, it may only meet the SME outcome measure of social sustainability performance but not that of the customer's social sustainability performance requirements (Fassin 2008). Thus, SMEs who are less dependent on large enterprises that demand formalization of social sustainability process may rate their social sustainability performance higher than such customers' performance expectation, which need a proof or a means of verification such as certificates.

The least performing enterprise is M14, a medium scale manufacturing enterprise. The majority of the least performing manufacturing enterprises (M14, M3, and M12) are adopters of social compliance or actively engaging their customers in collaboration to implement social sustainability practices in the supply chain to meet customer requirements. They have signed up or in the process of signing up for the ACA sustainability seal (i.e., certification). Therefore, adopting SMEs have experience with high demanding social sustainability customers and understand the difficulties implementing initiatives to meet the social compliance and/ or collaborate to enhance SSSC. Also,

they are highly dependent on their customers for their survival (Touboulic and Walker 2015a; El Baz et al. 2016).

Poor collaborations and invisibility predominantly characterize the current West Africa cashew supply chain regime in the upstream of manufacturing SMEs. It is difficult for manufacturing SMEs and their collaborating partners to implement social sustainability practices with their various farmer group suppliers to meet the requirements of their customers. It is a result of such challenges to implement SSSC that some of the leading actors have initiated the global supply chain traceability initiative and integrated with management information system. The present scenarios potentially render many manufacturing SMEs weak or have challenges in strengthening their collaboration with customers for the implementation of SSSC practices to meet customer demand. Previous studies (e.g., Touboulic and Walker 2015a; Stekelorum 2020) suggest that SMEs can build mutual relationships with their suppliers, especially when they are agricultural SMEs (Zaridis, Vlachos, and Bourlakis 2020) and in the same local community (Gadenne, Kennedy, and McKeiver 2009). However, it is difficult to develop sustainable multi-tier suppliers in upstream supply chain such as the West Africa cashew industry. The predominant barrier of misalignment of many farmer groups' short-term goal hinders the potential for a long-term strategic collaboration with other supply chain partners.

There is no public data available on organizations that use ISO 26000 because it is a guideline document, not certifiable standard. As such, comparatives empirical studies with ISO 26000 are rare. Although some studies (e.g., Toppinen et al. 2015) did not see much potential in ISO 26000 standard, we reckon that similar to other previous studies (Del Baldo and Aureli 2019; Ranängen, Zobel, and Bergström 2014), ISO 26000 was useful for capturing all the practices in agricultural SSSC and serve as important guidelines to enhance social sustainability performance.

Nevertheless, the various ISO 26000 core subjects and issues needed clarification to managers for contextual understanding. Thus, its use can be time-consuming. Furthermore, similar to other studies (e.g., Hasan 2016) on SMEs in developing countries implementing ISO 26000,managersdid not consider or categorize environmental practices as part of operational activities in social dimension of sustainability. However, the exclusion of environmental concerns is specifically related to the focus on strategic implementation of SSSC and social dimension of the three sustainability dimensions.

In all, in response to the study's research question on the need to identify SSSC criteria and the pathway that can guide SSSC implementation, seven criteria have been identified through the study's methodology. The ranking of the identified criteria provides clear insight into the practical pathway to SSSC implementation. Thus, the study provides clarity to the development and implementation of social sustainability criteria to achieve social sustainability performance in the supply chain, considering the role of cashew manufacturing SMEs in agricultural supply chain from developing countries' perspective. Similarly, in response to the second question of the study on the perceived social sustainability performance of cashew manufacturing SMEs based on the identified SSSC criteria, two main profiles of SMEs were identified, including generators and adaptors. SMEs with profiles that generate SSSC practices tend to perceive their social sustainability performance in the supply chain much higher than adopters who meet customers' sustainability requirements.

6. Sensitivity analysis and managerial feedback

6.1 Sensitivity analysis

The robustness and validity of the results of a model can be monitored to see its impact on the entire system. Through sensitivity analysis any possible biases during data collection and analysis

can be eliminated (Gupta and Barua 2018; Rajesh, Ravi, and Venkata Rao 2015).In this study, sensitivity analysis was conducted on the BWM-GRA method to see if the ranking of the manufacturing enterprises will change. Therefore, ten different rounds of analysis were performed. Table 7 presents the sensitivity analysis for the ranking of manufacturing enterprises. The results of the sensitivity analysis (Table 7) show that outcome of the enterprise rankings isnot so much variable. Therefore, the proposed analysis can be conveniently accepted as robust and free from biases and that the results may be comfortably generalizable to the industry.

Table 7: Ranking of manufacturing enterprises by sensitivity analysis when weight of criterion SOC 3 varies from 0.1 to 0.9

Manufacturing enterprises	Normalized	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
M1	5	6	6	9	6	5	5	7	5	5
M2	12	11	14	13	11	13	12	15	12	12
M3	14	12	15	12	14	14	15	10	13	14
M4	4	4	3	4	5	3	4	2	4	4
M5	2	2	2	3	3	2	2	4	2	2
M6	7	9	9	7	8	7	7	9	7	6
M7	9	8	7	8	10	9	9	8	9	9
M8	6	5	4	4	5	6	7	6	8	7
M9	1	1	1	1	1	1	1	1	1	1
M10	8	7	8	6	7	8	8	5	6	8
M11	3	3	4	2	2	2	3	3	3	2
M12	13	13	11	13	12	12	13	13	15	13
M13	10	10	10	10	9	11	11	12	10	10
M14	15	15	13	14	15	15	14	14	14	15
M15	11	14	12	11	13	10	10	11	11	11

6.2. *Managerial feedback*

The results (Tables 5 and 6) and initial frameworks (Appendix D and Table 4) were reported to the managers of focal firms and SME managers for validation and enhance the interpretation of the results. Two managers of focal firms (Managers of focal firm 1and 4) and three SME managers (Managers 5, 13, and 15) responded.

The two managers of focal firms confirmed the results. Managers of focal firm1 argued that *"food safety is the big thing in the supply chain; it is important to get that right."* Manager of focal firm 4 expectation was to see traceability as the second most important criterion. Nonetheless, she noted that the process for arriving at the decision was "*nuance, objective and did not miss the general target on strategic ranking of social sustainability concerns in the supply chain.*" Thus, both managers of focal firms were of the view that food safety is paramount to social sustainability concerns. The managers of focal firms emphasized that all the enterprises need support from various stakeholders to meet large enterprise customers' expectations in the global market.

The three respondent SME managers confirmed the results. However, manager 15 suggested that implementing the highly rank social sustainability practices are closely related to economic sustainability dimension. Therefore, the ranking of criteria indicates the challenges manufacturing sector faces in the supply chain. This reinforces the argument in the extant literature that social and economic practices of an enterprise cannot be segregated (Yawar and Seuring 2017).

7. **Conclusion**

Cashew supply chain is a quintessence agricultural supply chain faced with many social and environmental concerns from stakeholders. In West Africa, the cashew industry seeks to promote

local processing of RCN and manufacturing of kernel and other cashew products to reduce the negative impact of exporting RCN to India and Vietnam. However, to achieve a holistic, sustainable supply chain implementation, there is a need for manufacturing and processing SMEs, to strategically enhance social sustainability performance in the supply chain and meet the global market requirement. ISO 26000 presents an opportunity to tactically guide the implementation of social sustainability initiatives in the agricultural supply chain, as exemplified in the cashew supply chain. However, understanding the various initiatives requires rigorous evaluation to ascertain their impact on SSSC performance.

7.1 Theoretical contributions

In the present work, we made major contributions to social sustainability in agri-food sector. First, in reference to the research gap of limited insight on what strategic implementation activities can enhance social sustainability performance in the supply chain based on the role of agricultural SMEs in developing countries, we proposed seven criteria. We highlighted food safety as the most significant criterion. The other remaining pathway activities in order of significance include labor/work conditions, traceability, child labor, and force labor/prison labor, women empowerment, employment, and rural /local development.

Additionally, in response to understanding cashew manufacturing SMEs' perception of social sustainability performance based on SSSC criteria, the study results show the profile of two roles. The outcome confirms Stekelorum's (2020) recent categorization of SMEs' roles in supply chain CSR. We identify SMEs roles as generators and adopters. Our research suggests that generators may perceive their supply chain social sustainability performance much higher than adopters who meet customers' sustainability requirements. Also, the challenges to meet the reality of customers'

sustainability requirements include collaboration with upstream supply chain suppliers and formalization of social sustainability practices.

A proposed four-phase methodology achieved the outcome of the study. The first phase of the methodology used field visits, interviews, industrial literature, and ISO 26000 as a guide to identifying seven social sustainability criteria in the cashew supply chain. Subsequently, in the second, third, and fourth phases, we applied a hybrid MCDM tools, BWM and GRA to measure and compare the impact of the various SSSC initiatives in the West Africa cashew supply chain and performance of these criteria in the supply chain considering the view of manufacturing enterprise managers in their supply chain. Studies that emphasize the role of SMEs in MCDM SSSC are rare. To the best of our knowledge, this is the first time to emphasize the role of SMEs in MCDM problem. The methodology in this research can be applied in other research contexts.

Compared to previous studies that mainly analyze the relationship between environmental sustainability dimension practices to enhance sustainability performance, this study advanced the research to the limited work on social dimension. The study focuses on how to operationalize social sustainability in the supply chain. However, the considered socially sustainable practices can potentially enhance the environmental and economic sustainability dimensions.

7.2 Practical contributions

The present paper provides important insights for practitioners. The study can be helpful in the broad context of agricultural supply chain management in developing countries and how SSSC can be strategically implemented. The West Africa cashew industry's focus in this paper can provide practitioners with insights that can support cashew manufacturing SMEs and other stakeholders to guide the implementation of SSSC. The criteria proposed can be instrumental in the development of SSSC and enable the evaluation of the sustainability initiatives in the cashew

supply chain to determine the impact of the various criteria. The empirical finding shows that food safety initiatives and rural/local development initiatives are the most and least important criteria, respectively, to achieve SSSC. The study suggests that many SMEs implementing SSSC to meet the social compliance of their customers recognize and understand the various practical challenges to effective implementation of these criteria to enhance SSSC. Thus, organizations and governments interested in enhancing the social sustainability in the cashew supply chain can offer training and resources to enterprises in the industry to overcome these challenges and to have a better understanding of the levels of importance of criteria, as well as how they can enhance the supply chain by overcoming hindrances. Moreover, big global retailers interested in the West Africa supply chains and as focal firms can understand the perceptions of SSSC in the region and better collaborate with manufacturing enterprises and other supply chain members to enhance social sustainability in the industry.

Furthermore, the paper fills a practical literature gap (Balzarova and Castka 2018) by demonstrating ISO 26000 as suitable to guide agricultural SMEs in developing countries to enhance SSSC. We recognize that the introduction of ISO 26000 core subjects and issues to supply chain stakeholders can potentially be unclear and need further contextual explanation and clarity, thus its application is time-consuming. Nonetheless, it still proves to be a useful document for the industry to think through how to enhance SSSC. Thus similar to other studies (e.g., Calabrese et al. 2019), the benefit of applying the instrument allowed a deep and guided thinking on sustainability integration into SSCM. Therefore, contrary to the suggestion of other studies such as Schwartz and Tilling (2009) about the use of standardized approaches to address social sustainability, ISO 26000 can drive change, although not radical, but it can potentially enhance the SSSC of SMEs.

7.3 Limitations and future research directions

Although this study made theoretical and practical contributions, it did not explicitly focus on how multi-tier supply chains with many actors implement SSSC initiatives. Also, the ranking in Tables 4 and 5 are conditioned by the data input from fifteen managers in the West Africa cashew industry within a single period of study. It could be possible that in another investigation, when input data from different study periods, managers and locations are applied, different rankings may be obtained. This shows that MCDM, in general, does not provide an "ultimate" solution, but it supports the decision-making process to find an appropriate alternative. Nevertheless, the homogeneity of respondents and focus on a single industry makes a convincing case. The identified criteria offer the pathway to achieve SSSC in the West Africa cashew industry and provide insight on social sustainability performance.

Future studies would benefit from expanding this study to include across multi-industrial manufacturing sectors and locations, which might help overcome the potential problems with external generalizability. Besides, further research should be consider more empirical work on the proposed framework with other weight and performance calculation techniques such as Fuzzy-analytical network process, Rough set, Technique for order preference by similarity to ideal situation, VlseKriterijumskaOptimizacija I KompromisnoResenje, and Shannon entropy (Wan, Wang, and Dong 2013). The use of different techniques with different conceptual underpinnings as evaluation tools can potentially show relatively different rankings, which echoes the need for industrial managers to employ more than one tool in the evaluation of criteria to avoid misleading analysis (Kusi-Sarpong, Sarkis, and Wang 2016). The computation results from a single tool evaluation need a thorough comparative analysis of other techniques' outcomes to sufficiently develop an enriched interpretation of the various criteria for decision-

making (Zhou et al. 2016). Moreover, future studies can shed insights on how multi-tier supply chains with many actors implement SSSC initiatives and the success of the social sustainability performance pathways.

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Appendices

Appendix A: The five steps of BWM according to Rezaei (2015)

Step 1: Determination of the set of decision criteria.

Step 2: Determination of the best (B) and the worst (W) criteria among the decision criteria.

Step 3: Using a scale of 1-9, ask decision-makers to elicit pair-wise comparisons of the best criterion (B) over the other criteria. This exercise will result in vector $\boldsymbol{A_B} = (a_{B1}, a_{B2}, a_{B3}, \ldots, a_{Bn})$.

Step 4: Like above, decision-makers were asked to elicit pair-wise comparisons of all the other criteria with worst criterion (W). This exercise will also result in vector determination of the preference of each of the other criteria over the worst criterion: $\boldsymbol{A_W} = (a_{1W}, a_{2W}, a_{3W}, \ldots, a_{nW})^T$.

Step 5: Obtain the optimal weights $(w_1^*, w_2^*, w_3^*, \ldots, w_n^*)$ for all criteria.

Here, we obtain the weights of criteria such that, the maximum absolute differences for all j can be minimized for $\{|w_B - a_{Bj}w_j|, |w_j - a_{jW}w_W|\}$. The following minimax model will be obtained:

min $max_j\{|w_B - a_{Bj}w_j|, |w_j - a_{jW}w_W|\}$

Subject to

$\sum_j w_j = 1$ (1)

$w_j \geq 0$, for all j

Problem (1) can be transferred to the following linear programming problem:

$\min \xi^L$

subject to

$$\left|w_B - a_{Bj} w_j\right| \leq \xi^L, \text{ for all } j$$

$$\left|w_j - a_{jW} w_W\right| \leq \xi^L, \text{ for all } j \quad (2)$$

$$\sum_j w_j = 1$$

$w_j \geq 0$, for all j

After solving problem (2), the optimal weights $(w_1^*, w_2^*, w_3^*, \ldots, w_n^*)$ and ξ^{L*} are obtained. ξ^{L*}can be directly considered as an indicator of the consistency of the comparison system. The closer the value of ξ^{L*} is to zero, the higher the consistency is, and thus the more reliable the comparisons become.

Appendix B : The key steps of GRA according toWu (2002)

Step 1: Generate the referential series of $x_0 = (x_0(1)x_0(2),...x_0(j),...x_0(n)$ with j entities, and x_i is the compared series of $x_1 = (x_1(1)x_1(2),...x_1(j),...x_1(n)$ where $i = 1, 2, 3, ...m$

The compared series x_i can be represented in a matrix form:

$$x_1 = \begin{bmatrix} x_1(1) & x_1(2) & \cdots & x_1(n) \\ x_2(1) & x_2(2) & \cdots & x_2(n) \\ \vdots & \vdots & \ddots & \vdots \\ x_n(1) & x_n(2) & \cdots & x_2(n) \end{bmatrix} \quad (3)$$

Step 2: Normalize the data set.

Data can be treated by one of the three types; i.e., larger-is-better, smaller-is-better-and nominal-is-best.

For larger-is-better transformation, $x_i(j)$ can be transformed to $x_i^*(j)$ using equation (4).

$$x_i^*(j) = \frac{x_i(j) - \min_j x_i(j)}{\max_j x_i(j) - \min_j x_i(j)}, \quad (4)$$

Where $\max_j x_i(j)$ is the maximum value of entity j and $\min_j x_i(j)$ is the minimum value of entity j .For smaller-is-better, the equation to transform $x_i(j)$ to $x_i^*(j)$ is

$$x_i^*(j) = \frac{\max_j x_i(j) - x_i(j)}{\max_j x_i(j) - \min_j x_i(j)}. \quad (5)$$

For nominal-is-best, if the target value is $x_{ob}(j)$ and $\max_j x_i(j) \geq x_{ob}(j) \geq \min_j x_i(j)$,

then the equation is: $x_i^*(j) = \frac{|x_i(j) - x_{ob}(j)|}{\max_j x_i(j) - x_{ob}(j)}$ (6)

At the same time, the referential series of x_o should be normalized as well by one of Eqs. (4)–(6).Therefore, the normalized referential series of x_o becomes $x_o^* = (x_o^*(1), x_o^*(2), \ldots x_o^*(n))$. After the original data set is normalized by one of the threetypes of data transformations, the matrix shown in Eq. (3) can be revised as:

$$x_o^* = \begin{bmatrix} x_1^*(1) & x_1^*(2) & \ldots & x_1^*(n) \\ x_2^*(1) & x_2^*(2) & \ldots & x_2^*(n) \\ \vdots & \vdots & \ddots & \vdots \\ x_n^*(1) & x_n^*(2) & \cdots & x_n^*(n) \end{bmatrix} \quad (7)$$

Step 3: Compute the distance of $\Delta_{oi}(j)$, the absolute value of difference between x_o^* and x_1^* at the j -th point. The equation is: $\Delta_{oi}(j) = |x_o^*(j) - x_1^*(j)|$

$$= \begin{bmatrix} \Delta_{o1}(1) & \Delta_{o1}(2) & \ldots & \Delta_{o1}(n) \\ \Delta_{o2}(1) & \Delta_{o2}(2) & \ldots & \Delta_{o2}(n) \\ \vdots & \vdots & \ddots & \vdots \\ \Delta_{on}(1) & \Delta_{on}(2) & \cdots & \Delta_{on}(n) \end{bmatrix} \quad (8)$$

Step 4: Apply grey relational equation to compute grey relational coefficient $r_{oi}(j)$ using the following equation:

$$\gamma_{oi} = \frac{\Delta min + \zeta \Delta max}{\Delta_{oi}(j) + \zeta \Delta max} \quad (9)$$

where $\Delta max = \max_i \max_j \Delta_{oi}(j)$, $\Delta min = \min_i \min_j \Delta_{oi}(j)$, and $\zeta \in [0, 1]$.

Step 5: Compute the degree of grey coefficient Γ_{oi} .If the weights (w_i)of criteria are determined, the degree of grey coefficient Γ_{oi} is computed as:

$$\Gamma_{io} = \sum_{j=1}^{n} [w_i(j) * r_{oi}(j)]. \quad (10)$$

For decision-making processes, if any alternative has the highest Γ_{oi} value, then it is deemed the most important alternative. Therefore, the priorities of alternatives can be ranked in accordance with Γ_{oi} values.

Appendix C: Interview protocol for cashew manufacturing SMEs and producer (farmer) groups in the global supply chain traceability initiative

Overview

1. General organization (farmer group / manufacturing SMEs) information:
    - Size of the organization (number of employees/members, annual turnover/ seasonal yield).
    - Organizational structure and units of the organization.
2. Relationship between the organization and supply chain partners – Organizational sustainability perspective, motivation, orientation and collaboration
    - What is current structure of your supply chain(suppliers/customers)
    - Describe the activities undertaken by the organization and/or its members (farmers) in the supply chain
    - Describe your relationship with specific processing and manufacturing SMEs (history of the relationship, areas of collaboration, seasonal percentage of cashew supplied, etc).
    - What is the sustainability and traceability story in the sector?
    - What is the motivation to implement sustainability practices in the sector/industry?
    - What are the sustainability requirements from your partners?
    - What are the challenges in implementing sustainability practices in the sector/industry?

Appendix D: Mapping of sustainability concerns in the cashew industry against ISO 26000

	Stakeholders/ISO 26000 - Core subjects and issues	Producers	Cashew manufacturers	Kernel consumers and customers
6.2	Organizational Governance	Weak farmer based organization and governance;Lack of farmer based organisation; Relationship between upstream actors	Relationship with upstream and downstream actors	Relation with upstream actors
6.3	Human Rights	Child labour	Labor rights issues; Child labor/prison labor; Condition of work ;	Condition of work ; Labor right issues;Global social compliance
6.3.3	Due diligence	Child labour	Labor rights issues	
6.3.4	Human rights risk situations Issue	Child labour	Labor rights issues	Labor rights issues
6.3.5	Avoidance of complicity	Child labour	Labor rights issues	
6.3.6	Resolving grievances		Labor rights issues	
6.3.7	Discrimination and vulnerable groups		Labor rights issues ;Women empowerment	Labor rights issues
6.3.8	Civil and political rights Issue		Labor rights issues	
6.3.9	Economic, social and cultural rights Issue		Labor rights issues	
6.3.10	Fundamental principles and rights at work		Labor rights issues; Condition of work	Labor rights issues
6.4	Labour practices		Labor right issues; Health and safety; Child labour/prison labour; Work condition	Labor rights issues;Global social compliance
6.4.3	Employment and employment relationships		Labor rights issues; Condition of work	Labor rights issues
6.4.4	Conditions of work and social protection		Labor rights issues ; Condition of work	Labor rights issues
6.4.5	Social dialogue	Working together on growing the industry	Working together on growing the industry	
6.4.6	Health and safety at work		Labor right issues;health and safety	
6.4.7	Human development and training in the workplace		Labor right issues;health and safety	
6.5	The environment	Sustainable farming;research innovation; Good agricultural practices;Agriculture waste - Apple processing;Respect for the environment;Training farmer	Environmental management; Sustainable sourcing;Volorize RCN; Waste management	Environmental footptint ;Emission reduction
6.5.3	Prevention of pollution	Good agricultural practices;Post harvest practices	Environmental management; Volorize RCN; Waste management; Pollution contol	Environmental footptint ;Emission reduction
6.5.4	Sustainable resource use	Good agricultural practices; Post harvest practices; Sustainable sourcing; Packaging RCN	Environmental management ;Sustainable sourcing; Volorize RCN; Waste management	Environmental footptint
6.5.5	Climate change mitigation and adaptation	Good agricultural practices; Agriculture waste -Apple processing	Waste management; Volorize RCN	Environmental footptint ;Emission reduction
6.5.6	Protection of the environment, biodiversity and res	Good agricultural practices; Agriculture waste -Apple processing	Sustainable sourcing	Environmental footptint
6.6	Fair operating practices	Fair compensation of farmers; RCN market information and prices; Relationship between upstream actors	Market information; Relationship with upstream actors; RCN market information and prices	Relationship with upstream actors
6.6.3	Anti-corruption			
6.6.4	Responsible political involvement			
6.6.5	Fair competition	RCNs market information and prices	RCNs market information and prices	Fair practices
6.6.6	Promoting social responsibility in the value chain		Farmer –processor linkage	Supplier development ; Relationship with upstream actors
6.6.7	Respect for property rights			
6.7	Consumer issues	Traceability	Food safety; Traceability;Quality of nut;Certification;	Traceability; Food safety
6.7.3	Fair marketing, factual and unbiased information and fair contractual practices		Relationship with dowmstream actors	Relation with upstream actors
6.7.4	Protecting consumers' health and safety		Food safety; Traceability; Certification	Traceability; Certification; Food safety
6.7.5	Sustainable consumption		Certification ; Sustainable sourcing	Certification
6.7.6	Consumer service, support, and complaint and dispute resolution		Relationship with dowmstream actors	Relation with upstream actors
6.7.7	Consumer data protection and privacy		Traceability	Traceability
6.7.8	Access to essential services			
6.7.9	Education and awareness		Traceability	Traceability
6.8	Community involvement and development Issue	Rural development	Rural development	
6.8.3	Community involvement		Rural development	
6.8.4	Education and culture	Farmer training		
6.8.5	Employment creation and skills development	Employment	Employment; Women empowerment;	
6.8.6	Technology development and access	Traceability; Farmer training	Traceability	
6.8.7	Wealth and income creation Issue	Enhance livelihood of farmers through increasing income	Employment	Supplier development
6.8.8	Health			
6.8.9	Social investment		Partner with NGOs to training farmers	

d

Appendix E

Table E1: Characteristics of the five managers representing managers of focal firms and brief profile of their organization

Manager 1	
Position	Cashew Supply chain manager
Role	Provide expert knowledge and training to cashew organizations across the global value chain
Years of experience in the industry	22 years
Organization	Non-governmental organization
Manager 2	
Position	Procurement Manager
Role	Manage Kernel procurement
Years of experience in the industry	12 years
Organization	Kernel distributor in North America
Manager 3	
Position	Supply Chain Manager
Role	Manage Kernel procurement
Years of experience in the industry	15 years
Organization	Kernel distribution in North America
Manager 4	
Position	Food and Agribusiness Manager
Role	Train small and medium sized cashew processing enterprises
Years of experience in the industry	12 years
Organization	Industrial organization body in Africa
Manager 5	
Position	Sourcing and Sustainability Manager
Role	Kernel procurement and sustainability affairs
Years of experience in the industry	10 years
Organization	Kernel distribution in Europe

Appendix F: Survey Questionnaire -Social Sustainability in Cashew Industry

Data of organization

Size: Position in organization: Years of experience in cashew industry:

Dear Manager,

We are completing an academic study to assess the strategic implementation of social sustainability criteria in the cashew supply chain by manufacturers in West Africa. We sincerely ask for your participation to help us fully understand these criteria.

After initial general evaluation seven (7) social sustainability measurement criteria emerged as generally applicable to the cashew supply chain. Having known the criteria, the next stage involves the following:

1. Determine the most and least important criteria (Section 1, Question 1 and Table 1)
2. Compare the most important criteria to the other criteria- (Section 2, Questions 2A and Table 3)
3. Compare the other criteria to the least important criteria – (Section 2, Questions 2B and Table 4)
4. Rate all the criteria - (Section 2, Questions 2C and Table 5)

We will be more than happy to share the outcome of this study. We do understand that your time is valuable; we believe that this survey will only take about 20 minutes of your time. The individual respondent results will remain confidential at all stages. Only final results will be made public. Please return the completed questionnaire to email address:

Thank you for your time and expertise.

SECTION 1

Question 1A:

In your opinion what is the most and least important social sustainability criteria in the cashew supply chain? Please make an asterisk (*) in two of the cells to show your opinion.

Table 1: Most and least important social sustainability criteria.

Social Sustainability Criteria	Most Important	Least Important
Employment (SOC1)		
Food safety and quality (SOC2)		
Labor/work condition (SOC3)		
Child labor and force/prison labor (SOC4)		
Traceability (SOC5)		
Women empowerment (SOC6)		
Rural/local development (SOC7)		

SECTION 2

Table 2 below provides the measurement scale for answering the rest of the questions. Please use this1-9-pointmeasurement scale to respond to Questions 2A 2B and 2C.

Table 2: The 1-9-point Measurement Scale

1	Equal importance
3	Moderately more important
5	Strongly more important
7	Very strongly more important
9	Extremely more important
2,4,6,8	Intermediate values

Question 2A.

You have determined criterion (X) as the most important criterion based on your personal preferences and experience. Please identify your preference ratio of this criterion (X), over the other criteria by using the 1 - 9-point measurement scale shown in Table 2. Please note that a criteria compared to itself is automatically rated 1 (Equally important).

Table 3: Most important criterion (x) compared to the othercriteria

Most Important Social Sustainability Criteria	SOC 1	SOC 2	SOC 3	SOC4	SOC 5	SOC 6	SOC7
SOC2							

Question 2B

You have determined criterion (X) as the least important criterion among these seven criteria. Please determine your preference ratio of the other criteria over the least important criterion by using 1 - 9 measurement scale shown in Table 2. Please note that a criterion compared to itself is automatically rated 1 (Equally important).

Table 4: The other criteria compared to the least important criterion (x)

Least Important Social Sustainability Criteria	SOC 1
SOC1	
SOC2	
SOC3	
SOC4	
SOC5	
SOC6	
SOC7	

Question 2C

Using the 1-9-point measurement scale shown in Table 2 and considering your enterprise in the supply chain, rate all the seven identified SSSC criteria in terms of their importance to overall social sustainability performance.

Table 5: Criteria importance ratings by respondents

Social Sustainability Criteria	Rate
SOC1	
SOC2	
SOC3	
SOC4	
SOC5	
SOC6	
SOC7	

-End of Questionnaire-

Appendix G Table G1: Pair-wise comparison vector for the best criterion in BWM

Manager's Most Important Social Sustainability Criteria	SOC1	SOC2	SOC3	SOC4	SOC5	SOC6	SOC7
M1 - SOC 2	8	1	4	7	6	6	8
M2 - SOC 2	9	1	3	7	8	7	9
M3 - SOC 2	7	1	4	6	7	5	9
M4 - SOC 2	7	1	4	7	3	7	8
M5 - SOC 2	6	1	1	6	4	7	9
M6 - SOC 2	9	1	3	7	8	7	9
M7 - SOC 2	9	1	4	8	8	7	9
M8 - SOC 2	9	1	5	5	9	8	9
M9 - SOC 2	8	1	5	6	2	7	8
M10 - SOC 2	9	1	3	7	8	7	9
M11 - SOC 5	8	1	3	5	1	7	9
M12 - SOC 7	5	3	5	4	2	5	1
M13 - SOC 2	5	1	5	5	1	2	5
M14 - SOC 1	1	7	9	1	7	5	9
M15 - SOC 2	9	1	3	7	8	7	9

Manager = M, SOC = SSSC criterion

Table G2: Pair-wise comparison vector for the worst criterion in BWM

Manager's Least Important SSSC Criteria	M1-S1	M2-S 7	M3-S7	M4-S7	M5-S7	M6-S7	M7-S1	M8-S7	M9-S1	M10-S7	M11-S7	M12-S1	M13-S1	M14-S1	M15-S1
SOC1	1	5	9	7	2	5	1	6	1	1	4	1	5	9	5
SOC2	9	9	9	9	9	9	9	9	9	9	9	9	9	7	9
SOC3	9	5	7	8	8	9	8	8	9	7	9	9	7	7	8
SOC4	2	4	9	4	5	2	4	3	5	6	4	3	7	9	6
SOC5	5	7	3	7	7	5	5	5	7	5	8	8	7	5	7
SOC6	4	6	5	6	4	4	4	5	5	3	2	6	5	5	3
SOC7	4	1	1	1	1	1	3	1	6	1	1	9	4	3	2

Manager = M , S = SSSC criterion

Appendix H

Table H1: Criteria importance ratings by respondents for GRA

SSSC Criteria	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M3	M14	M15
SOC1	4	6	9	6	6	6	6	6	6	6	5	5	5	9	5
SOC2	9	9	7	9	9	9	9	9	9	9	9	7	9	7	9
SOC3	8	8	7	8	9	8	8	8	9	8	8	5	7	7	8
SOC4	7	5	9	8	5	7	4	7	7	6	7	7	7	9	6
SOC5	7	7	5	8	7	7	8	7	8	7	9	8	7	5	7
SOC6	6	3	5	6	7	5	3	5	6	5	6	7	5	5	3
SOC7	8	2	3	5	5	4	3	5	6	2	3	9	4	3	2

Manager = M, SOC = SSSC criterion