# Assessment of corporate culture in sustainability performance using a hierarchical framework and interdependence relations

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A B S T R A C T

There is a gap in the extant literature on what corporate cultural attributes drives toward corporate sustainability performance. This study investigates corporate culture attributes that are conducive for sustainability and forms these attributes as a measurement tool for assessing corporate sustainability performance using linguistic preferences. Most of the prior assessment frameworks use composite attributes which cannot handle subjective perceptions, however, sustainability issues are multi-dimensional and requires subjective judgements and linguistic preferences. Additionally, corporate sustainability performance is highly dependent on cultural aspect. Therefore, this study forms a measurement structure using cultural attributes to evaluate corporate sustainability performance. This study integrates the fuzzy synthetic evaluation and a decision-making trial and evaluation laboratory (DEMATEL) approach to address the interdependence relation among attributes in a hierarchical structure. The proposed framework is tested to show the reliability and validity. The proposed framework is able to identify over all sustainability performance as well as is able to draw specific managerial implications. The result reveals that overall corporate sustainability performance is low, and a poorer performance is found with regard to social responsibility. The study contributes in the literature by presenting a hierarchical assessment framework for understanding corporate sustainability performance.

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## 1. Introduction

Corporate sustainability (CS) has received attention for several decades. Studies assessing and maintaining sustainability have increased worldwide. CS is measured using three perspectives: economic benefits, reductions in environmental impacts, and social welfare (triple bottom line, TBL aspects) (Sarkis and Dhavale, 2015; Tseng et al., 2017). Thus, firms need to play a vital role through integrated sustainability activities, including minimizing pollution, using resources efficiently, improving their relationship with community stakeholders and ensuring economic progress to become sustainable (Benn et al., 2014). CS integrates and balances firms' activities with regard to the TBL in order to achieve sustainable development (Lozano, 2012; Morioka and Carvalho, 2016).

Therefore, assessing CS performance under TBL context is essential for firms. Prior studies proposed different assessment frameworks to investigate CS performance (Barkemeyer et al., 2015; Engida et al., 2018; Zhou et al., 2012; Dočekalová and Kocmanova, 2016). Most of the prior studies used composite attributes index to benchmark CS. For example, Engida et al. (2018) employed composite attributes to evaluate corporate sustainability performance in European food and beverage firms. However, the performance attributes require subjective evaluation and judgment, and composite attributes may not be able to handle subjective perceptions. Although few studies considered subjective evaluation in evaluating CS performance, however, their frameworks found to be more generic (Bottani et al., 2017; Tseng, 2017).

In the literature, corporate culture (CC) is an essential attribute to improve CS performance (Linnenluecke and Griffiths, 2010; Tseng et al., 2017; Jabbour and de Sousa Jabbour, 2016). It can negatively affect CS, while it can be conducive to achieving firms' performance. For example, Lozano (2013) found that CC hampers implementing firm change processes, whereas sustainability requires instigating innovations and cultural changes within firms.

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On the other hand, Benn et al. (2014) argued that creating a flexible culture around the core values of sustainable development requirements is essential for achieving a firm's performance. Lozano (2015) found evidence that CC is one of the drivers of enhancing firms' performance. Moreover, firms need to align the decision with the corporate culture (CC) to achieve sustainable development (Baumgartner, 2014). Since CC is vital for CS performance, hence it should be considered in the assessment framework. Prior studies have argued that firms need to instigate changes in their CC that are conducive to sustainable development (Feng et al., 2017). Hence, the debate focuses on what attributes of CC are favourable for maintaining CS performance (Linnenluecke and Griffiths, 2010). There is a lack of clarity to what attributes constitute CC driving CS performance. Moreover, in the absence of a proper assessment tool, it is unclear how to assess CS empirically using CC attributes. This study seeks to assess (1) what attributes constitute CC driving CS performance, (2) how to assess CS through CC attributes under uncertainty, and (3) how to address interdependent relations among the attributes. However, the linguistic preferences are involved in collecting perceptions about the attributes.

Linguistic preferences are usually used to assess qualitative attributes, and linguistic preferences or that nature of qualitative information is fuzzy (Kusi-Sarpong et al., 2016; Tseng et al., 2018b, 2018c). This fuzziness of human perception needs to be converted into crisp values; however, most prior studies employed a numerical scale-based technique to collect data. Therefore, this study applies fuzzy synthetic evaluation (FSE) to convert qualitative human subjective perceptions into quantitative data so that attributes can be ranked and determined based on priority. This study presents a hybrid approach, including 1. exploratory factor analysis (EFA) approaches to develop the hierarchical framework and enhance the reliability and validity, 2. decision-making trial and evaluation laboratory (DEMATEL) approach to address interdependence relation among attributes and to understand the attributes' causal effects, and 3. FSE to establish the hierarchical framework under uncertainty.

The contributions of the study are threefold. 1. This study identifies CC attributes that are conducive for CS performance; 2. The study provides a novel hierarchical assessment framework for assessing CS performance through CC attributes; 3. The integration of hierarchical framework with the FSE-DEMATEL method can handle interdependent relations under uncertainty and determines the priority attributes to improve performance. The rest of this study is organized as follows: section 2 discusses the theoretical background of CC, CS and the conceptualization of the attributes, followed by a detailed discussion of the methods used in this study in section 3. The results and discussion are presented in section 4. Section 5 presents the theoretical and practical implications. Finally, this study concludes by providing conclusions, limitations and future research suggestions in section 6.

## 2. Literature review

This section begins with the discussion of theoretical background then discusses the concepts of CS and CC and justifications of the proposed method, followed by the attribute's development process based on the literature review.

### 2.1. Theoretical background

The stakeholder theory suggests firms to shift from a traditional view, e.g., from stockholder view to stakeholder view; the change in the viewpoint from only owners' concern to the stakeholders' concern. Freeman (2010) presents that the stakeholder is any group or individual including employees, customers, community, unions, and shareholders who can affect or be affected by the achievement of the organizational objectives. Heath and Norman (2004) argued that firms' commitment to pay extraordinary attention to a particular stakeholder with the environment or human right concern can be the fundamental aspect of a firm's CC. Sarkis et al. (2011) showed how internal and external stakeholder pressure forces firms to adopt sustainable oriented practices. Hörisch et al. (2014) examine the links between stakeholders and sustainability and suggest that education, regulation, and sustainable oriented value creation for stakeholders can enhance sustainable performance. Moreover, Yu and Choi (2016) investigate the mediating relationship between stakeholder pressure and the adoption of corporate social responsibility; their finding suggests to adopt sustainable oriented CC to gain sustainable development.

Additionally, Hart (1995) claim in his theory of natural resource-based view (NRBV) that today's competitive advantage of firms not only depends on lowering cost and pre-empting competitors but also depends on consolidating position in the future. To consolidate future position thereby achieve CS firms must have pollution prevention strategy as well as an environmental consideration during product design and development process. NRBV theory referred to these strategies as emerging capabilities and argued that competitive advantage of the firms would be rooted increasingly in a set of emerging capabilities (Gladwin, 1993; Hart, 1994; Kleiner, 1990). Moreover, Jabbour and de Sousa Jabbour (2016) narrate that culture is one of the dominant force for green human resource management and proposed to the firms who wish to pursue sustainability performance (Jose Chiappetta Jabbour, 2011).

Therefore, firms adopted strategies and policies to minimize resource, respond to environmental concerns and enhance relationships with stakeholder and the greater community to achieve sustainability (Crane, 2000; Adams et al., 2016). However, Hart and Milstein (1999) argued that even though many firms adopted some practices and policies to improve sustainability performance but some firms experienced that merely adopting some practices and policies is insufficient to achieve the goal. Senge et al. (2001) argued that merely bringing technological changes may not achieve CS rather there should be changes in CC including the commitment of the employees towards sustainability, transparency and building ecological tie with the community. Linnenluecke and Griffiths (2010), also highlighted that there should be changes in the CC to properly respond to environmental and social needs. Additionally, also emphasized bringing cultural transformation to be able to enhance CS performance. In short, firms need to develop sustainable oriented CC in order to pursue CS. However, there is still lack of clarity in the extant literature what attributes constitute the sustainable oriented CC in the TBL context.

### 2.2. Corporate sustainability performance

The CS originated from the sustainable development concept. In particular, sustainable development was brought to light on a global scale through various initiatives, debates, and movements. In line with the sustainable development movement, firms need to play an important role by adopting sustainable oriented practices. Sharma (2002) argued that it is the challenge of today's firms not only to improve social and human welfare but also to improve ecological performance. Prior academic studies have established a new branch of sustainable development, CS, so that firms within industries can contribute to the broader sustainable development goal. Lozano (2012) defined CS as "*corporate activity in the action of seeking to contribute to sustainability equilibrium, consisting of TBL aspects as well as their inter-relations within and throughout time dimensions while addressing the firm's system and its stakeholders.*" Salzmann et al. (2005) maintained that CS is the strategic response

of a firm to environmental, social and economic issues through its ongoing operational activities. Berger et al. (2007) integrated TBL aspects with corporate social responsibility. Thus, it is apparent that CS addresses TBL aspects in various ways, including corporate activities, strategic responses, and operational activities.

Lozano et al. (2015) argued that the emergence of the CS idea is a new idea balancing firms' TBL aspects holistically for present and future generations. Hart (1995) also claimed that today's competitive advantage for firms not only depends on lowering costs and pre-empting competitors but also depends on consolidating their position in the future. Therefore, firms adopt strategies and policies to pursue the sustainable development goal (Crane, 2000). However, Hart and Milstein (1999) argued that merely adopting some practices and policies is insufficient to achieve the sustainability objective. Rather, there should be changes in the CC to properly respond to environmental and social needs (Linnenluecke and Griffiths, 2010). Moreover, Senge et al. (2001) argued that merely instituting technological changes may not achieve CS; instead, there should be changes in the CC as well, including the commitment of the employees towards sustainable development, transparency and building ecological ties with the community. In short, firms should emphasize cultural transformation to enhance CS performance. Wijethilake (2017) evaluated CS based on a relationship study between proactive sustainable development strategies and sustainability performance. Tseng et al. (2017) developed a hierarchical framework based on the resource-based view to assess CS performance. Moreover, Tseng (2017) benchmarked CS attributes by incorporating social media data and sets of qualitative and quantitative TBL attributes. Nevertheless, evaluating and understanding the process still requires further insights. The literature suggests that CC has been an important element to improve performance (Gupta and Kumar, 2013; Linnenluecke and Griffiths, 2010). Only a few studies have attempted to evaluate the performance level through a CC attributes. Witjes et al. (2017) claimed that CS integration into business operations remains unclear, and there is lack of clarity in prior studies with regard to sustainability activities. Thus, a study on how CC improves CS performance is vital to address the literature gap.

## 2.3. Corporate culture

CC emerged as an important aspect in the business management discipline after 1970 (Hofstede, 1980). There are many definitions available in the literature, and certain commonalities have been found among them. Schein (1990) defined it as consisting of practices, values, symbols, and assumptions that the members of a firm share about appropriate behaviour. Smircich (1983) maintains that CC is the shared patterns of meaning or understanding among members of a firm. It acts as a critical player hindering the successful implementation of change initiatives within a firm. Cameron and Quinn (2011) argued that it is difficult to implement new initiatives while keeping the CC unchanged, even if the firm introduces new tools, techniques, and strategies for the changes. Moreover, Lozano (2013) presented that there are some cultural barriers, including emotional, behavioural and informational barriers, to changes process that hinder the realization of CS performance. Linnenluecke and Griffiths (2010) maintain that the successful implementation of change programmes to achieve CS mostly depend on the CC, including the values and underpinning ideologies behind the culture.

CC has become an important subject in the sustainable development discipline because it can explain more about internal attributes, such as management commitment, human resource, and organizational behaviour. Eccles et al. (2014) stated that firms' norms and values, formal policies, procedures and management

systems constitute CC. Galpin et al. (2015) also argued that firms need to emphasize their mission, values, norms, and strategies to achieve CS. Lozano (2015) concluded that sustainable initiatives should be gradually integrated with CC, which requires bringing cultural changes to the organization to pursue the sustainable development goal. However, it is often argued that not all cultural changes bring sustainable development (Linnenluecke and Griffiths, 2010). Prior studies advocated having an ethical culture to achieve sustainable development, while another study focused on green branding (Gupta and Kumar, 2013). However, there are few comprehensive sets of CC attributes in the sustainable development context in the extant literature. Hence, this study is important to enrich the sustainable development studies by integrating CC attributes that achieve CS. There is a need on how to assess CS using CC attributes.

## 2.4. Proposed method

Most of the earlier studies used quantitative data and classical statistical methods to assess CS performance (Witjes et al., 2017). Only few studies have adopted a valid method for converting qualitative perceptions as well as addressing the interdependency problems among TBL attributes. For example (Lin et al., 2018), argued that human beings express their perceptions in qualitative language. Thus, an appropriate method needs to be employed to convert qualitative information into quantitative data. Additionally, Lozano (2008) showed that interrelationships exist among the TBL attributes. Therefore, a valid and reliable method is essential to address qualitative information as well as interdependency problems in the evaluation process.

Typically, the attributes have a dependency problem, which means that attributes are interrelated among themselves. Lozano (2008) found a complex interconnectedness among attributes of CS performance in aspects of the TBL. Schwartz (2013) argued, that the attributes of culture overlap, are related and reinforce each other. Dočekalová et al. (2017) argued that attributes of CS performance are interrelated, and the relationships are usually highly nonlinear, vague, partially inconsistent and multidimensional. To address the interdependency problem, there is a need to develop a hierarchical measurement framework (Su et al., 2016; Tseng et al., 2014). However, most prior studies ignored the interdependency problems among attributes. Therefore, this study will address this dependency issue by proposing a hierarchical measurement structure for the attributes. Tseng et al. (2017) evaluated CS performance in a hierarchical framework using aspects of the TBL.

Additionally, attributes are often expressed in qualitative terms (Wu et al., 2017a; Islam et al., 2018). However, most previous studies ignored qualitative information and, instead, used quantitative scales when evaluating performance level. Islam et al. (2018) argue that in using quantitative scales, respondents were forced to convert their natural language (good, very good) into the quantitative scale (4, 5), which is not their natural language. Tseng and Bui (2016) maintain that the conversion process in translating qualitative information into the quantitative form may err since this conversion process takes place in the human mind. Thus, it is recommended to collect data using natural language or using a linguistic scale (Tseng and Chiu, 2013). Since CC attributes are expressed in a qualitative form, the current study uses a qualitative scale to collect the data.

Moreover, the qualitative data are the outcome of human subjective perceptions(Tseng et al., 2018a). argues that human subjective perception is fuzzy or tainted with uncertainties. This uncertainty should be addressed using an appropriate method to obtain more reliable data (Tseng et al., 2013). Govindan et al. (2015b) found that fuzzy set theory has been used in the

literature to address the uncertainties in human perceptions. Thus, this study proposes a fuzzy set theory to address the fuzziness of human perceptions. Zadeh (1965) invented the fuzzy set theory, and subsequently Bellman and Zadeh (1970) demonstrated the application of fuzzy set theory to data analysis. This study conducted an EFA to form the hierarchical structure by grouping the attributes with their relevant TBL aspects. The proposed hierarchical structure is then examined with a reliability and validity analysis (Tseng et al., 2017; Tseng and Bui, 2016).

The extant literature provides various methods addressing the interrelationship problem of attributes (Lin et al., 2018). argued that DEMATEL is able to address the interrelationship problem among attributes and can identify causal attributes to understand the primary concern. Fuzzy synthetic method (FSE) is a branch of fuzzy set theory, which can handle qualitative data and transform it into numerical values based on membership grade (Shidpour et al., 2016). Wu et al. (2017b) applied FSE to assessing risk in China and to convert the qualitative information into quantitative data. Thus, the integration of FSE with DEMATEL results in the proposed FSE-DEMATEL method. Tseng et al. (2017) used FSE-DEMATEL to assess CS performance in a hierarchical structure. This method is a reliable and valid method to identify the critical attributes in dependence relational problems using a qualitative scale. Before the empirical assessment, a new set of measurement structures consisting of CC attributes should be developed for the aspects of the TBL.

### 2.5. Proposed attributes

This section discusses the literature review related to culture under sustainability and presents the list of proposed CC attributes. The development of these attributes is based on TBL aspects, such as economic, social and environmental. Table 1 presents the summary of twenty six attributes and their descriptions.

Regarding the economic aspect, Linnenluecke and Griffiths (2010) proposed that the organization, which is dominated by a rational goal culture, emphasize economic progress through cost reduction and resource efficiency in pursuit of CS. Rational goal culture includes (C1) resource efficiency without degrading environmental and social aspects, (C2) instructional communication, and (C3) developing rational planning and goal setting in light of environmental demand (Linnenluecke and Griffiths, 2010). Linnenluecke and Griffiths (2010) argued that resource efficiency emphasizes cost reduction and operational efficiency while considering wider environmental impacts. Additionally, Chen (2010) argued that green branding convinces customers to buy more green products. Thus, green branding has a positive impact on revenue generation. Gupta and Kumar (2013) argued that by (C4) emphasizing the branding of green initiatives as part of a CC, an organization can achieve sustainable development. Grace and O'Cass (2002) stated that brands help to create a strong association between customers and organizations. Rao and Holt (2005) found that ISO 14001 certified firms have a greater competitive advantage and better economic performance. Govindan et al. (2015a) stated that ISO 14001 systematically reduces waste and emissions, which eventually improves sustainable development performance. Therefore, (C5) adopting the culture of quality management systems, including ISO 14001, is essential for achieving CS (Linnenluecke and Griffiths, 2010).

Regarding the environmental aspect, Linnenluecke and Griffiths (2010) proposed that if the organization entertains open system values, it moves towards CS. The culture of open system values is attributed to (C10), an emphasis on adaptability and change, and (C11), flexible decision making. Coordination and control are achieved through informal and horizontal communication under the

open system (Zammuto et al., 2000). Moreover, firms are bringing innovations and changes to enhance their performance. However, not all changes and innovations lead to the better performance (Seyfang and Longhurst, 2016). There is a mutual relationship between the firms and the greater environment; innovation, adaptability and informal communication are necessary to respond to the wider environment. Senge et al. (2001) argue that organizations based on a rigid hierarchical culture might experience conflict when introducing changes and innovativeness. Galpin et al. (2015) argued that developing a sustainable oriented CC requires changes to the mission, values, goals, strategies and human resources (HR) levels. Jacopin and Fontrodona (2009) maintain that a firm's mission helps determine the priority actions for the firm and helps the firm distinguish itself from competitors. Moreover, Klemm et al. (1991) present that a mission statement helps firms articulate the values and shape the behaviours of the employees. Thus, the firm mission should contain (C6) a statement regarding the fact that environmental protection is an important CC attribute that drives CS.

However, the mission statement alone is insufficient to achieve CS unless it is able to translate this idea into values and strategic levels (Galpin et al., 2015). Posner (2010) stated that values influence the decision-making process, the thinking process and the employees' actions. For example, Proctor & Gamble designed their values as follows: *We are accountable for all of our own actions: these include safety, protecting the environment and ….* Thus, having a value like (C15) a shared commitment to protecting the environment is essential for achieving CS performance. Additionally, Galpin et al. (2015) argued that the firm mission and values should be compatible with its goals; otherwise, it would be insufficient to achieve the mission. Thus, organizations having a (C7) goal of reducing emissions, waste, and water use as well as increasing recycling is important for achieving CS performance. Ransom and Lober (1999) argued that goal setting offers the basis for articulating a roadmap for future activities as well as a tool for developing criteria for evaluating the performance of employees.

Moreover, sustainable development initiatives must be integrated into firms' strategies so that it can help articulate the mission, values, and goals into practices (Galpin et al., 2015). Castelló and Lozano (2009) argued that the firms that integrated sustainable development initiatives into their strategies are in a position to gain dual benefits by delivering value to society as well as differentiating themselves from competitors. Thus, it is critical for firms to have a strategy of (C8) assessing environmental impacts across the value chain. Lozano (2015) found that (C12) the presence of ethical leadership is essential for guiding and shepherding people towards achieving sustainable development objectives. Schwartz (2013) argued that an unethical CC results in environmental pollution, hampering employees' rights, degrading consumer safety and health concerns, etc. Eccles et al. (2012) concluded that sustainable firms were found to be more agile in (C9) publicly communicating sustainable development reports and making their practices transparent. Junior et al. (2014) argued that publications of sustainable development reporting have become a common practice in emerging economies. Wilkinson et al. (2001) argued that management should (C13) transfer environmental knowledge to their staff through training and (C14) empower employees so that they can take the initiative to adopt sustainability practices at the individual level. Daily and Huang (2001) reveal that environmental training, staff empowerment, and teamwork are essential for CS.

The social aspect is the last, but not the least, aspect of the TBL approach. CC related to the social aspect ranges from internal and external social elements. Linnenluecke and Griffiths (2010) proposed that the CC that drives CS is exhibited by human relation

**Table 1**
Summary of 26 CC attributes and their descriptions.

| TBL Perspectives | Attributes names | | Description | Sources |
|---|---|---|---|---|
| Economic perspective | (C1) | Eco-resource efficiency orientation | Maximize output by using the minimum amount of resources without degrading environmental and social aspects thereby reduced environmental and health impacts and lowered costs. | (Von Geibler et al., 2016); (Horton et al., 2016) |
| | (C2) | Instructional communication | It is the process of teaching and learning where managers and employees mutually influence each others using verbal and nonverbal messages. | Mottet et al., (2015) |
| | (C3) | Rational planning | Developing rational planning in light of environmental demand including planning for cleaner production, zero waste, industrial ecology, the natural step, green chemistry, design for sustainability, blue economy, cradle to cradle recycling etc. | (Vermeulen and Witjes, 2016); (Linnenluecke and Griffiths, 2010) |
| | (C4) | Green branding orientation | Emphasizing the branding of green initiatives may be able to drive the firm to exploit opportunities available to achieve superior performance | Gupta and Kumar, (2013) |
| | (C5) | Quality management systems | Adopting a culture of quality management systems, including Total Quality Management (TQM), ISO 14000 and environmental management system (EMS). | (Azapagic, 2003); (Govindan et al., 2015) |
| Environmental perspective | (C6) | Eco-friendly mission statement | A clear statement in the firm's mission statement declaring the concern for the environment. | Galpin et al. (2015) |
| | (C7) | Eco-friendly oriented goals | The measurable objectives a firm should have in reducing emissions, waste, and use of water as well as increasing recycling | Linnenluecke and Griffiths, (2010) |
| | (C8) | Eco-friendly orientation in value chain | Having a strategy of assessing environmental impacts in every step of creating a product including sourcing raw materials, processing it and distributing the final product to consumers. | Galpin et al., (2015) |
| | (C9) | Transparency in sustainability reports | It is a public document prepared by companies for the internal and external stakeholders highlighting qualitative and quantitative information on the extent to which the firm has managed to improve its economic, environmental and social areas. | Roca and Searcy, (2012) |
| | (C10) | Adaptability and change | Readiness to accept change process at the individual, organizational and systemic level to respond to wider environmental demand. | Hahn et al., (2015) |
| | (C11) | Decision making flexibility | Dynamic decisions based on the environmental pressure from the internal and external stakeholders. | Galpin et al., (2015) |
| | (C12) | Symbolic ethical leadership | The continuous presence of a role model with strong ethical and moral personality help shepherding people in the right direction. | Lozano, (2015) |
| | (C13) | Environmental knowledge sharing | Transferring environmental knowledge to employees through formal and informal training. | Eccles et al., (2012) |
| | (C14) | Nurturing environmental innovations | Firms' shared values to encourage subordinates to take initiatives to adopt sustainability practices at individual level. | Daily and Huang, (2001) |
| | (C15) | Shared environmental commitment | Shared commitment among people within the firm to take care of environmental issues. | Wilkinson et al., (2001) |
| Social perspective | (C16) | Socio-oriented mission statement | A clear statement in the firms' mission statement declaring the concern for the society. | Baumgartner, (2014) |
| | (C17) | Social networks | Firms' formal and informal relationship with the community, customers, and suppliers to take care of each other for mutual benefits. | Domahidi et al., (2014) |
| | (C18) | Shared commitment to society | A shared commitment among employees to health and safety concerns for the community | Galpin et al., (2015) |
| | (C19) | Green recruitment | Firms should have a policy of integrating sustainability criteria into the recruitment process to accelerate shared environmental commitment among people within the firm. | Jabbour and de Sousa Jabbour, (2016) |
| | (C20) | Talent attraction and retention | Recruiting and nurturing talented employees is vital for firms pursuing sustainability, thus, firm should have suitable policy to attract and retain talents. | Tseng, (2017) |
| | (C21) | Participative decision making | Creating an environment of participative decision making so that subordinates feel empowered to initiate and make decision related to sustainability. | (Tseng, 2017; Galpin et al., 2015). |
| | (C22) | Skill building orientation | Firms should manage and develop the skills necessary to pursue sustainability among people within it through conducting regular training. | Lozano, (2015) |
| | (C23) | Eco-friendly reward system | Firms should integrate sustainable development goals with the performance measurement system to evaluate the performance of employees. | Lozano, (2015) |
| | (C24) | Interpersonal communication | Creating a state of the environment within the firm where people exchange ideas, feelings, information and emotions through verbal and nonverbal message. | Eccles et al., (2012) |
| | (C25) | Long tenure | Long-term employment growth and stability is vital for firms pursuing sustainability, thus, firms should maintain that. | (Lozano, 2015); (Epstein et al., 2010) |
| | (C26) | Long-term employee benefits | Pensions, bonuses and health care plans are suitable for long terms performance evaluation as well as help firm to retain employees. | Lozano and Huisingh, (2011) |

culture. The human relations culture can be attributed to (C21) employee engagement in participative decision making and (C24) interpersonal communication among employees (Linnenluecke and Griffiths, 2010). Benn et al. (2014) argued that organizations that follow a human relation orientation demonstrate greater responsibility towards staff development, equal opportunity, work-life balance, workplace diversity, and establishing social justice. Eccles et al. (2012) found that sustainable firms adopt certain social policies that are reflected in their missions, values, beliefs and business processes. Dermol (2012) argued that a mission statement is a powerful tool helping firms set their strategic directions and functional tactics. Thus, the firm mission should contain a (C16) statement regarding caring for society.

Chow and LIU (2009) concluded that the successful implementation of HR practices should be aligned with the fundamental values and strategies of the firm. Galpin et al. (2015) stated that the HR value chain is an important element that drives CS. Additionally, there are job seekers who trust and are likely to work in organizations that demonstrate sustainability criteria in their recruitment process. Thus, (C19) the inclusion of sustainable development criteria in the recruitment process is important (Jabbour and de Sousa Jabbour, 2016). Moreover, the continuous reinforcement of staffs through training and reward system is another way to boost CS (Galpin et al., 2015). Dessler (1999) claimed that training develops committed employees; and the reward system shapes behaviour and enhances commitment, resulting in retaining appropriate behaviour in the organization (LAWLER III, 2003). Thus, (C22) conducting regular training to share sustainable development-related information and skill building as well as (C23) integrating sustainable development goals with a performance measurement system are essential for attaining CS performance (Tseng, 2017; Galpin et al., 2015).

Additionally, Lozano (2015) claimed that committed, compliant and motivated employees are conducive to achieving CS. Thus, employee welfare, including (C25) long-term employment growth and stability and (C26) employees' pensions, bonuses and health care plans are essential to achieving committed, compliant and motivated employees. Eccles et al. (2014) found that highly sustainable firms use different financial benefits to help employees focus on a non-financial aspect of the organization. Additionally, (C20) talent attraction and retention also plays a critical role in CS (Tseng, 2017) because sustainable development requires innovation initiatives and talented and satisfied staff help develop innovations. Kearns and Forrest (2000) claim that a sense of community helps establish social order, common social norms and civic culture among a neighbourhood. If the organization feels social belongingness with its community, suppliers, and customers, then it drives the firm to reduce any harmful action towards society. Thus, (C17) social networks with the community, customers, and suppliers play a vital role in the social perspective (Domahidi et al., 2014).

Hargett and Williams (2009) argued that shared values are found to be an important element in aligning strategic decisions with employees' behaviour in pursuit of CS. Thus, having values such as (C18) a shared commitment to health and safety concerns for employees, customers, and community is another crucial CC attribute for firms pursuing CS (Galpin et al. (2015)). International labour organization (ILO) proposes minimizing the use of the toxic chemicals in the operation process, replacing humans with robots in dangerous workplaces, and providing in-house medical facilities as some of the health and safety concerns that are essential for CS (Lozano and Huisingh, 2011).

## 3. Method

The following section presents the industry background followed by the FSE-DEMATEL method and the proposed steps in analysis respectively.

### 3.1. Industry background

The leather industry in Bangladesh is the country's second largest export earning industry (Bank, 2018). However, this industry is now under acute pressure from stakeholders due to its environmental and social degradation. The environmental degradation occurs due to the release of untreated wastes by the firms into nearby lakes and rivers, which also poses a health hazard to employees and the community in the form of water pollution and an unhealthy work environment (Uttam, 2018). Due to the social and environmental degradation, the government imposed strict regulations to monitor the industry's operation and control its expansion. Moreover, local and international environmental groups and agencies have also expressed their concerns on these issues. Due to these circumstances, the firms are also experiencing export restrictions from many regional blocs. For example, the EU (European Union) commission recently passed a regulation to limit imports from firms that do not take care environmental and social aspects (Commission, 2016). This trade barrier potentially limits the export capacity of this industry. Thus, the firms are under economic pressure and it is losing revenues (Mirdha, 2018). Hence, the firms need to improve their CS performance immediately to survive the industry and continue their operations. Thus, the selection of this industry to validate the study framework is relevant due to the industry's economic, social and environmental implications.

The proposed CC attributes identified in this study help us to understand the CS performance of the firms as well as the industry. Moreover, the TBL aspects help us to view and to study the CC attributes comprehensively in pursuit of sustainable development aims for the industry. Certain attributes are helpful to minimize environmental degradation as well as improve the social welfare and wellbeing of employees and the community as a whole. The firms within this industry needs to ensure that a sustainably oriented CC is present to minimize the pressure from stakeholders. Thus, it is important to monitor and prescribe CC to understand the status of CS performance. However, it is not clear to what extent the firms embrace those CC attributes. Therefore, it is necessary to investigate the CC first to know the level of practices. To achieve this aim, the study designed a three-stage analysis process. First, this study conducted a literature review to identify the attributes of CC that are conducive to CS performance, and consulted with the industry experts to validate the preliminary study design. Second, an FSE is used to convert qualitative data into the quantitative form. Third, a DEMATEL approach was applied to identify the causal attributes for the priority action given the dependency problem among the attributes. The study is useful to managers and practitioners to assess CS and understand the priority action for improving CS performance.

### 3.2. The factor analysis

The researcher perform exploratory factor analysis (EFA) to group attributes and remove irrelevant attributes. EFA plays a critical role in designing an appropriate measurement structure. It ensures the validity of the attributes or items measuring a particular construct or group. Green et al. (2016) argue that EFA is suitable when the phenomenon is new and little is known about the factors' structure or item groups. Additionally, EFA is employed during the scale development process and is useful for grouping items into a constructs (Ghosh and Roy, 2018). Since the development of CC attributes is relatively new, EFA is an appropriate statistical tool to group the attributes.

### 3.3. FSE-DEMATEL

The study applies a multi-attribute evaluation model to assess CS using CC attributes using a TBL aspects approach. $a = \{a_1, a_2, a_3..., a_n\}$ represents the series of attributes and $(m_{ij})_{m*n}$, represents the evaluation matrix, where $m_{ij}$ measuring the degree of performance for attributes. Additionally, $P1$, $P2$, $P3$ represent three perspectives of TBL aspects, where, $P1$, stands for the economic perspective, $P2$, stands for environmental perspective, and $P3$ stands for social perspective. For the performance perceptions, approximately 26 attributes have been collected using a five-point linguistic scale ranging from very low to very high, such as very low (VL), low (L), medium (M), high (H), and very high (VH). $m_{ij}$ demonstrates the degree to which the perspectives ($P$) consider the attributes $i$ in the assessment matrix. The matrix is given below:

$$\left(M_i^{Pk}\right)_{1*5} = \left(M_{i1}^{Pk}, M_{i2}^{Pk}, M_{i3}^{Pk}, M_{i4}^{Pk}, M_{i5}^{Pk}\right) \qquad (1)$$

The following equation calculates the perspective:

$$Pk = \sum_{j=1}^{5}\left(r_j\, m_{r,j}^{Pk}\right) \qquad (2)$$

Here, $r_j$ is the perception rating assigned to criteria $i$, such as $r_j = 1, 2, 3, 4, 5$. The measurement criticality (MC) has been used to know how much the attributes are aligned with the perspectives. The study calculates the MC based on the mathematical average, which uses a matrix to maintain the consistency of the scale with all the attributes and perspectives. The equation for MC given below:

$$MC_{i=} = \sqrt[n]{P1*P2*P3} \qquad (3)$$

Next the direct relation matrix ($P_k$) is generated by using the $P_k$ values. After applying the FSE, the paired comparison among the criteria generate a $n \times n$, $RP_k$ matrix. $R_{ij}P_k$ denotes the degree to which criterion $i$ impacts criterion $j$. The equation for $RP_k$ is given below:

$$RP_k = [R_{ij}P_k]_{n*n} \qquad (4)$$

The following equation calculates the normalization process of direct relation matrix $RP_k$.

$$D = RP_k \Big/ \max_{1 \le i \le n} \sum_{j=1}^{n} Rij \qquad (5)$$

After normalizing the direct relation matrix $D$, the total relation matrix $TR$ can be generated using the following equation, where $I$ stands for identity matrix.

$$TR = D(I - D)^{-1} \qquad (6)$$

Now, the cause and effect diagram must be developed. To produce the cause and effect graphic, there is a need to aggregate the columns (C) and rows (R) individually among the total relation matrix $TR$ and then apply $(C + R, C - R)$ to create that graphic. The cause and effect diagram contains four quadrants. The means score of $(C + R)$ and $(C - R)$ have been used to plot the quadrants. The horizontal axis is demonstrated by $(C + R)$ and vertical axis is demonstrated by $(C - R)$. The horizontal axis in the graphic denotes the relative importance of the attributes. The positive result from the vertical axis $(C - R)$ forms the causal group, and the negative result of the vertical axis forms the effect groups.

$$TR = [d_{ij}][d_{ij}]_{n \times n} \quad ij = 1, 2, ..., n \qquad (7)$$

$$C = \left[\sum_{i=1}^{n} d_{ij}\right]_{n \times 1} = [dj]_{n \times 1} \qquad (8)$$

$$R = \left[\sum_{j=1}^{n} d_{ij}\right]_{1 \times n} = [dj]_{1 \times n} \qquad (9)$$

Next, the weight $W = (w1, w2, ...wk)$ of each perspective needs to be calculated from the criteria. Suppose K is the number of criteria. The weight for each perspective $i$ can be calculated using the equation below:

$$w_i^{p(i)} = P \Big/ \sum_{i=1}^{k} P_i \qquad (10)$$

The fuzzy weight vector $WV$ and the evaluation matrix $EM$ comprise the assessment result as such $R = WV*EM$. The following equation calculates the membership function groups (g) for perspectives $P1$, $P2$, and $P3$:

$$r_{gj}^{P1} = \sum_{i=1}^{k} wv_i^{P1} x\, em_{ij}^{P1}$$

$$\left(R_g^{P1}\right)_{1*5} = \left(WV_i^{P1}\right)_{1*k} * \left(EM_i^{P1}\right)_{k*5} = \left(r_{t1}^{P1}, r_{t2}^{P1}, r_{t3}^{P1}, r_{t4}^{P1}, r_{t5}^{P1}\right) \qquad (11)$$

$$r_{gj}^{P2} = \sum_{i=1}^{k} wv_i^{P2} x\, em_{ij}^{P2}$$

$$\left(R_g^{P2}\right)_{1*5} = \left(WV_i^{P2}\right)_{1*k} * \left(EM_i^{P2}\right)_{k*5} = \left(r_{t1}^{P2}, r_{t2}^{P2}, r_{t3}^{P2}, r_{t4}^{P2}, r_{t5}^{P2}\right)$$

$$r_{gj}^{P3} = \sum_{i=1}^{k} wv_i^{P3} x\, em_{ij}^{P3}$$

$$\left(R_g^{P3}\right)_{1*5} = \left(WV_i^{P3}\right)_{1*k} * \left(EM_i^{P3}\right)_{k*5} = \left(r_{t1}^{P3}, r_{t2}^{P3}, r_{t3}^{P3}, r_{t4}^{P3}, r_{t5}^{P3}\right) \qquad (12)$$

The following equation takes the membership functions of the criteria group ($t$) with the perspectives ($P$) into consideration:

$$P_{gt} = \sum_{1}^{5}\left(r_j r_{tj}^{P_k}\right), \; k = 1, 2, 3 \qquad (13)$$

$$MC_i = \sqrt{P1*P2*P3} \qquad (14)$$

The total aspect weight for the perspectives can be calculated as $W_{As} = \{W_{As1}, W_{As2}......W_{Asm}\}$ where $m$ is the number of aspects. The following equation integrates the perspectives' weight $j$.

$$w_{gj}^{P_k} = \left(\sum_{i=j}^{k} P_i\right)_j \Big/ \sum_{j=1}^{x}\left(\sum_{i=1}^{k} P_k\right)_j \qquad (15)$$

where $\sum_{i=j}^{k} P_i$ represents the summation of $P$ considering $k$ criteria in

group $m$.

The following equations calculate the membership functions for an overall weight of perspectives $P$:

$$mr_{Allj}^{P1} = \sum_{i=1}^{x} wv_{Asm}^{P1} x\, MR_{jj}^{P1}$$

$$\left(MR_{All}^{P1}\right)_{1*5} = \left(WV_{Asm}^{P1}\right)_{1*x} * \left(mr_{Asm}^{P1}\right)_{x*5}$$
$$= \left(mr_{All1}^{P1}, mr_{All2}^{P1}, mr_{All3}^{P1}, mr_{All4}^{P1}, mr_{All5}^{P1}\right)$$

$$mr_{Allj}^{P2} = \sum_{i=1}^{x} wv_{Asm}^{P2} x\, MR_{jj}^{P2}$$

$$\left(MR_{All}^{P2}\right)_{1*5} = \left(WV_{Asm}^{P2}\right)_{1*x} * \left(mr_{Asm}^{P2}\right)_{x*5}$$
$$= \left(mr_{All1}^{P2}, mr_{All2}^{P2}, mr_{All3}^{P2}, mr_{All4}^{P2}, mr_{All5}^{P2}\right)$$

$$mr_{Allj}^{P3} = \sum_{i=1}^{x} wv_{Asm}^{P3} x\, MR_{jj}^{P3}$$

$$\left(MR_{All}^{P3}\right)_{1*5} = \left(WV_{Asm}^{P3}\right)_{1*x} * \left(mr_{Asm}^{P3}\right)_{x*5}$$
$$= \left(mr_{All1}^{P3}, mr_{All2}^{P3}, mr_{All3}^{P3}, mr_{All4}^{P3}, mr_{All5}^{P3}\right) \qquad (16)$$

Here, $(mr_{Asm}^{Pi})_{x*5}$ represents a matrix of $(x*5)$. The following equation calculates the overall membership function for perspectives $P_i$ as well as for $MC$.

$$P_{i\,All} = \sum_{j=1}^{5} \left(r_j mr_{Allj}^{P_k}\right) \qquad (17)$$

$$MC_{All} = \sqrt[n]{(P1_{All} * P2_{All} * P3_{All})} \qquad (18)$$

Here, $r_j = 1,2,3,4,5$.

### 3.4. Proposed steps in analysis

The study follows the following steps of analysis:

1. The study identifies CC attributes in TBL aspects based on the literature and develops a measurement structure using EFA. Fig. 1 presents the hierarchical assessment frameowrk. The questionnaire was validated by consultation with a group of three experts, including two industry experts and one expert from academia. The data have been collected from 55 industry experts through a survey questionnaire using a five-point linguistic scale (very low, low, medium, high and very high) which is compatible with prior studies (Tseng et al., 2017). For the study purpose these respondents are considered as experts because they are working in the top and mid level management at the same time they have completed at least five years tenure in the same industry.

2. Next, the FSE converts the linguistic perceptions of the respondents into a fuzzy number. The crisp values are developed after converting the fuzzy numbers using Eqs. (1)–(3). An EFA was conducted to form different groups using relevant criteria. A decision matrix is proposed to address the interdependence problem using Eq. (4).

3. Next, the total DEMATEL relation matrix is integrated with the crisp values using Eqs. (5)–(9). By taking the values of cause and effect groups then the causal effect diagram is plotted.
4. Next, the perspective versus criteria crisp values as well as the weights for groups are computed with the help of Eqs. (10)-(14).
5. Next, the study calculates the crisp values of the perspectives versus aspects followed by the overall weight. Finally, the aspect weights are computed using Eq. (16) and the overall weights of the perspectives are calculated by Eqs. (17) and (18).

## 4. Results

This section presents the results of the applied method in order. First, there is a description of the EFA that was conducted to group the criteria into clusters. Then, the results of the FSE-DEMATEL approach are presented.

### 4.1. Result of EFA

Table 2 shows the EFA of the criteria as well as the factor loadings and reliability results of each group. The factor loadings of all the groups are greater than 0.70, which exceeds the minimum threshold maintain suggested in the literature (Hair et al., 2010). Thus, the EFA indicates that there is a high convergent validity among the groups. Additionally, Table 2 presents the reliability results of each group using Cronbach alpha ($\alpha$). The $\alpha$ values of each group are greater than 0.70, which confirms the minimum threshold values (0.60–0.70) as recommended in the literature (Hair et al., 2010). Thus, the reliability analysis indicates that there is a considerable internal consistency among the criteria within the groups.

### 4.2. FSE-DEMATEL

The FSE calculates the membership functions and crisp values using the equations (1)–(3). Table 3 presents the membership functions and the crisp values of the criteria according to the perspectives. The three TBL aspects are P1, P2 and P3. The crisp values of C1 for P1, P2, and P3 are 3.000, 3.114 and 2.914 respectively, while the MC value is 3.008. Similarly, the crisp values, membership functions, MC and ranking of all the other criteria can be found in Table 3. The top three ranking criteria regarding high performance are (C9) transparency in sustainability reports, (C13) environmental knowledge sharing and (C21) participative decision making.

The crisp values of the FSE apply to the total relation matrix of the attributes. Then, using equation (4), it calculates the matrix. Table 4 presents the total DEMATEL relation matrix of attributes. Moreover, Table 5 presents the crisp values for causal and effect groups. The item with positive values indicate the causal attributes (C2, C3, C4, C7, C9, C10, C14, C15, C16, C18, C19), while negative values (C1, C5, C6, C8, C11, C12, C13, C17, C20, C21, C22, C23, C24, C25, C26) indicate the effect attributes. Fig. 2 represents the cause and effect diagram for the attributes. It is clear from the figure that the influential causal criteria are (C7) eco-friendly oriented goals, (C2) instructional communication, (C19) green recruitment, (C14) nurturing environmental innovations, and (C16) socio-oriented mission statement.

The membership functions of aspect (As1) under perspective (P1) is calculated using equations (11) and (12), followed by the calculation of group (P1) using equation (13). Then, the study calculates the MC using equation (14). Table 6 presents the aspect weights under the perspectives. There are five aspects that are the result of the EFA. The weights of aspects based on the TBL aspects are calculated using equation (15). Table 7 presents the crisp overall values, membership functions, MC and rankings of the aspects
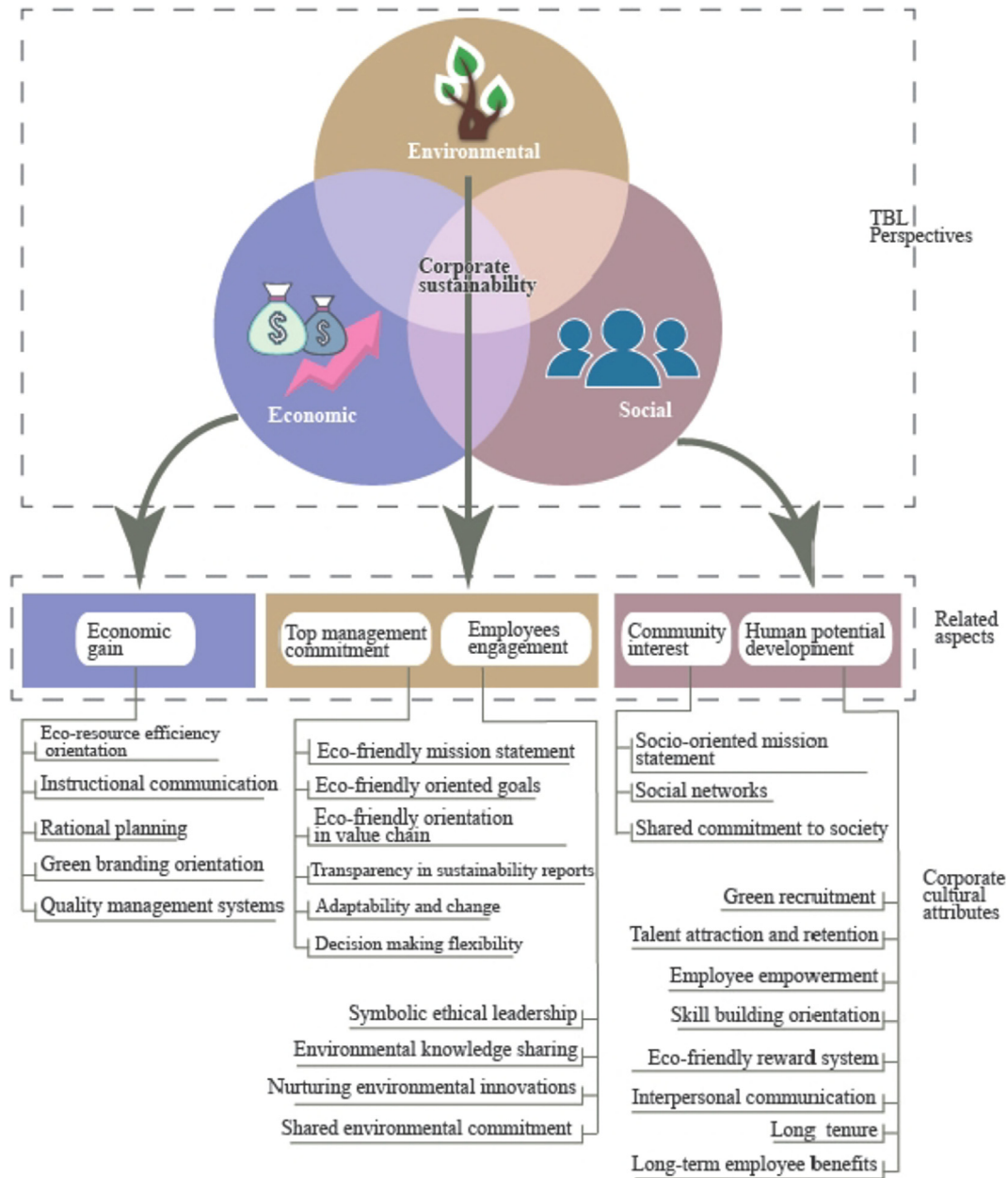
**Fig. 1.** Hierarchical assessment framework.

under TBL aspects. The calculation of all the perspectives, P1, P2 and P3, are calculated using equation (16). The top three ranking high-performance aspects are employee engagement (As3), top management commitment (As2), and economic gain (As1).

Next, the total perspective weights are calculated using equation (17) as below:

$P_{1\ All} = 8.185\ P_{2\ All} = 9.735\ P_{3\ All} = 9.205$

Finally, the total MC is computed using equation (18) as below:

$MC_{All} = \sqrt[n]{(P1_{All}*P2_{All}*P3_{All}} = \sqrt[3]{(8.185*9.735*9.205} = 3.74$ (62.4%)

The results reveal the MC for different perspectives. The MC for economic perspective (P1) reveals 8.185, while the MC for the environmental perspective (P2) and the social perspective (P3) reveal 9.735, and 9.205 respectively. The total MC is 3.74, which is almost 62.4% of the total performance. Thus, the industry has room for performance improvement.

Table 7 showed that the employees' engagement aspect (As3)

ranked number one, while the top management commitment aspect (As2) ranks number two. The MC value of As3 and As2 are 3.0728 and 3.0440 respectively. Additionally, these two aspects fall under the environmental perspective (P2). Thus, the environmental perspective (P2) ranks higher than the other perspectives in terms of firm performance.

## 5. Implications

The following section discuss the theoretical implications of the CC in pursuit of CS performance as well as the managerial implications to improve sustainable development performance within the industry with the help of CC.

### 5.1. Theoretical implications

This study addresses the ongoing debate by showing how CC

**Table 2**
EFA for five aspects and criteria.

| | Aspects | Criteria | | Loadings | Reliability |
|---|---|---|---|---|---|
| As1 | Economic gain | C1 | Eco-resource efficiency orientation | 0.796 | 0.870 |
| | | C2 | Instructional communication | 0.856 | |
| | | C3 | Rational planning | 0.855 | |
| | | C4 | Green branding orientation | 0.798 | |
| | | C5 | Quality management systems | 0.702 | |
| As2 | Top management commitment | C6 | Eco-friendly mission statement | 0.758 | 0.856 |
| | | C7 | Eco-friendly oriented goals | 0.772 | |
| | | C8 | Eco-friendly orientation in value chain | 0.799 | |
| | | C9 | Transparency in sustainability reports | 0.765 | |
| | | C10 | Adaptability and change | 0.809 | |
| | | C11 | Decision making flexibility | 0.825 | |
| As3 | Employees engagement | C12 | Symbolic ethical leadership | 0.729 | 0.825 |
| | | C13 | Environmental knowledge sharing | 0.772 | |
| | | C14 | Nurturing environmental innovations | 0.778 | |
| | | C15 | Shared environmental commitment | 0.798 | |
| As4 | Community interest | C16 | Socio-oriented mission statement | 0.825 | 0.803 |
| | | C17 | Social networks | 0.830 | |
| | | C18 | Shared commitment to society | 0.729 | |
| As5 | Human potential development | C19 | Green recruitment | 0.789 | 0.778 |
| | | C20 | Talent attraction and retention | 0.758 | |
| | | C21 | Participative decision making | 0.778 | |
| | | C22 | Skill building orientation | 0.805 | |
| | | C23 | Eco-friendly reward system | 0.730 | |
| | | C24 | Interpersonal communication | 0.716 | |
| | | C25 | Long tenure | 0.806 | |
| | | C26 | Long-term employee benefits | 0.892 | |

**Table 3**
Perspectives and attributes using FSE-DEMATEL.

| Criteria | Perspective 1 | | | | | | Perspective 2 | | | | | | Perspective 3 | | | | | | MC | Rank |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Membership function | | | | | Value | Membership function | | | | | Value | Membership function | | | | | Value | | |
| C1 | 0.086 | 0.200 | 0.343 | 0.371 | 0.000 | 3.000 | 0.229 | 0.200 | 0.086 | 0.200 | 0.286 | 3.114 | 0.171 | 0.314 | 0.171 | 0.114 | 0.229 | 2.914 | 3.008 | 9 |
| C2 | 0.029 | 0.229 | 0.514 | 0.229 | 0.000 | 2.943 | 0.200 | 0.086 | 0.200 | 0.314 | 0.200 | 3.229 | 0.200 | 0.229 | 0.286 | 0.143 | 0.143 | 2.800 | 2.985 | 10 |
| C3 | 0.057 | 0.200 | 0.286 | 0.457 | 0.000 | 3.143 | 0.171 | 0.171 | 0.143 | 0.200 | 0.314 | 3.314 | 0.286 | 0.143 | 0.171 | 0.143 | 0.257 | 2.943 | 3.130 | 4 |
| C4 | 0.143 | 0.457 | 0.143 | 0.257 | 0.000 | 2.514 | 0.200 | 0.200 | 0.286 | 0.171 | 0.143 | 2.857 | 0.114 | 0.200 | 0.086 | 0.229 | 0.371 | 3.543 | 2.941 | 13 |
| C5 | 0.171 | 0.229 | 0.429 | 0.171 | 0.000 | 2.600 | 0.143 | 0.229 | 0.314 | 0.057 | 0.257 | 3.057 | 0.343 | 0.057 | 0.200 | 0.200 | 0.200 | 2.857 | 2.832 | 19 |
| C6 | 0.057 | 0.229 | 0.400 | 0.314 | 0.000 | 2.971 | 0.171 | 0.200 | 0.171 | 0.286 | 0.171 | 3.086 | 0.286 | 0.200 | 0.143 | 0.257 | 0.114 | 2.714 | 2.920 | 15 |
| C7 | 0.000 | 0.229 | 0.486 | 0.286 | 0.000 | 3.057 | 0.343 | 0.229 | 0.143 | 0.171 | 0.114 | 2.486 | 0.200 | 0.086 | 0.257 | 0.286 | 0.171 | 3.143 | 2.880 | 17 |
| C8 | 0.000 | 0.114 | 0.400 | 0.429 | 0.057 | 3.429 | 0.200 | 0.229 | 0.143 | 0.229 | 0.200 | 3.000 | 0.257 | 0.286 | 0.257 | 0.086 | 0.114 | 2.514 | 2.957 | 11 |
| C9 | 0.000 | 0.200 | 0.486 | 0.314 | 0.000 | 3.114 | 0.086 | 0.257 | 0.171 | 0.200 | 0.286 | 3.343 | 0.200 | 0.143 | 0.171 | 0.229 | 0.257 | 3.200 | 3.218 | 1 |
| C10 | 0.143 | 0.143 | 0.486 | 0.200 | 0.029 | 2.829 | 0.171 | 0.229 | 0.229 | 0.143 | 0.229 | 3.029 | 0.171 | 0.114 | 0.229 | 0.229 | 0.257 | 3.286 | 3.042 | 8 |
| C11 | 0.000 | 0.314 | 0.429 | 0.229 | 0.029 | 2.971 | 0.229 | 0.086 | 0.229 | 0.314 | 0.143 | 3.057 | 0.086 | 0.257 | 0.200 | 0.286 | 0.171 | 3.200 | 3.075 | 6 |
| C12 | 0.000 | 0.200 | 0.371 | 0.429 | 0.000 | 3.229 | 0.143 | 0.229 | 0.229 | 0.257 | 0.143 | 3.029 | 0.143 | 0.200 | 0.314 | 0.257 | 0.086 | 2.943 | 3.064 | 7 |
| C13 | 0.000 | 0.143 | 0.600 | 0.257 | 0.000 | 3.114 | 0.057 | 0.229 | 0.171 | 0.314 | 0.229 | 3.429 | 0.229 | 0.143 | 0.229 | 0.143 | 0.257 | 3.057 | 3.196 | 2 |
| C14 | 0.000 | 0.171 | 0.514 | 0.257 | 0.057 | 3.200 | 0.171 | 0.400 | 0.114 | 0.114 | 0.200 | 2.771 | 0.257 | 0.229 | 0.200 | 0.200 | 0.114 | 2.686 | 2.877 | 18 |
| C15 | 0.000 | 0.114 | 0.514 | 0.371 | 0.000 | 3.257 | 0.200 | 0.143 | 0.143 | 0.171 | 0.343 | 3.314 | 0.200 | 0.286 | 0.171 | 0.229 | 0.114 | 2.771 | 3.104 | 5 |
| C16 | 0.000 | 0.286 | 0.657 | 0.057 | 0.000 | 2.771 | 0.171 | 0.257 | 0.200 | 0.171 | 0.200 | 2.971 | 0.257 | 0.200 | 0.257 | 0.143 | 0.143 | 2.714 | 2.817 | 22 |
| C17 | 0.171 | 0.171 | 0.543 | 0.114 | 0.000 | 2.600 | 0.229 | 0.171 | 0.200 | 0.229 | 0.171 | 2.943 | 0.286 | 0.200 | 0.086 | 0.143 | 0.286 | 2.943 | 2.824 | 20 |
| C18 | 0.200 | 0.400 | 0.343 | 0.057 | 0.000 | 2.257 | 0.257 | 0.171 | 0.343 | 0.114 | 0.114 | 2.657 | 0.257 | 0.200 | 0.257 | 0.086 | 0.200 | 2.771 | 2.552 | 25 |
| C19 | 0.686 | 0.286 | 0.029 | 0.000 | 0.000 | 1.343 | 0.143 | 0.257 | 0.286 | 0.200 | 0.114 | 2.886 | 0.171 | 0.257 | 0.229 | 0.143 | 0.200 | 2.943 | 2.251 | 26 |
| C20 | 0.114 | 0.371 | 0.400 | 0.114 | 0.000 | 2.514 | 0.171 | 0.200 | 0.343 | 0.057 | 0.229 | 2.971 | 0.257 | 0.143 | 0.200 | 0.229 | 0.171 | 2.914 | 2.792 | 23 |
| C21 | 0.029 | 0.114 | 0.571 | 0.286 | 0.000 | 3.114 | 0.229 | 0.229 | 0.143 | 0.200 | 0.200 | 2.914 | 0.114 | 0.171 | 0.143 | 0.314 | 0.257 | 3.429 | 3.145 | 3 |
| C22 | 0.057 | 0.314 | 0.486 | 0.143 | 0.000 | 2.714 | 0.229 | 0.286 | 0.171 | 0.171 | 0.143 | 2.714 | 0.143 | 0.229 | 0.257 | 0.171 | 0.200 | 3.057 | 2.824 | 20 |
| C23 | 0.057 | 0.371 | 0.343 | 0.229 | 0.000 | 2.743 | 0.086 | 0.314 | 0.171 | 0.114 | 0.314 | 3.257 | 0.200 | 0.314 | 0.086 | 0.257 | 0.143 | 2.829 | 2.935 | 14 |
| C24 | 0.029 | 0.143 | 0.514 | 0.314 | 0.000 | 3.114 | 0.200 | 0.171 | 0.200 | 0.200 | 0.229 | 3.086 | 0.229 | 0.257 | 0.229 | 0.200 | 0.086 | 2.657 | 2.945 | 12 |
| C25 | 0.171 | 0.229 | 0.514 | 0.086 | 0.000 | 2.514 | 0.114 | 0.286 | 0.257 | 0.114 | 0.229 | 3.057 | 0.200 | 0.143 | 0.229 | 0.171 | 0.257 | 3.143 | 2.891 | 16 |
| C26 | 0.171 | 0.400 | 0.400 | 0.029 | 0.000 | 2.286 | 0.229 | 0.171 | 0.257 | 0.229 | 0.114 | 2.829 | 0.286 | 0.143 | 0.171 | 0.143 | 0.257 | 2.943 | 2.670 | 24 |

improves CS performance. Merely developing innovations or instigating technological changes will be insufficient for achieving CS unless its goals are integrated with the CC. In addition, this study addresses the gaps in the literature by integrating CC attributes into sustainability. This study presents several attributes based on the TBL aspects, which is conducive for CS performance. The TBL aspects is important to ensure that the attributes are incorporated to address sustainable development performance.

The economic gain (As1) aspect presented in this study consists of attributes that drive sustainable economic benefits for firms. Firms should not focus on short-term profit maximization; instead, they need to consolidate their future position. The attributes present in this aspect suggest that firms should pursue important CC characteristics, including resource efficiency, branding green initiatives, rational planning, quality management, and instructional communication. The top management commitment (As2) aspect suggests that firms should focus on shaping a mission statement, goals, and strategies to protect the environment as well as bring

**Table 4**
The total DEMATEL relation matrix of attributes.

| | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 | C20 | C21 | C22 | C23 | C24 | C25 | C26 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C1 | 2.981 | 3.143 | 3.000 | 3.095 | 2.705 | 3.162 | 2.971 | 2.857 | 3.219 | 2.914 | 2.981 | 2.838 | 3.000 | 3.152 | 2.876 | 2.924 | 3.124 | 2.981 | 3.219 | 2.857 | 3.019 | 3.219 | 2.762 | 3.114 | 3.048 | 2.848 |
| C2 | 3.076 | 3.190 | 3.210 | 2.924 | 2.857 | 3.029 | 3.248 | 3.162 | 2.933 | 3.076 | 3.133 | 2.829 | 3.000 | 2.952 | 3.267 | 3.124 | 3.057 | 2.952 | 2.914 | 3.162 | 3.171 | 2.971 | 2.971 | 3.048 | 3.057 | 3.143 |
| C3 | 2.981 | 3.019 | 2.981 | 3.029 | 3.181 | 2.800 | 3.124 | 3.124 | 3.000 | 2.771 | 2.914 | 2.905 | 3.029 | 3.076 | 3.371 | 2.686 | 3.038 | 2.981 | 3.038 | 2.952 | 2.933 | 3.038 | 3.048 | 3.000 | 2.962 | 3.257 |
| C4 | 3.257 | 3.124 | 3.000 | 2.829 | 3.057 | 2.924 | 3.048 | 3.124 | 3.152 | 2.905 | 2.848 | 3.038 | 3.324 | 3.133 | 2.981 | 2.886 | 3.200 | 3.171 | 2.800 | 2.971 | 2.829 | 3.143 | 3.057 | 2.705 | 3.067 | 3.000 |
| C5 | 2.962 | 2.895 | 2.990 | 3.019 | 2.971 | 3.086 | 2.952 | 3.000 | 2.876 | 2.952 | 2.886 | 3.171 | 3.067 | 2.895 | 2.714 | 2.752 | 2.857 | 2.933 | 3.152 | 2.924 | 3.076 | 2.952 | 3.000 | 3.238 | 2.943 | 3.029 |
| C6 | 3.190 | 2.838 | 3.076 | 2.867 | 2.933 | 2.829 | 2.943 | 2.933 | 2.990 | 3.124 | 3.057 | 3.010 | 2.981 | 2.952 | 3.114 | 2.981 | 3.181 | 2.933 | 2.829 | 2.933 | 2.933 | 2.914 | 2.781 | 3.010 | 3.295 | 3.257 |
| C7 | 3.057 | 3.086 | 2.943 | 3.048 | 3.210 | 2.886 | 3.067 | 3.190 | 3.105 | 3.133 | 3.019 | 3.238 | 3.010 | 3.238 | 2.905 | 3.048 | 3.229 | 3.152 | 3.105 | 2.867 | 3.048 | 3.019 | 3.029 | 3.057 | 3.190 | 2.905 |
| C8 | 3.038 | 3.219 | 2.933 | 2.686 | 3.210 | 3.057 | 3.029 | 3.019 | 2.790 | 2.895 | 3.219 | 3.095 | 3.057 | 2.886 | 3.114 | 3.267 | 2.771 | 3.057 | 2.790 | 2.971 | 2.914 | 2.829 | 2.990 | 3.038 | 2.886 | 2.981 |
| C9 | 3.010 | 3.057 | 3.000 | 2.962 | 3.000 | 2.962 | 3.152 | 2.895 | 3.019 | 2.686 | 2.990 | 3.067 | 3.105 | 3.190 | 2.933 | 2.848 | 3.048 | 3.057 | 3.019 | 3.000 | 2.848 | 2.952 | 3.333 | 2.981 | 2.952 | 3.248 |
| C10 | 3.133 | 2.676 | 3.133 | 2.971 | 2.895 | 3.086 | 3.029 | 2.933 | 2.810 | 2.895 | 2.905 | 2.848 | 2.933 | 2.933 | 2.771 | 3.248 | 2.981 | 3.010 | 3.067 | 3.000 | 3.152 | 3.076 | 3.086 | 2.990 | 3.038 | 3.019 |
| C11 | 2.743 | 2.886 | 3.057 | 2.886 | 2.914 | 2.876 | 3.010 | 3.057 | 2.952 | 2.895 | 3.048 | 3.086 | 3.038 | 3.067 | 2.790 | 3.095 | 3.086 | 2.781 | 2.971 | 3.152 | 2.905 | 3.038 | 2.876 | 2.905 | 3.162 | 2.952 |
| C12 | 2.962 | 2.829 | 2.981 | 2.914 | 2.971 | 2.990 | 2.971 | 3.133 | 2.895 | 2.981 | 3.162 | 3.000 | 3.067 | 3.152 | 2.981 | 3.000 | 2.810 | 3.067 | 2.943 | 2.886 | 3.200 | 2.952 | 2.895 | 3.067 | 3.200 | 3.010 |
| C13 | 2.838 | 2.810 | 2.952 | 3.038 | 3.019 | 3.114 | 2.857 | 3.019 | 2.924 | 2.924 | 2.829 | 2.886 | 3.000 | 2.952 | 2.933 | 2.581 | 3.029 | 3.019 | 3.000 | 2.990 | 3.038 | 3.086 | 2.943 | 3.114 | 2.905 | 2.905 |
| C14 | 3.019 | 3.095 | 2.905 | 3.152 | 2.981 | 2.743 | 2.971 | 2.971 | 2.914 | 3.019 | 3.029 | 2.962 | 3.095 | 3.390 | 3.067 | 3.076 | 3.000 | 3.010 | 3.133 | 3.105 | 3.048 | 3.057 | 3.114 | 3.067 | 3.143 | 2.762 |
| C15 | 3.210 | 3.105 | 2.800 | 3.143 | 3.171 | 3.152 | 2.933 | 2.886 | 2.990 | 2.867 | 3.010 | 2.962 | 2.848 | 3.038 | 2.905 | 3.210 | 2.876 | 3.076 | 2.810 | 3.057 | 3.257 | 3.000 | 3.381 | 2.790 | 3.210 | 3.038 |
| C16 | 2.971 | 3.029 | 3.095 | 2.914 | 3.362 | 3.229 | 2.990 | 3.057 | 3.371 | 3.029 | 3.048 | 2.810 | 2.943 | 2.952 | 3.276 | 2.800 | 3.133 | 2.962 | 3.019 | 3.162 | 2.705 | 2.971 | 2.905 | 2.857 | 2.971 | 3.057 |
| C17 | 2.905 | 2.905 | 3.124 | 3.352 | 3.133 | 2.895 | 2.943 | 2.952 | 2.838 | 2.838 | 2.933 | 3.086 | 3.286 | 3.057 | 3.038 | 3.171 | 2.952 | 2.952 | 2.838 | 3.029 | 3.114 | 3.371 | 3.105 | 2.981 | 3.019 | 2.781 |
| C18 | 3.010 | 3.000 | 2.971 | 2.943 | 3.038 | 3.048 | 3.181 | 2.914 | 2.990 | 3.152 | 3.314 | 3.048 | 2.781 | 2.867 | 2.895 | 2.914 | 2.629 | 2.790 | 3.067 | 3.190 | 3.029 | 3.295 | 3.352 | 3.010 | 2.943 | 3.105 |
| C19 | 3.143 | 3.267 | 3.010 | 2.876 | 2.781 | 2.971 | 3.124 | 2.771 | 3.048 | 3.010 | 2.819 | 3.124 | 3.190 | 3.105 | 3.000 | 3.181 | 3.057 | 2.990 | 3.229 | 3.029 | 3.105 | 3.029 | 3.229 | 3.229 | 3.038 | 2.886 |
| C20 | 3.038 | 3.171 | 2.876 | 3.095 | 2.800 | 2.971 | 3.038 | 2.943 | 2.876 | 2.971 | 2.914 | 2.981 | 2.933 | 2.876 | 2.867 | 3.095 | 3.210 | 2.924 | 3.124 | 3.124 | 3.114 | 2.971 | 2.867 | 3.010 | 2.924 | 3.181 |
| C21 | 3.133 | 2.981 | 3.029 | 2.867 | 2.781 | 3.210 | 2.819 | 3.181 | 2.962 | 3.086 | 2.914 | 2.743 | 2.895 | 2.962 | 2.924 | 3.048 | 3.105 | 3.067 | 2.981 | 2.981 | 3.343 | 3.076 | 3.114 | 3.219 | 2.971 | 3.095 |
| C22 | 3.029 | 3.095 | 2.876 | 3.114 | 3.400 | 3.162 | 2.905 | 3.057 | 2.943 | 2.752 | 2.971 | 3.124 | 2.971 | 2.876 | 3.057 | 2.981 | 3.229 | 3.010 | 3.029 | 3.010 | 2.886 | 2.657 | 2.971 | 3.086 | 2.952 | 3.057 |
| C23 | 3.029 | 3.048 | 2.867 | 2.933 | 3.038 | 3.048 | 2.838 | 3.010 | 2.962 | 3.076 | 3.029 | 3.124 | 3.305 | 2.924 | 3.219 | 2.876 | 3.038 | 3.181 | 2.848 | 2.752 | 3.143 | 2.819 | 3.067 | 3.067 | 2.962 | 2.848 |
| C24 | 2.886 | 2.648 | 2.962 | 2.590 | 2.924 | 2.819 | 3.114 | 3.171 | 3.076 | 2.952 | 3.200 | 2.867 | 2.648 | 2.829 | 2.857 | 2.905 | 3.038 | 2.943 | 3.219 | 2.990 | 3.010 | 3.133 | 2.886 | 3.057 | 2.886 | |
| C25 | 3.000 | 2.781 | 2.819 | 2.962 | 2.733 | 3.000 | 3.095 | 3.057 | 3.010 | 3.095 | 3.162 | 3.010 | 3.162 | 3.000 | 2.857 | 3.143 | 3.143 | 2.790 | 3.152 | 2.743 | 3.171 | 3.295 | 3.124 | 3.200 | 3.000 | 2.952 |
| C26 | 2.790 | 2.733 | 2.990 | 3.010 | 3.143 | 3.143 | 3.143 | 2.981 | 2.962 | 2.971 | 3.010 | 2.933 | 3.210 | 3.010 | 2.914 | 3.105 | 2.933 | 2.933 | 3.105 | 3.152 | 3.124 | 2.933 | 3.181 | 2.838 | 3.019 | 2.905 |

**Table 5**
The crisp values for the cause and effect groups.

| | C | R | C+R | C-R |
|---|---|---|---|---|
| C1 | 43.661 | 43.974 | 87.636 | (0.313) |
| C2 | 44.471 | 43.554 | 88.025 | 0.916 |
| C3 | 43.783 | 43.523 | 87.306 | 0.260 |
| C4 | 43.973 | 43.321 | 87.295 | 0.652 |
| C5 | 43.247 | 43.789 | 87.035 | (0.542) |
| C6 | 43.581 | 43.863 | 87.444 | (0.282) |
| C7 | 44.571 | 44.028 | 88.599 | 0.543 |
| C8 | 43.505 | 43.980 | 87.485 | (0.475) |
| C9 | 43.824 | 43.537 | 87.361 | 0.287 |
| C10 | 43.434 | 43.128 | 86.562 | 0.306 |
| C11 | 43.218 | 43.978 | 87.195 | (0.760) |
| C12 | 43.656 | 43.698 | 87.354 | (0.042) |
| C13 | 42.981 | 44.395 | 87.375 | (1.414) |
| C14 | 44.117 | 43.911 | 88.028 | 0.207 |
| C15 | 44.055 | 43.332 | 87.387 | 0.722 |
| C16 | 44.001 | 43.949 | 87.950 | 0.051 |
| C17 | 43.982 | 44.100 | 88.082 | (0.118) |
| C18 | 43.907 | 43.643 | 87.551 | 0.264 |
| C19 | 44.346 | 43.820 | 88.166 | 0.526 |
| C20 | 43.598 | 43.903 | 87.501 | (0.306) |
| C21 | 43.915 | 44.398 | 88.313 | (0.483) |
| C22 | 43.764 | 44.058 | 87.822 | (0.295) |
| C23 | 43.674 | 44.583 | 88.257 | (0.909) |
| C24 | 42.842 | 43.927 | 86.769 | (1.085) |
| C25 | 43.897 | 44.339 | 88.236 | (0.442) |
| C26 | 43.747 | 43.813 | 87.560 | (0.066) |

**Fig. 2.** The cause and effect diagram of the criteria.

flexibility to the firms. The employee engagement (As3) aspect emphasizes ethical leadership, environmental training, employee empowerment and a shared commitment to protecting the environment. The economic gain (As1) and employee engagement (As3) aspects address the environmental perspective (P2) of the TBL. To address the social perspective (P3), the study develops community interest (As4) and human potential development (As5) aspects.

The community interest aspect focuses on shaping a mission statement, building social networks and developing shared commitments to protect community interests. Finally, the human potential development aspect advocates for developing human potentiality as part of social responsibility towards employees as well as in order to utilize their skill to pursue CS goals. This aspect helps firms achieve a win-win situation through reformation of the recruitment process, talent attraction, skills building, reward systems, participative decision-making, and long-term employment growth. Therefore, it is evident that CC is being regarded as a way to change the beliefs, values, norms, and attitudes of the human beings working in firms, which results in encouraging or prohibiting

**Table 6**
The factor weights of the aspects under the perspectives.

| | | P1 | | | P2 | | | P3 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Value | Group Sum | Factor Weight | Value | Group Sum | Factor Weight | Value | Group Sum | Factor Weight |
| AS1 | C1 | 3.000 | 14.200 | 0.211 | 3.114 | 15.571 | 0.219 | 2.914 | 15.057 | 0.205 |
| | C2 | 2.943 | | 0.207 | 3.229 | | 0.227 | 2.800 | | 0.197 |
| | C3 | 3.143 | | 0.221 | 3.314 | | 0.233 | 2.943 | | 0.207 |
| | C4 | 2.514 | | 0.177 | 2.857 | | 0.201 | 3.543 | | 0.249 |
| | C5 | 2.600 | | 0.183 | 3.057 | | 0.215 | 2.857 | | 0.201 |
| AS2 | C6 | 2.971 | 18.371 | 0.162 | 3.086 | 18.000 | 0.168 | 2.714 | 18.057 | 0.148 |
| | C7 | 3.057 | | 0.166 | 2.486 | | 0.135 | 3.143 | | 0.171 |
| | C8 | 3.429 | | 0.187 | 3.000 | | 0.163 | 2.514 | | 0.137 |
| | C9 | 3.114 | | 0.170 | 3.343 | | 0.182 | 3.200 | | 0.174 |
| | C10 | 2.829 | | 0.154 | 3.029 | | 0.165 | 3.286 | | 0.179 |
| | C11 | 2.971 | | 0.162 | 3.057 | | 0.166 | 3.200 | | 0.174 |
| AS3 | C12 | 3.229 | 12.800 | 0.252 | 3.029 | 12.543 | 0.237 | 2.943 | 11.457 | 0.230 |
| | C13 | 3.114 | | 0.243 | 3.429 | | 0.268 | 3.057 | | 0.239 |
| | C14 | 3.200 | | 0.250 | 2.771 | | 0.217 | 2.686 | | 0.210 |
| | C15 | 3.257 | | 0.254 | 3.314 | | 0.259 | 2.771 | | 0.217 |
| AS4 | C16 | 2.771 | 7.629 | 0.363 | 2.971 | 8.571 | 0.390 | 2.714 | 8.429 | 0.356 |
| | C17 | 2.600 | | 0.341 | 2.943 | | 0.386 | 2.943 | | 0.386 |
| | C18 | 2.257 | | 0.296 | 2.657 | | 0.348 | 2.771 | | 0.363 |
| AS5 | C19 | 1.343 | 20.343 | 0.066 | 2.886 | 23.714 | 0.142 | 2.943 | 23.914 | 0.145 |
| | C20 | 2.514 | | 0.124 | 2.971 | | 0.146 | 2.914 | | 0.143 |
| | C21 | 3.114 | | 0.153 | 2.914 | | 0.143 | 3.429 | | 0.169 |
| | C22 | 2.714 | | 0.133 | 2.714 | | 0.133 | 3.057 | | 0.150 |
| | C23 | 2.743 | | 0.135 | 3.257 | | 0.160 | 2.829 | | 0.139 |
| | C24 | 3.114 | | 0.153 | 3.086 | | 0.152 | 2.657 | | 0.131 |
| | C25 | 2.514 | | 0.124 | 3.057 | | 0.150 | 3.143 | | 0.154 |
| | C26 | 2.286 | | 0.112 | 2.829 | | 0.139 | 2.943 | | 0.145 |

**Table 7**
The crisp values of the aspects under the perspectives with the MC and final rankings.

| | P1 | | | | | | P2 | | | | | | P3 | | | | | | MC | Ranking |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Value | Membership Function | | | | | Value | Membership Function | | | | | Value | Membership Function | | | | | | |
| AS1 | 2.861 | 0.093 | 0.257 | 0.346 | 0.304 | 0.000 | 3.122 | 0.188 | 0.176 | 0.203 | 0.190 | 0.242 | 3.036 | 0.218 | 0.189 | 0.178 | 0.168 | 0.246 | 3.0041 | 3 |
| AS2 | 3.073 | 0.031 | 0.203 | 0.447 | 0.299 | 0.020 | 3.022 | 0.194 | 0.205 | 0.182 | 0.225 | 0.194 | 3.037 | 0.195 | 0.176 | 0.209 | 0.233 | 0.186 | 3.0440 | 2 |
| AS3 | 3.201 | 0.000 | 0.157 | 0.499 | 0.329 | 0.014 | 3.157 | 0.141 | 0.244 | 0.165 | 0.219 | 0.232 | 2.872 | 0.206 | 0.212 | 0.230 | 0.206 | 0.145 | 3.0728 | 1 |
| AS4 | 2.561 | 0.118 | 0.281 | 0.525 | 0.077 | 0.000 | 2.864 | 0.218 | 0.201 | 0.244 | 0.173 | 0.164 | 2.813 | 0.267 | 0.200 | 0.197 | 0.124 | 0.212 | 2.7427 | 5 |
| AS5 | 2.652 | 0.124 | 0.269 | 0.437 | 0.170 | 0.000 | 2.973 | 0.173 | 0.240 | 0.228 | 0.159 | 0.199 | 3.005 | 0.198 | 0.205 | 0.193 | 0.205 | 0.200 | 2.8721 | 4 |

Table 7 showed that the employees' engagement aspect (As3) ranked number one, while the top management commitment aspect (As2) ranks number two. The MC value of As3 and As2 are 3.0728 and 3.0440 respectively. Additionally, these two aspects fall under the environmental perspective (P2). Thus, the environmental perspective (P2) ranks higher than the other perspectives in terms of firm performance.

certain actions. CC may encourage employees to take care of community interests, while it may not prohibit employees from releasing untreated waste through lakes and rivers, thereby causing the suffering of millions and negatively affecting community interest. Thus, having a proper CC is essential for achieving CS performance. The result reveals that the firms focus more on the economic and environmental aspects, while the social aspect gets less attention. These findings confirm prior studies are claiming a similar result (Tseng, 2017; Waligo et al., 2013).

A couple of aspects related to social perspectives, such as community interest (As4) and human potential development (As5), reveal a poorer performance. Previous studies maintain that firms need to pay attention to community interest as well as human development to pursue CS performance(Baumgartner and Ebner, 2010; Galpin et al., 2015). Additionally, the result of aspects related to economic and environmental perspectives, such as economic gain (As1), top management commitment (As2) and employee engagement (As3), does not indicate a significant high-performance level. That might be the reason why the leather industry is currently facing pressure from stakeholders to improve its sustainability aspects. Previous studies also focused on the economic benefit of top management commitment and employee engagement as a way to achieve CS performance (Tseng et al.,

2017). Therefore, the cultural attributes presented in this study are essential for building and shaping organizations in order to pursue CS performance.

### 5.2. Managerial implications

The study bring significant implications for managers to improve CS performance. Regarding the industry's performance results, the perspectives rank them as follows: the environmental perspective (P2), economic perspective (P1), and social perspective (P3). The aspects are ranked in the following order: employee engagement (As1), top management commitment (As2), economic gain (As3), community interest (As4) and human potential development (As5). The top five ranked criteria are (C9) transparency in sustainability reports, (C13) environmental knowledge sharing, (C21) participative decision making, (C3) rational planning, and (C15) shared environmental commitment. The overall performance level (62%) of the criteria is low, which suggests that managers need to redesign the existing culture to pursue CS performance.

The causal criteria for performance enhancement are (C7) eco-friendly oriented goals, (C2) instructional communication, (C19) green recruitment, (C14) nurturing environmental innovations, and (C16) socio-oriented mission statement. The leather industry is

facing challenges due to lack of balanced practices in TBL aspects. This industry found to be causing environmental and health hazard to community through releasing untreated wastes through lakes and rivers. Thus, having (C7) eco-friendly oriented goals is essential to improve CS performance because the goals translate into actions. Instructional communications are another way to teach and learn about the environment. Such communications include training through multimedia presentations, distance learning, and the development of communication between managers and workers. In this process, instructors or leaders' teaching strategies and preferences significantly influence the way employees learn and behave. Moreover, the presence of an ethical leader as an instructor is necessary to transfer sustainable information through (C2) instructional communication. Thus, building and sustaining beliefs, values, and skills through employee instructional communications plays a crucial role in achieving CS performance.

The recruitment process ensures the right employee is in the right place. For the firms that aim to achieve CS performance, it is important to integrate CS criteria into the recruitment process. There are certain individuals in society who want to contribute to greater sustainability and prefer to work with a firm that is pursuing CS performance. There would be ideal situations where individual goals and organizational goals become aligned. Then, firms can expect better performance from their employees. Thus, (C19) the green recruitment process which includes sustainability criteria into the recruitment process is an important CC attribute that managers should pursue as a way to achieve CS performance. Managers need to ensure employee empowerment in sustainability initiatives. This requires making flexible organizations, and it necessitates the inclusion of sustainability criteria in the recruitment process. Self-motivated, enthusiastic employees will think, innovate and make decisions based on their own initiative to take care of the environment and society. Therefore, (C14) nurturing environmental innovations is another critical CC attribute that managers need to focus on in pursuing CS performance.

Finally, the reformation of the mission statement is necessary to change the existing beliefs, values, norms, goals, and strategies. The mission statements should address social responsibility in order to translate this idea into the values, strategies, and goals of the firms. The result of the study also reveals the poorest performance was related to the social perspective. The industry needs to find balance by improving in the social perspectives area. Therefore, the (C16) socio-oriented mission statement is another important CC attribute that managers should consider to achieve CS performance. Finally, the causal criteria suggest that managers prioritize these cultural attributes. The CC attributes identified in this study demonstrate an ideal culture for firms that want to pursue CS performance. It is possible that the industry is facing its current challenges because of the low level of sustainability-oriented CC. Thus, the study recommends that managers instigate the above cultural changes with the aim of pursuing CS performance.

## 6. Conclusions

Firms are pursuing CS to balance in TBL as well as to contribute to greater sustainable development goals. Therefore, regular assessment is necessary to understand the firms' progress toward sustainability. Thus, an appropriate measurement tool is essential with a valid and reliable method for evaluation purpose. Although there are many CS assessment frameworks are available in the literature however, there is a lack of frameworks available using the CC attributes. Because sustainability performance is highly dependent on designing an appropriate CC since not all CC attributes are favourable for achieving CS performance. Thus, it is important to integrate CC attributes into the measurement of CS

performance. Moreover, sustainability issues are multidimensional and need to be studied from different perspectives. Thus, in the absence of such an assessment framework, this study integrates sustainable oriented CC attributes into a measurement structure to evaluate CS performance. Additionally, there is a lack of studies in the extant literature on which attributes constitute a CC appropriate for pursuing CS performance.

This study identifies and presents a set of CC attributes that are conducive to attaining CS performance. Moreover, the study integrates these attributes into the TBL to address sustainability issues three dimensionally and then formed a measurement structure for evaluation purpose. The study employed a qualitative scale to obtain perceptions from the experts and used an FSE to convert the qualitative scale into quantitative values. Moreover, the study uses the FSE- DEMATEL method to assess CS while considering the hierarchical dependency problem because the TBL aspects present a natural interrelationship phenomenon. Additionally, the researchers perform an EFA to group the attributes into several aspects. Finally, the researchers conducted a case study in the leather industry to show the validity and reliability of the proposed framework. The proposed framework is able to identify the overall industry performance as well as it is able to draw specific managerial and theoretical implications.

The contribution of this study is to identify the CC attributes that are conducive to attaining CS performance and then form a measurement structure using these attributes for the evaluation purpose. Additionally, the integration of hybrid FSE-DEMATEL method with the proposed framework has strengthened the reliability of the framework since this hybrid method can handle qualitative data in a hierarchical dependence relation structure. Thus, the issue of natural dependence relation problem among TBL attributes can be addressed by the proposed method. This study has limitations. The study developed the measurement structure based on the literature and tested it in the leather industry context to show the validity and reliability of the framework. Although the framework has been validated with the leather industry context, however attention has been given to keep the framework as generic as possible. Since the framework is more generic thus, careful attention is necessary to apply this framework to other industry contexts. Because the cultural attributes may vary depending on the type of industry as well as locations. The findings derived from the case study cannot be generalized because the study is based on limited experts data. However, the findings presented from the case study is to show the ability of the framework on how it can provide managerial and theoretical implications. Future studies can use large sample data sets to find empirical evidence and to be able to generalize the results. It would be interesting to see how this framework fits with other methods such as fuzzy ANP, AHP, fuzzy importance and performance approach etc. Moreover, future studies can integrate social media data to further enhance the reliability of the result. This study can also be applied in a single case firm. Finally, CS is multidimensional and its performance can be assessed by various measurement frameworks. CC attributes are one of the ways to understand CS performance level.

their useful comments for improving the quality of this manuscript.

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