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Supplier selection based on corporate social responsibility practices

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ABSTRACT

Due to the momentous effects of responsible sourcing in a firm's performance, the sourcing process is tedious. Purchasing managers face a difficult decision in determining how to select responsible suppliers so they can maintain their firm's competitive advantage in the contemporary business environment. Firms need to satisfy not only the views of society but also to consider the opinions of all stakeholders to stay profitable and to create a supportive business strategy. Existing studies fail to provide a model for socially responsible supplier selection, particularly when various actors are involved. To fill this gap, this study proposes a model to select the best supplier based on their corporate social responsibility (CSR) practices and to identify the key actors (Shareholder, Governments, Customers, and Community) whose perspective is vital. We utilize a hybrid multi criteria decision making (MCDM) approach; however, the supplier selection portion relies on a pure decision making process with consideration of multiple criteria. This study proposes the model in three phases as follows. In the first phase, the collected common CSR practices are scrutinized through fuzzy Delphi with the assistance of experts' opinions. In second phase, the interdependencies, interrelationship and weights of CSR practices are analysed through DEMATEL-ANP (DANP). The final phase proceeds with the selection of the best alternative (supplier) based on CSR practices through PROMETHEE. The proposed model is validated with the case illustration and the results are discussed with feedback from the case purchasing managers. Finally, the study ends by identifying managerial implications and its limitations, and we provide some useful future insights which will increase the effective integration of CSR in supply chains and especially in the supplier selection process.

1. Introduction

Because of the world's rapid economic and industrial growth, today's global business environments necessarily focus on supply chains and operations management. Managers of traditional supply chains have had to become flexible to the dynamic, changing requirements of their customers while still maintaining profits (Li et al., 2013, 2015). That new approach is called "responsive," (Roh et al., 2014), and responsive supply chains typically include green supply chain management (GSCM) techniques, sustainable supply chain management (SSCM), reverse logistics, or other strategies. Historically, corporate social responsibility (CSR) is widely accepted as an important supply chain approach that emphasizes both competition and sustainability. In fact, CSR includes the three pillars of sustainability: economic, environmental, and social concerns. Pressures from both internal and external stakeholders have urged industrial managers to adopt CSR practices into their supply chains, and the potential benefits are noteworthy. Adopting CSR practices may increase the market share and sales revenue of a firm, and it may improve customers' perception of the firm (Salam, 2009; Xu et al., 2013). In recent decades, the rise of CSR depends on the global political economy (Luning, 2012) and has become a popular research topic, but an exact definition of the concept is still under debate (Devinney, 2009; McWilliams et al., 2006). Because of the lack of a clear definition of CSR, companies emphasize and practice it differently (Oberseder et al., 2013). Thus, the next research focus has been to establish the role of CSR and to identify, in particular, what stakeholders expect from a company that adopts CSR practices.

Some current literature explores the importance of stakeholder involvement in CSR implementation. First, we must recognize that in many firms, stakeholder perspectives are not considered; decisions are left solely to managers. Researchers disagree on the value of including stakeholders' views. For instance, Trapp (2014) argues that more benefits emerge for the company when stakeholders are involved in the decision to adopt CSR strategies. On the other hand, Costa and Menichini (2013) state that stakeholders sometimes do not know how a company might specifically implement CSR practices. We can affirm, however, that adopting CSR practices is likely to ignite relations between the firm and

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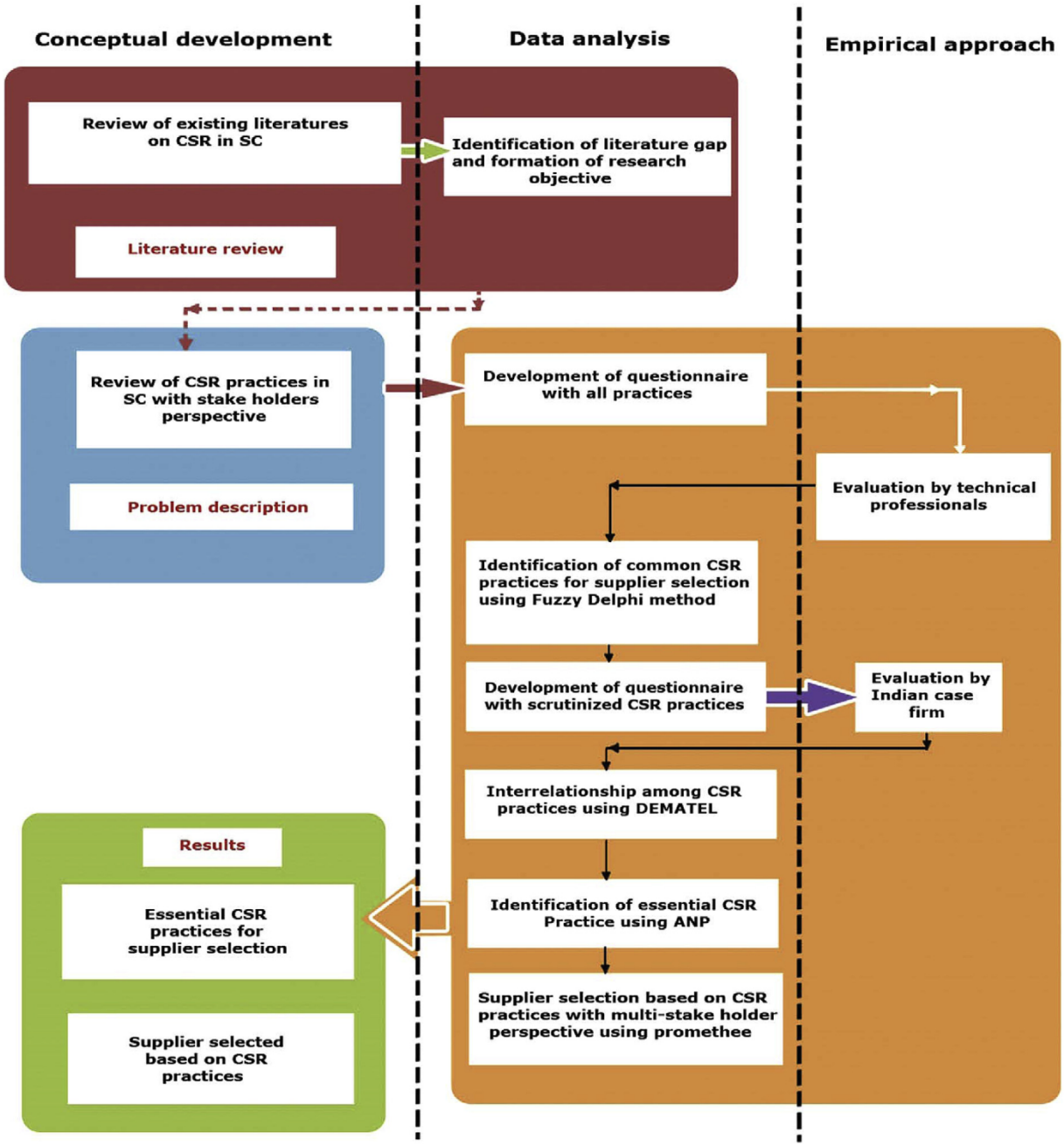

Fig. 1. Research framework of the study.

its stakeholders and will likely improve the company's competitive advantage.

Supplier selection is one of the toughest decisions industrial managers make, because the amount spent for procuring materials may reach 75% of the company's initial capital costs, and inefficiencies in the supplier selection process will damage the firm's profit margin (Cheung et al., 2009; Xu et al., 2013). In a conventional supply chain, supplier selection is generally based on some common criteria such as quality, cost, durability, or the supplier's environmental management system. Currently, few studies consider the role of multiple stakeholders in the supplier selection process; those that do focus on either green or economic criteria. Some work that considers the supplier selection process (Xu et al., 2013; Baskaran et al., 2011; Baskaran et al., 2012) will include a discussion of CSR perspectives, but those studies are limited to the multi-stakeholder approach and examine CSR issues, not practices. Hence, to fill this literature gap, this study considers the supplier selection process based on the CSR practices with the concern of multi-stakeholder perspectives. To address the research gap and to achieve the aim of the paper, three research questions are framed as follows:

RQ1: Why are CSR practices really needed for this study?

RQ2: What are the most influential CSR practices that will be involved in the supplier selection process?

RQ3: How do multiple stakeholders influence the supplier selection process?

Some stakeholder studies with CSR implementation already exist with regard to companies in developed nations. But Abreu et al., (2012) and Dong et al., (2014) make an important observation: the level of stakeholders' power on CSR initiatives will naturally vary from one country to the next because of each nation's unique social, political, regulatory, economic, and cultural institutions. In this concern, this study examines CSR practices, the supplier selection process, and the expectations of multiple stakeholders in an Indian scenario. India is the fourth

Table 1
Common CSR practices.

S. #	Perspective	Practices	Definition	References
1	**Society**	Generous financial donations	The firm supports the community through continuous financial donations to create and motivate societal value initiatives.	Garay and Font (2012); Filizöz and Fişne (2011); Agudo Valiente et al., (2012); Pastrana and Sriramesh (2014); Chi (2011); Birth et al., (2008); Lamberti and Lettieri (2009); Tian and Yuan (2013); Lu et al (2015); Qin et al (2016)
		Innovative giving	The firm needs to help the community with new innovative ideas as a part of its development.	
		Support for education and job training programmes	The firm needs to assist the local community by providing support through jobs and education programmes.	
		Direct involvement in community projects and affairs	The firm needs to engage directly in communal development projects and affairs sponsored by the government or NGOs.	
		Community volunteer programmes	The firm should engage itself in the volunteer programmes of the community.	
		Support for the local community	The firm's practices give full support to the local community in all means.	
		Campaigning for environmental and social change	The firm needs to conduct campaigns among the community with the concerns of environmental and social change.	
		An employee-led approach to philanthropy	Motivate employees to become involved in philanthropic activities.	
		Efficient and effective community activity	The firm needs to engage in effective and efficient communal activities with voluntary involvement.	
		Disclosure of environmental and social performance	The firm should periodically disclose their performance on environmental and social concerns.	
		Environmental policies, organisation, and management	Tightening governance on environmental policies combined with fair organizational management.	
2	**Environment**	Materials policy of reduction, reuse, and recycling	The firm should integrate the practices of 3R (reduce, reuse, and recycle) in their operations.	Garay and Font (2012); Kucukusta et al., (2013); Bagire et al., (2011); Filizöz and Fişne (2011); Raufflet et al., (2014); Agudo Valiente et al., (2012); Pastrana and Sriramesh (2014); Chi (2011); Birth et al., (2008); Lamberti and Lettieri (2009); Lee (2008)
		Monitoring, minimizing, and taking responsibility for releases to the environment	The firm needs to periodically monitor the emissions from the firm and they need to minimize those emissions.	
		Waste management	The firm needs to manage waste created through the production/manufacturing or any other operations. The firm should have a system designed to manage all types of waste.	
		Energy conservation	The firm engages itself in the conservation of energy by creating optimized energy models.	
		Effective emergency response	The firm should always be ready to respond effectively for emergency or uncertainty conditions.	
		Public dialogue and disclosure	The firm should communicate their environmental performance to the public through disclosures and dialogues.	
		Product stewardship	The firm's manufactured products should meet all requirements of green criteria, from green design to EOL (End-of-Life) product management. The products should be easily recyclable / reusable.	
		Environmental requirements for suppliers	The firm should follow all environmental regulations at times of supplier selection. Also, they should regularly monitor suppliers based on their green activities.	
		Environmental audits	The firm should engage in regular environmental audits through both external and internal audits.	
		Fair remuneration	The firm needs to provide good remuneration as per the national / international labor pay scale standards.	
		Effective communication	The firm needs to communicate effectively among the employees relevant to the firm's sustainable development activities.	Garay and Font (2012); Kucukusta et al., (2013); Bagire et al., (2011); Filizöz and Fişne (2011); Raufflet et al., (2014); Agudo Valiente et al., (2012); Pastrana and Sriramesh (2014); Chi (2011); Birth et al., (2008); Lamberti and Lettieri (2009)
3	**Employees**	Learning and development opportunities	The firm needs to provide employees with opportunities to learn and to develop their skills through technical programmes.	
		Fulfilling work	The firm should provide fulfilling work opportunities for employees.	
		A healthy and safe work environment	The firm should maintain high safety and environmental standards at the workplace.	
		Equal employment opportunities	The firm should not consider gender traits while providing job opportunities; they need to give equal rights to both male and female employees.	
		Job security	The firm should provide job security for employees by promoting them from training staff to permanent staff based on their experiences.	
		Competent leadership	The firm should act as a reputable leader who organizes everyone without dissatisfaction.	
		Community spirit	The firm should develop team spirit among employees to improve and to strengthen the firm/employee relationship.	
		Social mission integration	The firm should motivate employees to engage in social activities.	

(*continued on next page*)

Table 1 (*continued*)

S. #	Perspective	Practices	Definition	References
		Industry-leading quality programmes	The firm should provide programmes based on their products' quality to their customers.	
		Value for money	The firm should provide good product value.	
		Truthful promotion	The firm should promote the product correctly; they should not promote the product in any unsuitable way.	
		Full product disclosure	The firm should disclose all relevant details of the product.	
4	**Customers**	Leadership in research and development	The firm should motivate the research and development of their products in order to compete with the sustainable environment.	Öberseder et al. (2013); Garay and Font (2012); Kucukusta et al. (2013); Bagire et al., (2011); Filizöz and Fişne (2011); Raufflet et al., (2014); Agudo Valiente et al. (2012); Pastrana and Sriramesh (2014); Kucukusta et al. (2013); Chi (2011); Birth et al. (2008); Lamberti and Lettieri (2009)
		Minimal packaging	The product should be packaged with the minimal packaging required to help with sustainability.	
		Rapid and respectful responses to customer comments/concerns	The firm should respond quickly to customer queries and comments.	
		Customer dialogue	The firm should accept the dialogue of the customer and also communicate the firm's activities with customers.	
		Safe products	The firm needs to produce / manufacture their products in the safest manner possible, respecting the environment and community.	
		Environmentally and socially responsible product composition	The firm's products should be sustainable and be environmentally and socially responsible.	
5	**Suppliers**	Develop and maintain long-term purchasing relationships	The firm should maintain good long-term relationships with their suppliers.	Bagire et al., (2011); Filizöz and Fişne (2011); Raufflet et al., (2014); Agudo Valiente et al., (2012); Pastrana and Sriramesh (2014); Chi (2011); Hemat and Yuksel (2014); Birth et al., (2008); Lamberti and Lettieri (2009)
		Clear expectations	The firm needs to clearly identify their expectations of their suppliers.	
		Pay fair prices and bills according to terms agreed upon	The firm needs to pay fair prices according to the terms and conditions as per agreements.	
		Fair and competent handling of conflicts and disputes	The firm should carefully and fairly handle any conflicts and disputes that arise with suppliers.	
		Reliable anticipated purchasing requirements	Purchasing requirements should be reliable and not lead to an inventory for suppliers.	
		Encouragement to provide innovative suggestions	The firm should allow suppliers to give suggestions to improve the competitive advantage and sustainable development.	
		Assist suppliers to improve their environmental/social performance	The firm needs to assist suppliers in promoting their environmental and social status with its performance through collaborative activities.	
		Utilize local suppliers	The firm needs to utilize local suppliers rather than outside suppliers to yield the support of the local community.	
		Sourcing from minority-owned suppliers	The firm needs to give chances to minority suppliers and to encourage them to improve their profit margin through sourcing business.	
		Inclusion of environmental/social criteria in the suppliers' selection	The firm needs to select suppliers not only based on economic concerns but also considering the economic and social impact of the suppliers at the time of selection.	
6	**Shareholders**	Good rate of long-term return to shareholders	The firm should provide good long-term return profits against the shareholders' investments.	Bagire et al., (2011); Agudo Valiente et al., (2012); Chi (2011); Hemat and Yuksel (2014); Birth et al., (2008); Lamberti and Lettieri (2009)
		Disseminate comprehensive and clear information	The firm should periodically communicate information to all stakeholders and maintain a transparent process.	
		Encourage staff ownership of shares	The firm should support and encourage company staff to buy shares and to engage in ownership of the firm.	
		Develop and build relationships with shareholders	The firm should maintain a good relationship between all shareholders and stakeholders.	
		Clear dividends policy and payment of appropriate dividends	Shares should be equally divided to appropriate shareholders without any partiality.	
		Corporate governance issues are well managed	The firm should govern all corporate activities mainly in relation with its stakeholders.	
		Access to company's directors and senior managers	The firm should get access from all board of directors and senior managers in the management process.	
		Annual reports provide a picture of the company's performance	The firm should prepare annual reports with the assistance of measurement techniques such as indicators, benchmarking, index, etc. to improve the firm's performance	
		Clear long-term business strategy	The firm should have clear long-term business strategies in place.	
		Open communication with the financial community	The firm should have a clear and transparent communication relationship with the financial community which assists the firm through all financial commitments.	

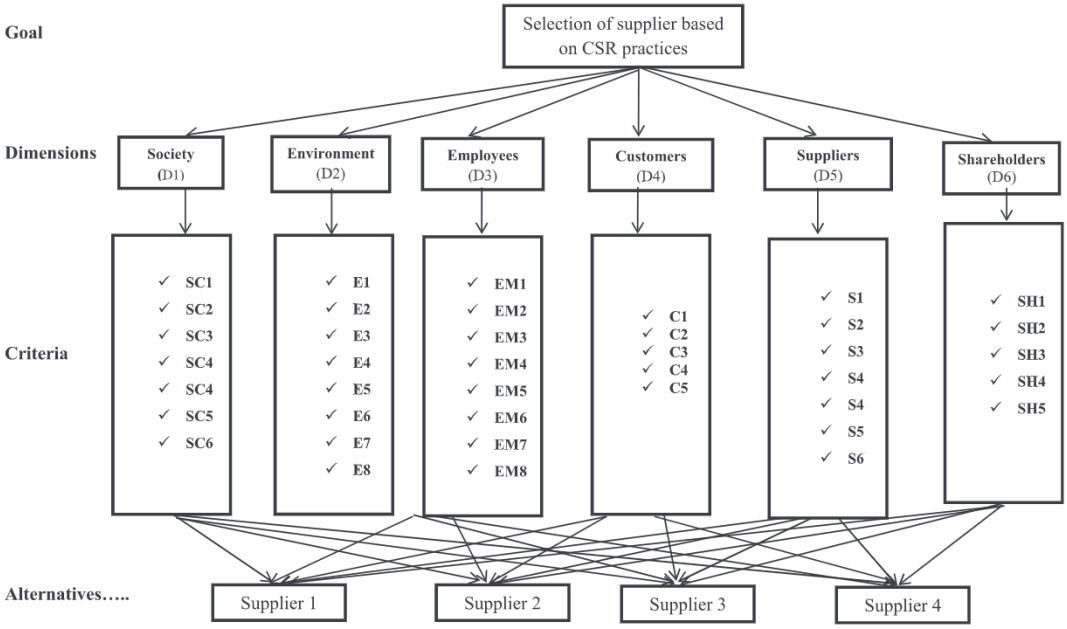

Fig. 2. Supplier selection based on CSR – a hierarchy model.

largest economy and one of the fastest emerging contexts. Yet, CSR implementation is still largely ineffective in Indian companies due to low level economic development, corruption, an unwillingness to cooperate, and a lack of effective communication with a firm's stakeholders (Lattemann et al., 2009; Kannan et al., 2014; Shen et al., 2015). To motivate a broader adoption of CSR practices in Indian companies, this study seeks to evaluate suppliers utilizing multi-stakeholder perspectives. We employ a proposed framework that is validated with an Indian case

Table 2
Shortlisted CSR practices for supplier selection through FDM.

S. No	Perspective	Practices	
1	**Society**	**SC1**	Generous financial donations
		SC2	Innovative giving
		SC3	Support for education and job training programmes
		SC4	Direct involvement in community projects and affairs
		SC5	Campaigning for environmental and social change
		SC6	Disclosure of environmental and social performance
2	**Environment**	**E1**	Environmental policies, organisation and management
		E2	Materials policy of reduction, reuse and recycling
		E3	Monitoring, minimizing and taking responsibility for releases to the environment
		E4	Waste management
		E5	Energy conservation
		E6	Effective emergency response
		E7	Product stewardship
		E8	Environmental requirements for suppliers
3	**Employees**	**EM1**	Fair remuneration
		EM2	Effective communication
		EM3	Learning and development opportunities
		EM4	A healthy and safe work environment
		EM5	Equal employment opportunities
		EM6	Job security
		EM7	Competent leadership
		EM8	Community spirit
4	**Customers**	**C1**	Value for money
		C2	Truthful promotion
		C3	Leadership in research and development
		C4	Minimal packaging
		C5	Rapid and respectful responses to customer comments/concerns
5	**Suppliers**	**S1**	Develop and maintain long-term purchasing relationships
		S2	Pay fair prices and bills according to terms agreed upon
		S3	Encouragement to provide innovative suggestions
		S4	Assist suppliers to improve their environmental/social performance
		S5	Utilise local suppliers
		S6	Inclusion of environmental/social criteria in the suppliers' selection
6	**Shareholders**	**SH1**	Good rate of long-term return to shareholders
		SH2	Disseminate comprehensive and clear information
		SH3	Encourage staff ownership of shares
		SH4	Develop and build relationships with shareholders
		SH5	Clear dividend policy and payment of appropriate dividends

Table 3
Initial influence matrix "A" for criteria – combined stakeholder perspective.

	SC1	SC2	SC3	SC4	SC5	SC6	E1	E2	E3	E4	E5	E6	E7	E8
SC1	0	2.75	2.5	3	2.5	1	1.5	2.75	2.75	1.5	1.5	2.75	1	2.25
SC2	1.25	0	1	1.25	1.25	1	1	1.5	1.5	1	1	1.5	1	1
SC3	1.75	2.25	0	2.25	1.75	1	1.25	2.25	2	1.25	1.25	2.75	1	1.75
SC4	1	1.25	1	0	1	1	1	1.5	1	1	1	1.5	1	1
SC5	1	2.25	1.5	2.5	0	1	1	1.5	1.5	1	1	2	1	1.5
SC6	2.25	3	2.5	3	2.5	0	2	2.75	2.5	2	2	2.75	1.75	1.75
E1	1.75	2.5	1.75	2.5	2.5	1	0	2	1.75	1.25	1.25	2.5	1.25	1.75
E2	1.25	1.5	1	1.5	1.5	1	1	0	1.75	1	1	1.75	1	1.25
E3	1.5	1.75	1	1.75	1.75	1	1.25	1.5	0	1	1	2	1	1.25
E4	1.75	3	1.75	3	2.5	1	1.75	2.75	2.5	0	2	2.75	1.25	1.75
E5	1.75	3	1.75	3	2.5	1	1.75	2.75	2.5	1	0	2.75	1.25	1.75
E6	1.25	1.75	1	1.75	1.25	1	1	1.75	1.5	1	1	0	1	1
E7	2.25	3	2	3	2.5	1.25	1.75	2.75	2.5	1.75	1.75	3.25	0	2
E8	1.5	2.25	1.25	2.25	1.75	1.25	1.25	2	1.75	1.25	1.25	2.5	1	0
EM1	2	3.25	2	3.25	2.75	1.25	2	2.75	2.75	1.25	1.75	3.25	1.25	2.5
EM2	1.25	1.25	1	1.25	1.25	1	1	1.25	1	1	1	1.5	1	1
EM3	1.5	2	1	2	1.5	1	1.25	1.75	1.5	1	1	1.5	1	1
EM4	2	3.25	2	3.25	2.25	1.25	1.5	2.25	2.25	1.25	1.25	2.75	1.25	2
EM5	1.5	1.5	1	1.5	1.5	1	1	1.25	1	1	1	1.75	1	1
EM6	1.75	1.75	1.25	1.75	1.75	1.25	1.5	1.5	1.5	1.25	1.25	2	1.25	1.25
EM7	1	1	1	1	1	1	1	1	1	1	1	1.5	1	1
EM8	1	1.5	1	1.5	1	1	1	1.5	1.5	1	1	1.25	1	1
C1	2	3	2	3	2.5	1.25	2	2.75	2.5	1.25	1.75	3	1.25	2.5
C2	2	2.5	2	2.5	2	1.25	1.5	2.25	2	1.25	1.25	2.5	1.25	2
C3	1	1	1	1.25	1.25	1	1	1	1	1	1	1.5	1	1
C4	1	1.25	1	1.5	1.5	1	1	1	1	1	1	1.5	1	1
C5	2	3	2	3	2	1.25	1.5	2.25	2	1.25	1.25	2.5	1.25	2
S1	1.5	1.5	1	1.5	1.5	1	1.25	1.5	1.25	1	1	2	1	1
S2	1.75	3	1.75	3	2	1	1	2	1.75	1	1	2.5	1	1.75
S3	1	1	1	1.25	1.25	1	1	1	1	1	1	1.25	1	1
S4	1.75	2	1.25	2	2	1	1.25	1.75	1.5	1	1	2.25	1	1.25
S5	1.75	2.5	1.25	2.5	2	1	1	2	1.75	1	1	2	1	1.25
S6	1.75	3	1.75	3	2.5	1	1.75	2.75	2.5	1	1.5	2.75	1	1.75
SH1	1.75	1.75	1.25	1.75	1.75	1.25	1	1	0.75	0.75	0.75	1.25	0.75	0.75
SH2	1.5	2.5	1.5	2.5	2	1	0.75	0.75	0.5	0.5	0.5	1	0.5	0.5
SH3	1.5	1.5	1	1.5	1.5	1	0.75	0.75	0.5	0.5	0.5	1	0.5	0.5
SH4	1.5	2	1.5	2	1.5	1	0.75	0.75	0.5	0.5	0.5	1	0.5	0.5
SH5	1.75	1.75	1.25	1.75	1.75	1.25	1	1	0.75	0.75	0.75	1.25	0.75	0.75

	EM1	EM2	EM3	EM4	EM5	EM6	EM7	EM8	C1	C2	C3	C4	C5
SC1	0.5	1.25	1.25	0.5	1	1	1.25	1.5	1.5	2	3.25	3	2
SC2	0.5	1	1	0.5	0.75	0.75	1	1.25	1	1	2	2.25	1
SC3	0.5	1.5	1.5	0.5	1	0.75	1.25	1.75	1	1	2.5	3	1
SC4	0.5	1	1	0.5	0.75	0.75	1	1.25	1	1	1.75	2	1
SC5	0.5	1	1	0.5	0.75	0.75	1	1.25	1	1.5	2.25	2.5	1.5
SC6	0.75	1.5	1.5	0.75	1.25	1	1.5	1.75	1.75	1.75	3	3.25	1.75
E1	1.25	3	2.25	1.75	2.75	2.5	3	2.75	1.25	1.75	3	3.25	1.75
E2	1	2.75	1.75	1	2.5	2.5	2.75	2	1	1	2.25	3	1
E3	1	3	2	1	2.75	2.5	3	2.25	1	1	2.5	3.25	1
E4	1.25	3.5	3	1.75	3.25	3	3.5	3.25	1.75	1.75	3	3.25	1.75
E5	1.25	3.5	3	1.75	3.25	3	3.5	3.25	1.25	1.75	3	3.25	1.75
E6	1	2	1.5	1	2	2	2.25	1.75	1	1	1.75	2.25	1
E7	1.75	3.5	3	1.75	3.25	3	3.5	3.25	1.75	1.75	3	3.25	1.75
E8	1	2.75	2.25	1	2.5	2.25	2.75	2.5	1	1	2.25	2.75	1
EM1	0	3.75	3.25	2	3.5	3.25	3.75	3.5	1.75	1.75	3.25	3.5	1.75
EM2	1	0	1	1	1	1	1.75	1.25	1	1	1.25	2.25	1
EM3	1	2.5	0	1	2.25	2	2.5	2	1	1	2	2.5	1
EM4	1	3.25	2.75	0	3	2.75	3.25	3	1.25	1.75	3.25	3.5	1.75
EM5	1	2.25	1.5	1	0	1.75	2.25	2	1	1	1.75	2.5	1
EM6	1	2.5	2	1	1.5	0	2.5	2.25	1	1	2	2.75	1
EM7	1	1.5	1.5	1	1	1	0	1.75	1	1	1.25	2	1
EM8	1	2.25	1.25	1	2	2	2	0	1	1	1.5	2	1
C1	1.25	3.5	3	1.75	3.25	3	3.5	3.25	0	1.75	3	3.5	1.75
C2	1.25	3.5	2.5	1.25	2.75	2.5	3	2.75	1.25	0	2.5	3	1.5
C3	1	2	1.5	1	1.5	1.5	1.75	1.75	1	1	0	2	1
C4	1	1.5	1.5	1	1.25	1.25	1.5	1.75	1	1	1.5	0	1
C5	1.25	3	2.5	1.25	2.75	2.5	3	2.75	1.25	1.5	3	3.5	0
S1	1	2.75	1.75	1	2.25	2	2.5	2	1	1	2	3	1
S2	1	3	2.25	1	2.5	2.5	3	2.75	1.25	1.75	3	3.25	1.25
S3	1	1.25	1.25	1	1	1	1.25	1.25	1	1	1	2	1
S4	1	3	2	1	2.75	2.5	3	2.25	1.25	1.25	2.5	3.25	1.25
S5	1	3	2.25	1	2.5	2.5	3	2.75	1.25	1.25	2.5	2.75	1.25
S6	1	3.5	3	1.5	3.25	3	3.5	3.25	1.25	1.75	3	3.25	1.75
SH1	1.25	1.75	1.75	1.25	1.5	1.25	1.75	1.75	1.25	1.25	1.75	2.25	1.25

(*continued on next page*)

Table 3 (*continued*)

	EM1	EM2	EM3	EM4	EM5	EM6	EM7	EM8	C1	C2	C3	C4	C5
SH2	1	3	2.25	1.5	2.75	2.5	3	2.5	1	1.5	2.5	3	1.5
SH3	1	1.5	1.5	1	1.25	1	1.5	1.5	1	1	1.5	2	1
SH4	1	3	2	1	2.25	2	2.5	2	1	1.5	2	2.5	1
SH5	1.25	1.75	1.75	1.25	1.5	1.25	1.75	1.75	1.25	1.25	1.75	2.25	1.25

	S1	S2	S3	S4	S5	S6	SH1	SH2	SH3	SH4	SH5
SC1	1	0.5	1.5	2.5	2.5	1.5	1.25	1.25	1.25	1.25	0.75
SC2	0.75	0.5	1.25	1.5	1.5	1	1	1	1	1	0.5
SC3	1.25	0.75	1.75	1.75	1.75	1.25	1.25	1.5	1.5	1.5	0.75
SC4	0.75	0.5	1	1.5	1	1	1	1	1	1	0.5
SC5	0.75	0.5	1	2	1.5	1	1	1	1	1	0.5
SC6	1.25	1	1.75	2.5	2.5	2	1.25	1.5	1.5	1.5	0.75
E1	2.5	2	3.75	2.25	2	1.25	1.25	1.25	1.25	1.25	0.75
E2	2	1	3.5	1.5	1	1	1.25	1.25	1.25	1.25	0.75
E3	2	1.25	3.75	1.5	1.25	1	1.25	1.5	1.25	1.25	0.75
E4	2.75	2	3.75	2.5	2.5	2	1.25	1.5	1.5	1.5	0.75
E5	2.75	2	3.75	2.5	2.5	1.5	1.25	1.5	1.5	1.5	0.75
E6	1.5	1	2.25	1.5	1.5	1	0.5	0.5	0.5	0.5	0.5
E7	2.75	2	3.75	2.5	2.5	2	1.25	1.5	1.5	1.5	0.75
E8	2.25	1.25	3	1.75	1.75	1.25	1	1.25	1.25	1.25	0.75
EM1	2.75	2.25	4	2.5	2.75	2	3.25	2.75	3.5	2.5	2.75
EM2	1	1	1.75	1	1	1	1.5	1	2	1	2
EM3	1.5	1.25	2.5	1.5	1.25	1	2	1.25	2	1	2
EM4	2.75	2.25	4	2.5	2.25	1.5	3.25	2.25	3.5	2.5	2.75
EM5	1.25	1.25	2.5	1	1.25	1	2	1.5	2.5	1.5	2
EM6	1.5	1.5	2.75	1.25	1.5	1.25	2	2	2.75	1.75	2
EM7	1.25	1	2	1	1	1	2	1.5	2.5	1.5	2
EM8	1.5	1	2	1.5	1	1	2.25	1.25	2.25	1.25	2
C1	2.75	2	3.75	2.25	2.5	1.75	3	2.5	3.25	2.25	2.75
C2	2.25	2.5	3.25	1.75	2	1.25	2.5	2	2.75	1.75	2.25
C3	1.25	1	2.25	1	1	1	2.5	1.5	2.5	1.5	2
C4	1.25	1	1.75	1	1	1	1.5	1.5	1.5	1.5	1
C5	2.75	2	3.75	2.25	2	1.25	3	2	3.25	2.25	2.75
S1	0	1.25	3.5	1.75	1.25	1.25	2	1.75	2.25	1.75	1.5
S2	2.5	0	3.75	2.25	2	1.25	3.25	1.75	3.25	2.25	2.75
S3	1	1	0	1	1	1	1.75	1.25	2.25	1.25	2
S4	1.5	1.25	3.75	0	1.5	1.5	2.25	2	2.5	2	1.75
S5	2	1	3.25	1.5	0	1.25	2.75	1.75	2.75	1.75	2.25
S6	2.5	1.75	3.75	2	2.25	0.5	3.25	2	3.5	2.5	2.75
SH1	1.25	1.5	1.75	1.25	1.5	1.25	0	1.75	2	1.5	1.75
SH2	2	1.75	3	2	1.75	1.5	2.5	0	2.5	1.5	2.5
SH3	1	1.25	1.5	1	1.25	1	1	1.5	0	1	1
SH4	1.5	2.25	2.5	1.5	1.75	1	2	1.5	2.5	0	2
SH5	1.25	1.5	1.75	1.25	1.5	1.25	1.25	1.75	2	1.5	0

industry. A hybrid multi criteria decision making (MCDM) tool is used as a solution methodology for this problem, and it includes four steps. First, fuzzy Delphi is used to select the relevant CSR practices based on the views of industrial managers from the case company. Second, DEMATEL (decision making trial and evaluation laboratory) is used to analyze relationships between the CSR practices. Third, an analytic network process (ANP) is used to provide the weightage and priority of the various CSR practices, and finally, PROMETHEE (Preference Ranking Organization METHod for Enrichment Evaluations) allows us to rank the results.

The remaining sections of the paper are organized as follows. Section 2 provides an overview of the existing literatures in the field and explains the research gap. Section 3 discusses the problem description and its proposed research framework, and Section 4 provides the solution methodology for the problem. A validation of the proposed research framework is presented in Section 5, and Section 6 includes results and their respective discussions and validations. Sections 7 and 8 explore the managerial implications and offer some conclusions to the study.

2. Literature review

This section explores the basis of the problem with its preliminary concepts and provides some in-depth knowledge. This section is categorized into three subsections. The first subsection explores the history of CSR and its evolution. The second subsection focuses on the literature resources that discuss CSR practices, and the third subsection clearly pinpoints the existing gaps in the literature and sheds light on the research highlights.

2.1. CSR

CSR is not a new topic to the literature but its conceptual background is still vague. For example, according to Windsor (2013), CSR is a cluster concept which includes business ethics, corporate citizenship (CC), corporate environmental responsibility (CER) or sustainability, corporate environmental and social responsibility (CESR), corporate social performance (CSP), philanthropy, stakeholder theory, sustainable development (SD), and recognizing the triple bottom line (TBL). Due to these broad, often overlapping, contexts, many definitions exist for CSR and vary from the perspectives of researchers and practitioners. We reviewed original literatures from Carroll (1999, 2008), Carroll and Shabana (2010), Preston (1975), Crowther (2008), Windson (2001), Dahlsrud (2006), Frederick (2008), Joyner and Payne (2002), Lee (2008), Moir (2001), Valor (2005) and Moura-Leite and Padgett (2011) as a basis by which to explain CSR and its evolution with respective to time. CSR becomes an important research topic in the 1990s (see Moura-Leite and Padgett, 2011), but the concepts of CSR originated about 1932 in the book *The Modern Corporation and Private Property* written by two Harvard University professors, Berle and Means (Sen, 2011; Kannan et al., 2014). Although notions of corporate social responsibility emerged in the 1930s, a formal definition was first introduced in 1953 by Bowen in his book

Table 4
Normalized direct relationship matrix "X" for criteria.

	SC1	SC2	SC3	SC4	SC5	SC6	E1	E2	E3	E4	E5	E6	E7	E8
SC1	0.000	0.027	0.024	0.029	0.024	0.010	0.015	0.027	0.027	0.015	0.015	0.027	0.010	0.022
SC2	0.012	0.000	0.010	0.012	0.012	0.010	0.010	0.015	0.015	0.010	0.010	0.015	0.010	0.010
SC3	0.017	0.022	0.000	0.022	0.017	0.010	0.012	0.022	0.019	0.012	0.012	0.027	0.010	0.017
SC4	0.010	0.012	0.010	0.000	0.010	0.010	0.010	0.015	0.010	0.010	0.010	0.015	0.010	0.010
SC5	0.010	0.022	0.015	0.024	0.000	0.010	0.010	0.015	0.015	0.010	0.010	0.019	0.010	0.015
SC6	0.022	0.029	0.024	0.029	0.024	0.000	0.019	0.027	0.024	0.019	0.019	0.027	0.017	0.017
E1	0.017	0.024	0.017	0.024	0.024	0.010	0.000	0.019	0.017	0.012	0.012	0.024	0.012	0.017
E2	0.012	0.015	0.010	0.015	0.015	0.010	0.010	0.000	0.017	0.010	0.010	0.017	0.010	0.012
E3	0.015	0.017	0.010	0.017	0.017	0.010	0.012	0.015	0.000	0.010	0.010	0.019	0.010	0.012
E4	0.017	0.029	0.017	0.029	0.024	0.010	0.017	0.027	0.024	0.000	0.019	0.027	0.012	0.017
E5	0.017	0.029	0.017	0.029	0.024	0.010	0.017	0.027	0.024	0.010	0.000	0.027	0.012	0.017
E6	0.012	0.017	0.010	0.017	0.012	0.010	0.010	0.017	0.015	0.010	0.010	0.000	0.010	0.010
E7	0.022	0.029	0.019	0.029	0.024	0.012	0.017	0.027	0.024	0.017	0.017	0.032	0.000	0.019
E8	0.015	0.022	0.012	0.022	0.017	0.012	0.012	0.019	0.017	0.012	0.012	0.024	0.010	0.000
EM1	0.019	0.032	0.019	0.032	0.027	0.012	0.019	0.027	0.027	0.012	0.017	0.032	0.012	0.024
EM2	0.012	0.012	0.010	0.012	0.012	0.010	0.010	0.012	0.010	0.010	0.010	0.015	0.010	0.010
EM3	0.015	0.019	0.010	0.019	0.015	0.010	0.012	0.017	0.015	0.010	0.010	0.015	0.010	0.010
EM4	0.019	0.032	0.019	0.032	0.022	0.012	0.015	0.022	0.022	0.012	0.012	0.027	0.012	0.019
EM5	0.015	0.015	0.010	0.015	0.015	0.010	0.010	0.012	0.010	0.010	0.010	0.017	0.010	0.010
EM6	0.017	0.017	0.012	0.017	0.017	0.012	0.015	0.015	0.015	0.012	0.012	0.019	0.012	0.012
EM7	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.015	0.010	0.010
EM8	0.010	0.015	0.010	0.015	0.010	0.010	0.010	0.015	0.015	0.010	0.010	0.012	0.010	0.010
C1	0.019	0.029	0.019	0.029	0.024	0.012	0.019	0.027	0.024	0.012	0.017	0.029	0.012	0.024
C2	0.019	0.024	0.019	0.024	0.019	0.012	0.015	0.022	0.019	0.012	0.012	0.024	0.012	0.019
C3	0.010	0.010	0.010	0.012	0.012	0.010	0.010	0.010	0.010	0.010	0.010	0.015	0.010	0.010
C4	0.010	0.012	0.010	0.015	0.015	0.010	0.010	0.010	0.010	0.010	0.010	0.015	0.010	0.010
C5	0.019	0.029	0.019	0.029	0.019	0.012	0.015	0.022	0.019	0.012	0.012	0.024	0.012	0.019
S1	0.015	0.015	0.010	0.015	0.015	0.010	0.012	0.015	0.012	0.010	0.010	0.019	0.010	0.010
S2	0.017	0.029	0.017	0.029	0.019	0.010	0.010	0.019	0.017	0.010	0.010	0.024	0.010	0.017
S3	0.010	0.010	0.010	0.012	0.012	0.010	0.010	0.010	0.010	0.010	0.010	0.012	0.010	0.010
S4	0.017	0.019	0.012	0.019	0.019	0.010	0.012	0.017	0.015	0.010	0.010	0.022	0.010	0.012
S5	0.017	0.024	0.012	0.024	0.019	0.010	0.010	0.019	0.017	0.010	0.010	0.019	0.010	0.012
S6	0.017	0.029	0.017	0.029	0.024	0.010	0.017	0.027	0.024	0.010	0.015	0.027	0.010	0.017
SH1	0.017	0.017	0.012	0.017	0.017	0.012	0.010	0.010	0.007	0.007	0.007	0.012	0.007	0.007
SH2	0.015	0.024	0.015	0.024	0.019	0.010	0.007	0.007	0.005	0.005	0.005	0.010	0.005	0.005
SH3	0.015	0.015	0.010	0.015	0.015	0.010	0.007	0.007	0.005	0.005	0.005	0.010	0.005	0.005
SH4	0.015	0.019	0.015	0.019	0.015	0.010	0.007	0.007	0.005	0.005	0.005	0.010	0.005	0.005
SH5	0.017	0.017	0.012	0.017	0.017	0.012	0.010	0.010	0.007	0.007	0.007	0.012	0.007	0.007

	EM1	EM2	EM3	EM4	EM5	EM6	EM7	EM8	C1	C2	C3	C4	C5
SC1	0.005	0.012	0.012	0.005	0.010	0.010	0.012	0.015	0.015	0.019	0.032	0.029	0.019
SC2	0.005	0.010	0.010	0.005	0.007	0.007	0.010	0.012	0.010	0.010	0.019	0.022	0.010
SC3	0.005	0.015	0.015	0.005	0.010	0.007	0.012	0.017	0.010	0.010	0.024	0.029	0.010
SC4	0.005	0.010	0.010	0.005	0.007	0.007	0.010	0.012	0.010	0.010	0.017	0.019	0.010
SC5	0.005	0.010	0.010	0.005	0.007	0.007	0.010	0.012	0.010	0.015	0.022	0.024	0.015
SC6	0.007	0.015	0.015	0.007	0.012	0.010	0.015	0.017	0.017	0.017	0.029	0.032	0.017
E1	0.012	0.029	0.022	0.017	0.027	0.024	0.029	0.027	0.012	0.017	0.029	0.032	0.017
E2	0.010	0.027	0.017	0.010	0.024	0.024	0.027	0.019	0.010	0.010	0.022	0.029	0.010
E3	0.010	0.029	0.019	0.010	0.027	0.024	0.029	0.022	0.010	0.010	0.024	0.032	0.010
E4	0.012	0.034	0.029	0.017	0.032	0.029	0.034	0.032	0.017	0.017	0.029	0.032	0.017
E5	0.012	0.034	0.029	0.017	0.032	0.029	0.034	0.032	0.012	0.017	0.029	0.032	0.017
E6	0.010	0.019	0.015	0.010	0.019	0.019	0.022	0.017	0.010	0.010	0.017	0.022	0.010
E7	0.017	0.034	0.029	0.017	0.032	0.029	0.034	0.032	0.017	0.017	0.029	0.032	0.017
E8	0.010	0.027	0.022	0.010	0.024	0.022	0.027	0.024	0.010	0.010	0.022	0.027	0.010
EM1	0.000	0.036	0.032	0.019	0.034	0.032	0.036	0.034	0.017	0.017	0.032	0.034	0.017
EM2	0.010	0.000	0.010	0.010	0.010	0.010	0.017	0.012	0.010	0.010	0.012	0.022	0.010
EM3	0.010	0.024	0.000	0.010	0.022	0.019	0.024	0.019	0.010	0.010	0.019	0.024	0.010
EM4	0.010	0.032	0.027	0.000	0.029	0.027	0.032	0.029	0.012	0.017	0.032	0.034	0.017
EM5	0.010	0.022	0.015	0.010	0.000	0.017	0.022	0.019	0.010	0.010	0.017	0.024	0.010
EM6	0.010	0.024	0.019	0.010	0.015	0.000	0.024	0.022	0.010	0.010	0.019	0.027	0.010
EM7	0.010	0.015	0.015	0.010	0.010	0.010	0.000	0.017	0.010	0.010	0.012	0.019	0.010
EM8	0.010	0.022	0.012	0.010	0.019	0.019	0.019	0.000	0.010	0.010	0.015	0.019	0.010
C1	0.012	0.034	0.029	0.017	0.032	0.029	0.034	0.032	0.000	0.017	0.029	0.034	0.017
C2	0.012	0.034	0.024	0.012	0.027	0.024	0.029	0.027	0.012	0.000	0.024	0.029	0.015
C3	0.010	0.019	0.015	0.010	0.015	0.015	0.017	0.017	0.010	0.010	0.000	0.019	0.010
C4	0.010	0.015	0.015	0.010	0.012	0.012	0.015	0.017	0.010	0.010	0.015	0.000	0.010
C5	0.012	0.029	0.024	0.012	0.027	0.024	0.029	0.027	0.012	0.015	0.029	0.034	0.000
S1	0.010	0.027	0.017	0.010	0.022	0.019	0.024	0.019	0.010	0.010	0.019	0.029	0.010
S2	0.010	0.029	0.022	0.010	0.024	0.024	0.029	0.027	0.012	0.017	0.029	0.032	0.012
S3	0.010	0.012	0.012	0.010	0.010	0.010	0.012	0.012	0.010	0.010	0.010	0.019	0.010
S4	0.010	0.029	0.019	0.010	0.027	0.024	0.029	0.022	0.012	0.012	0.024	0.032	0.012
S5	0.010	0.029	0.022	0.010	0.024	0.024	0.029	0.027	0.012	0.012	0.024	0.027	0.012
S6	0.010	0.034	0.029	0.015	0.032	0.029	0.034	0.032	0.012	0.017	0.029	0.032	0.017
SH1	0.012	0.017	0.017	0.012	0.015	0.012	0.017	0.017	0.012	0.012	0.017	0.022	0.012

(*continued on next page*)

Table 4 (*continued*)

	EM1	EM2	EM3	EM4	EM5	EM6	EM7	EM8	C1	C2	C3	C4	C5
SH2	0.010	0.029	0.022	0.015	0.027	0.024	0.029	0.024	0.010	0.015	0.024	0.029	0.015
SH3	0.010	0.015	0.015	0.010	0.012	0.010	0.015	0.015	0.010	0.010	0.015	0.019	0.010
SH4	0.010	0.029	0.019	0.010	0.022	0.019	0.024	0.019	0.010	0.015	0.019	0.024	0.010
SH5	0.012	0.017	0.017	0.012	0.015	0.012	0.017	0.017	0.012	0.012	0.017	0.022	0.012

	S1	S2	S3	S4	S5	S6	SH1	SH2	SH3	SH4	SH5
SC1	0.010	0.005	0.015	0.024	0.024	0.015	0.012	0.012	0.012	0.012	0.007
SC2	0.007	0.005	0.012	0.015	0.015	0.010	0.010	0.010	0.010	0.010	0.005
SC3	0.012	0.007	0.017	0.017	0.017	0.012	0.012	0.015	0.015	0.015	0.007
SC4	0.007	0.005	0.010	0.015	0.010	0.010	0.010	0.010	0.010	0.010	0.005
SC5	0.007	0.005	0.010	0.019	0.015	0.010	0.010	0.010	0.010	0.010	0.005
SC6	0.012	0.010	0.017	0.024	0.024	0.019	0.012	0.015	0.015	0.015	0.007
E1	0.024	0.019	0.036	0.022	0.019	0.012	0.012	0.012	0.012	0.012	0.007
E2	0.019	0.010	0.034	0.015	0.010	0.010	0.012	0.012	0.012	0.012	0.007
E3	0.019	0.012	0.036	0.015	0.012	0.010	0.012	0.015	0.012	0.012	0.007
E4	0.027	0.019	0.036	0.024	0.024	0.019	0.012	0.015	0.015	0.015	0.007
E5	0.027	0.019	0.036	0.024	0.024	0.015	0.012	0.015	0.015	0.015	0.007
E6	0.015	0.010	0.022	0.015	0.015	0.010	0.005	0.005	0.005	0.005	0.005
E7	0.027	0.019	0.036	0.024	0.024	0.019	0.012	0.015	0.015	0.015	0.007
E8	0.022	0.012	0.029	0.017	0.017	0.012	0.010	0.012	0.012	0.012	0.007
EM1	0.027	0.022	0.039	0.024	0.027	0.019	0.032	0.027	0.034	0.024	0.027
EM2	0.010	0.010	0.017	0.010	0.010	0.010	0.015	0.010	0.019	0.010	0.019
EM3	0.015	0.012	0.024	0.015	0.012	0.010	0.019	0.012	0.019	0.010	0.019
EM4	0.027	0.022	0.039	0.024	0.022	0.015	0.032	0.022	0.034	0.024	0.027
EM5	0.012	0.012	0.024	0.010	0.012	0.010	0.019	0.015	0.024	0.015	0.019
EM6	0.015	0.015	0.027	0.012	0.015	0.012	0.019	0.019	0.027	0.017	0.019
EM7	0.012	0.010	0.019	0.010	0.010	0.010	0.019	0.015	0.024	0.015	0.019
EM8	0.015	0.010	0.019	0.015	0.010	0.010	0.022	0.012	0.022	0.012	0.019
C1	0.027	0.019	0.036	0.022	0.024	0.017	0.029	0.024	0.032	0.022	0.027
C2	0.022	0.024	0.032	0.017	0.019	0.012	0.024	0.019	0.027	0.017	0.022
C3	0.012	0.010	0.022	0.010	0.010	0.010	0.024	0.015	0.024	0.015	0.019
C4	0.012	0.010	0.017	0.010	0.010	0.010	0.015	0.015	0.015	0.015	0.010
C5	0.027	0.019	0.036	0.022	0.019	0.012	0.029	0.019	0.032	0.022	0.027
S1	0.000	0.012	0.034	0.017	0.012	0.012	0.019	0.017	0.022	0.017	0.015
S2	0.024	0.000	0.036	0.022	0.019	0.012	0.032	0.017	0.032	0.022	0.027
S3	0.010	0.010	0.000	0.010	0.010	0.010	0.017	0.012	0.022	0.012	0.019
S4	0.015	0.012	0.036	0.000	0.015	0.015	0.022	0.019	0.024	0.019	0.017
S5	0.019	0.010	0.032	0.015	0.000	0.012	0.027	0.017	0.027	0.017	0.022
S6	0.024	0.017	0.036	0.019	0.022	0.005	0.032	0.019	0.034	0.024	0.027
SH1	0.012	0.015	0.017	0.012	0.015	0.012	0.000	0.017	0.019	0.015	0.017
SH2	0.019	0.017	0.029	0.019	0.017	0.015	0.024	0.000	0.024	0.015	0.024
SH3	0.010	0.012	0.015	0.010	0.012	0.010	0.010	0.015	0.000	0.010	0.010
SH4	0.015	0.022	0.024	0.015	0.017	0.010	0.019	0.015	0.024	0.000	0.019
SH5	0.012	0.015	0.017	0.012	0.015	0.012	0.012	0.017	0.019	0.015	0.000

Social Responsibilities of the Businessman. Carroll (1999) called Bowen the "father of corporate social responsibility" (Moura-Leite and Padgett, 2011). As the need for sustainable practices grew more urgent for companies, attention to CSR also accelerated. Developed nations moved quickly to engage in CSR activities, while developing nations have been slower to implement CSR practices.

2.2. CSR practices

Examples of scholarly attention to CSR practices are summarized in this subsection. Obserseder et al., (2013) examines CSR practices through customer perceptions using both qualitative and quantitative data analysis. Pastrana and Sriramesh (2014) investigated CSR perceptions and practices within a sample of Colombian small and medium scale enterprises (SMEs), in which 54 SMEs were analysed for their practices in motivations, decision making processes, communication, resource allocation, and evaluation. Kucukusta et al., (2013) investigated CSR practices in nine four- and five-star hotels in Hong Kong through the quantitative responses of 150 visitors. Wang (2011) discussed customers' perceptions of pharmaceutical advertising disclosures with the concern of CSR practices and attitudes. Cowper-Smith and de Grosbois (2011) surveyed the annual reports of 41 airlines (14 of which exist in January 2009) to identify the determinants of CSR practices in the airline industry. Manente et al., (2012) analyzed the reporting of CSR practices in tourism with the aid of a quantitative model especially suited to small companies. A few studies correlate CSR practices and their company's performance. For instance, Gjølberg (2009) develops two CSR indices, one for measuring CSR practices and the other for CSR performances as applied to 20 Organisation for Economic Co-operation and Development (OECD) nations. Nalband and Al-Amri (2013) identified the perceptions of managers through an in-depth questionnaire survey in 21 listed companies in Saudi Arabia considering their CSR practices and performances.

Some existing literatures focus on CSR practices and assessments. Raufflet et al., (2014) investigated CSR practices in leading international mining and oil and gas industries, finding that they utilize a concept called regulatory script. Mann et al., (2014) studied the CSR practices and reporting assessments among specialty apparel retailers. A high portion of existing studies examine general concepts of CSR practices. Arevalo and Aravind (2011) discussed the various pressures, drivers, barriers, and issues of CSR practices within the Indian context. Hemat and Yuksel (2014) declared cause-related marketing as a CSR and questioned whether cause-related marketing might provide a 'Win-Win-Win' strategy. Misani (2010) said that there are two forms of CSR practices: convergent, that emphasizes conformity, and divergent, in which purposeful steps are taken to differentiate one's business from its rivals. Haberberg et al. (2010) made a conceptual study on CSR practices to find the idiosyncratic features of institutionalization and adaption. Narwal and Singh (2013) explored CSR practices in an Indian context through the Multi-National Companies (MNC) companies; their sample of 38

Table 5
Total influence matrix "T_c" for criteria.

	SC1	SC2	SC3	SC4	SC5	SC6	E1	E2	E3	E4	E5	E6	E7	E8
SC1	0.021	0.054	0.042	0.057	0.048	0.024	0.031	0.049	0.047	0.029	0.030	0.053	0.024	0.039
SC2	0.025	0.018	0.022	0.030	0.028	0.019	0.020	0.029	0.028	0.019	0.020	0.032	0.019	0.021
SC3	0.034	0.045	0.016	0.046	0.037	0.022	0.026	0.041	0.037	0.025	0.025	0.049	0.022	0.032
SC4	0.022	0.029	0.021	0.017	0.024	0.019	0.020	0.029	0.023	0.019	0.019	0.031	0.018	0.021
SC5	0.025	0.041	0.028	0.044	0.017	0.020	0.022	0.031	0.030	0.020	0.021	0.039	0.020	0.027
SC6	0.045	0.059	0.045	0.060	0.051	0.016	0.038	0.052	0.048	0.035	0.036	0.056	0.033	0.037
E1	0.040	0.055	0.038	0.056	0.051	0.027	0.019	0.046	0.041	0.029	0.030	0.055	0.028	0.037
E2	0.030	0.038	0.026	0.039	0.035	0.023	0.024	0.020	0.035	0.023	0.023	0.040	0.022	0.028
E3	0.034	0.042	0.027	0.043	0.039	0.024	0.028	0.036	0.019	0.023	0.024	0.044	0.023	0.029
E4	0.044	0.064	0.041	0.065	0.055	0.029	0.039	0.056	0.051	0.019	0.039	0.061	0.031	0.040
E5	0.043	0.063	0.040	0.064	0.054	0.028	0.038	0.055	0.050	0.028	0.019	0.060	0.030	0.039
E6	0.028	0.038	0.024	0.038	0.030	0.021	0.022	0.034	0.030	0.021	0.021	0.021	0.021	0.023
E7	0.049	0.066	0.044	0.067	0.056	0.032	0.039	0.058	0.052	0.037	0.038	0.067	0.019	0.043
E8	0.035	0.048	0.030	0.049	0.040	0.027	0.028	0.042	0.037	0.026	0.027	0.050	0.024	0.017
EM1	0.051	0.072	0.047	0.073	0.062	0.035	0.044	0.061	0.057	0.034	0.040	0.071	0.033	0.051
EM2	0.027	0.032	0.023	0.032	0.029	0.020	0.021	0.028	0.024	0.020	0.020	0.033	0.020	0.022
EM3	0.033	0.043	0.026	0.044	0.036	0.023	0.027	0.037	0.033	0.023	0.023	0.038	0.022	0.025
EM4	0.047	0.068	0.044	0.069	0.054	0.032	0.037	0.052	0.049	0.032	0.033	0.062	0.031	0.043
EM5	0.032	0.037	0.025	0.038	0.034	0.022	0.024	0.031	0.027	0.022	0.022	0.039	0.021	0.024
EM6	0.037	0.043	0.030	0.044	0.040	0.026	0.030	0.036	0.034	0.026	0.027	0.045	0.026	0.029
EM7	0.025	0.030	0.023	0.030	0.027	0.021	0.022	0.026	0.025	0.020	0.021	0.034	0.020	0.023
EM8	0.027	0.036	0.025	0.037	0.029	0.022	0.023	0.033	0.031	0.021	0.022	0.033	0.021	0.024
C1	0.049	0.067	0.046	0.068	0.058	0.033	0.043	0.059	0.053	0.033	0.038	0.066	0.032	0.049
C2	0.044	0.057	0.042	0.058	0.048	0.030	0.035	0.049	0.044	0.030	0.030	0.056	0.029	0.041
C3	0.026	0.031	0.024	0.034	0.031	0.021	0.023	0.027	0.026	0.021	0.021	0.035	0.021	0.023
C4	0.025	0.032	0.023	0.035	0.032	0.020	0.022	0.026	0.025	0.020	0.021	0.034	0.020	0.022
C5	0.046	0.063	0.043	0.064	0.049	0.031	0.036	0.050	0.045	0.031	0.031	0.057	0.030	0.041
S1	0.034	0.040	0.027	0.040	0.036	0.023	0.027	0.035	0.031	0.023	0.024	0.043	0.023	0.026
S2	0.041	0.061	0.039	0.062	0.047	0.027	0.029	0.046	0.041	0.027	0.028	0.055	0.026	0.038
S3	0.024	0.029	0.023	0.032	0.029	0.020	0.021	0.026	0.024	0.020	0.020	0.030	0.019	0.022
S4	0.038	0.048	0.032	0.048	0.044	0.025	0.029	0.040	0.036	0.025	0.026	0.049	0.024	0.030
S5	0.039	0.053	0.032	0.053	0.044	0.025	0.027	0.043	0.038	0.025	0.026	0.047	0.025	0.031
S6	0.045	0.065	0.042	0.066	0.056	0.030	0.039	0.057	0.051	0.029	0.035	0.062	0.029	0.040
SH1	0.034	0.040	0.028	0.040	0.037	0.024	0.023	0.029	0.024	0.019	0.020	0.034	0.019	0.022
SH2	0.035	0.051	0.033	0.052	0.043	0.025	0.024	0.030	0.025	0.019	0.020	0.036	0.019	0.022
SH3	0.028	0.033	0.022	0.033	0.030	0.019	0.018	0.022	0.019	0.014	0.015	0.027	0.014	0.017
SH4	0.033	0.043	0.031	0.044	0.035	0.023	0.022	0.027	0.023	0.018	0.018	0.033	0.017	0.020
SH5	0.033	0.039	0.027	0.0399	0.036	0.024	0.023	0.028	0.024	0.019	0.019	0.033	0.018	0.021

	EM1	EM2	EM3	EM4	EM5	EM6	EM7	EM8	C1	C2	C3	C4	C5
SC1	0.018	0.044	0.037	0.020	0.037	0.035	0.043	0.043	0.030	0.036	0.061	0.065	0.036
SC2	0.014	0.030	0.026	0.014	0.025	0.024	0.030	0.031	0.020	0.021	0.039	0.045	0.021
SC3	0.017	0.042	0.036	0.018	0.033	0.029	0.039	0.041	0.023	0.025	0.050	0.060	0.024
SC4	0.013	0.029	0.025	0.014	0.024	0.023	0.029	0.030	0.019	0.020	0.035	0.042	0.020
SC5	0.015	0.033	0.028	0.016	0.027	0.026	0.032	0.033	0.021	0.027	0.043	0.051	0.027
SC6	0.022	0.050	0.043	0.024	0.042	0.038	0.049	0.049	0.034	0.036	0.062	0.072	0.036
E1	0.028	0.065	0.050	0.034	0.057	0.053	0.065	0.059	0.030	0.037	0.063	0.073	0.036
E2	0.022	0.054	0.039	0.023	0.047	0.046	0.054	0.044	0.024	0.025	0.048	0.061	0.025
E3	0.023	0.058	0.043	0.024	0.051	0.047	0.058	0.048	0.025	0.026	0.052	0.065	0.026
E4	0.030	0.075	0.062	0.036	0.066	0.062	0.075	0.069	0.037	0.040	0.068	0.079	0.039
E5	0.030	0.074	0.061	0.036	0.065	0.061	0.073	0.067	0.032	0.039	0.067	0.078	0.038
E6	0.020	0.043	0.034	0.021	0.040	0.038	0.045	0.039	0.022	0.023	0.040	0.050	0.023
E7	0.035	0.077	0.063	0.037	0.067	0.063	0.076	0.070	0.038	0.040	0.069	0.081	0.040
E8	0.023	0.057	0.046	0.024	0.050	0.046	0.057	0.052	0.025	0.027	0.051	0.062	0.026
EM1	0.021	0.084	0.069	0.042	0.074	0.069	0.083	0.077	0.041	0.043	0.076	0.089	0.043
EM2	0.019	0.023	0.028	0.020	0.029	0.027	0.039	0.033	0.021	0.022	0.033	0.048	0.022
EM3	0.022	0.052	0.022	0.023	0.045	0.041	0.051	0.045	0.024	0.025	0.046	0.056	0.025
EM4	0.028	0.074	0.060	0.020	0.065	0.060	0.073	0.067	0.034	0.040	0.071	0.083	0.040
EM5	0.021	0.048	0.036	0.022	0.022	0.038	0.048	0.043	0.023	0.024	0.042	0.055	0.024
EM6	0.023	0.054	0.044	0.024	0.040	0.024	0.054	0.049	0.025	0.027	0.048	0.062	0.026
EM7	0.020	0.038	0.033	0.021	0.030	0.028	0.023	0.038	0.021	0.023	0.034	0.046	0.022
EM8	0.021	0.047	0.033	0.022	0.041	0.039	0.044	0.023	0.022	0.024	0.038	0.049	0.023
C1	0.032	0.079	0.065	0.038	0.069	0.064	0.078	0.072	0.023	0.042	0.071	0.086	0.041
C2	0.029	0.072	0.054	0.030	0.059	0.054	0.066	0.061	0.031	0.021	0.060	0.073	0.035
C3	0.021	0.044	0.034	0.021	0.035	0.034	0.041	0.039	0.022	0.023	0.023	0.048	0.023
C4	0.020	0.037	0.033	0.020	0.031	0.030	0.037	0.038	0.021	0.022	0.036	0.027	0.022
C5	0.030	0.069	0.056	0.031	0.060	0.056	0.068	0.063	0.032	0.037	0.066	0.080	0.022
S1	0.022	0.055	0.040	0.023	0.046	0.042	0.053	0.046	0.024	0.026	0.047	0.062	0.025
S2	0.026	0.066	0.051	0.027	0.055	0.053	0.065	0.060	0.031	0.037	0.064	0.075	0.032
S3	0.019	0.034	0.030	0.020	0.028	0.027	0.034	0.032	0.021	0.022	0.031	0.045	0.022
S4	0.024	0.062	0.046	0.025	0.054	0.050	0.061	0.051	0.029	0.030	0.055	0.069	0.030
S5	0.024	0.062	0.048	0.025	0.052	0.050	0.061	0.056	0.029	0.030	0.055	0.065	0.030
S6	0.028	0.076	0.063	0.034	0.067	0.062	0.075	0.070	0.033	0.040	0.069	0.080	0.040
SH1	0.023	0.043	0.038	0.024	0.036	0.033	0.042	0.041	0.025	0.027	0.042	0.052	0.026

(*continued on next page*)

Table 5 (*continued*)

	EM1	EM2	EM3	EM4	EM5	EM6	EM7	EM8	C1	C2	C3	C4	C5
SH2	0.023	0.060	0.046	0.029	0.052	0.048	0.059	0.052	0.025	0.032	0.053	0.065	0.031
SH3	0.019	0.035	0.031	0.019	0.029	0.026	0.035	0.033	0.020	0.021	0.034	0.043	0.021
SH4	0.022	0.056	0.041	0.023	0.044	0.041	0.051	0.044	0.024	0.030	0.045	0.056	0.025
SH5	0.023	0.042	0.037	0.024	0.036	0.032	0.042	0.040	0.025	0.026	0.041	0.051	0.026

	S1	S2	S3	S4	S5	S6	SH1	SH2	SH3	SH4	SH5
SC1	0.032	0.023	0.050	0.046	0.045	0.031	0.037	0.033	0.039	0.032	0.028
SC2	0.022	0.016	0.035	0.029	0.028	0.021	0.026	0.023	0.028	0.023	0.019
SC3	0.031	0.022	0.047	0.036	0.035	0.027	0.033	0.032	0.038	0.032	0.025
SC4	0.021	0.016	0.032	0.028	0.023	0.020	0.025	0.022	0.027	0.022	0.018
SC5	0.024	0.018	0.035	0.035	0.030	0.022	0.028	0.025	0.030	0.024	0.020
SC6	0.037	0.029	0.056	0.049	0.048	0.038	0.039	0.037	0.045	0.037	0.030
E1	0.050	0.040	0.077	0.047	0.044	0.032	0.041	0.036	0.045	0.036	0.032
E2	0.039	0.026	0.065	0.034	0.029	0.025	0.034	0.031	0.037	0.030	0.027
E3	0.040	0.029	0.069	0.035	0.032	0.026	0.036	0.034	0.039	0.031	0.028
E4	0.056	0.043	0.083	0.053	0.052	0.042	0.045	0.042	0.052	0.041	0.036
E5	0.055	0.042	0.081	0.052	0.051	0.036	0.044	0.041	0.051	0.040	0.035
E6	0.032	0.023	0.049	0.031	0.031	0.023	0.024	0.021	0.027	0.021	0.021
E7	0.057	0.043	0.084	0.054	0.053	0.042	0.046	0.043	0.053	0.042	0.037
E8	0.043	0.029	0.063	0.039	0.038	0.029	0.034	0.032	0.040	0.032	0.028
EM1	0.060	0.049	0.092	0.058	0.059	0.045	0.069	0.058	0.076	0.055	0.059
EM2	0.026	0.023	0.042	0.026	0.025	0.022	0.032	0.025	0.039	0.024	0.034
EM3	0.034	0.028	0.055	0.034	0.031	0.025	0.041	0.031	0.044	0.028	0.038
EM4	0.057	0.046	0.086	0.054	0.051	0.038	0.065	0.050	0.072	0.052	0.056
EM5	0.031	0.027	0.053	0.028	0.030	0.024	0.040	0.032	0.048	0.032	0.037
EM6	0.036	0.032	0.060	0.034	0.035	0.029	0.043	0.039	0.053	0.036	0.040
EM7	0.029	0.023	0.045	0.026	0.026	0.022	0.038	0.030	0.045	0.029	0.035
EM8	0.033	0.024	0.048	0.032	0.027	0.023	0.042	0.029	0.044	0.029	0.037
C1	0.058	0.045	0.086	0.053	0.055	0.041	0.064	0.054	0.071	0.051	0.057
C2	0.049	0.046	0.074	0.044	0.045	0.033	0.054	0.045	0.061	0.042	0.048
C3	0.030	0.024	0.049	0.027	0.027	0.023	0.043	0.031	0.046	0.030	0.036
C4	0.028	0.023	0.042	0.026	0.025	0.022	0.032	0.029	0.035	0.029	0.025
C5	0.055	0.042	0.080	0.050	0.047	0.034	0.060	0.046	0.067	0.048	0.054
S1	0.021	0.029	0.066	0.037	0.032	0.028	0.042	0.036	0.048	0.036	0.035
S2	0.050	0.021	0.077	0.048	0.045	0.032	0.061	0.042	0.065	0.046	0.052
S3	0.025	0.022	0.025	0.025	0.025	0.022	0.034	0.027	0.041	0.026	0.034
S4	0.038	0.031	0.072	0.023	0.037	0.032	0.048	0.041	0.054	0.041	0.040
S5	0.043	0.029	0.068	0.038	0.023	0.030	0.053	0.039	0.056	0.038	0.045
S6	0.054	0.041	0.083	0.049	0.050	0.028	0.065	0.047	0.072	0.051	0.056
SH1	0.031	0.029	0.046	0.031	0.032	0.026	0.021	0.034	0.043	0.031	0.035
SH2	0.041	0.035	0.063	0.041	0.038	0.031	0.049	0.021	0.053	0.035	0.046
SH3	0.024	0.024	0.037	0.024	0.026	0.021	0.026	0.028	0.019	0.023	0.024
SH4	0.034	0.037	0.054	0.034	0.036	0.025	0.042	0.033	0.049	0.018	0.039
SH5	0.030	0.029	0.045	0.030	0.032	0.026	0.032	0.034	0.042	0.031	0.017

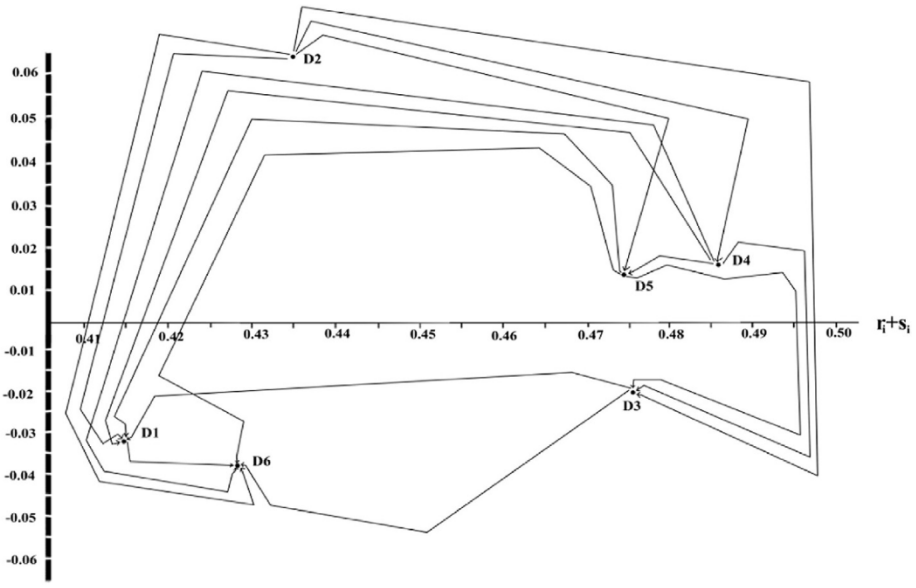

Fig. 3. Casual influence diagram for dimensions.

Table 6
The sum of influences given and received on criteria.

Criteria	r_i	s_i	r_i+s_i	r_i-s_i
SC1	1.450	1.326	2.776	0.124
SC2	0.939	1.775	2.714	-0.835
SC3	1.251	1.202	2.453	0.049
SC4	0.890	1.809	2.699	-0.919
SC5	1.052	1.531	2.583	-0.479
SC6	1.618	0.934	2.552	0.684
E1	1.681	1.065	2.746	0.616
E2	1.293	1.478	2.772	-0.185
E3	1.379	1.338	2.717	0.041
E4	1.918	0.924	2.842	0.994
E5	1.861	0.971	2.832	0.890
E6	1.111	1.710	2.822	-0.599
E7	1.980	0.893	2.873	1.087
E8	1.435	1.142	2.577	0.294
EM1	2.223	0.871	3.094	1.351
EM2	1.033	2.043	3.076	-1.010
EM3	1.299	1.631	2.929	-0.332
EM4	1.996	0.949	2.945	1.047
EM5	1.228	1.731	2.959	-0.503
EM6	1.410	1.621	3.031	-0.211
EM7	1.072	2.011	3.083	-0.938
EM8	1.179	1.849	3.028	-0.671
C1	2.087	1.007	3.094	1.080
C2	1.779	1.116	2.895	0.663
C3	1.139	1.928	3.067	-0.789
C4	1.047	2.350	3.398	-1.303
C5	1.869	1.095	2.964	0.774
S1	1.354	1.454	2.809	-0.100
S2	1.750	1.157	2.907	0.593
S3	1.009	2.275	3.284	-1.266
S4	1.539	1.445	2.983	0.094
S5	1.560	1.401	2.961	0.159
S6	1.978	1.094	3.072	0.884
SH1	1.204	1.592	2.796	-0.388
SH2	1.467	1.334	2.800	0.133
SH3	0.956	1.793	2.749	-0.837
SH4	1.287	1.306	2.593	-0.019
SH5	1.193	1.365	2.558	-0.172

companies analyzed data through factor analysis. The impact of CSR on the supply chain results has generated additional research. Chi (2011) analyzed the challenges, achievements, and developments of CSR practices in Chinese textile and apparel industries with a supply chain focus; he used a theory called the World Bank CSR Diamond Model. Some studies (Nasrullah and Rahim, 2014; Bevan and Wynne, 2011; Proença and Branco, 2014; Klerkx et al., 2012; Mahmood and Humphrey, 2013; Muniapan, 2014) provide a view of CSR practices in developing contexts with their own conceptualization models.

2.3. Gap analysis and research highlights

A survey of existing literatures revealed that there is no previous work that addresses the supplier selection process considering CSR practices with the concerns of multi-stakeholders' perspectives. A few studies include work on CSR issues in the supplier selection process, but do not examine CSR practices. Some studies do consider the concerns of multi-stakeholders' perspectives but they are limited with the CSR practices based supplier selection. We determined that only a few studies consider CSR in supply chain management in a developing context such as India. Hence, to bridge the virtual and literature concerns, this study attempts to identify essential CSR practices with multi-stakeholders' perspectives as it relates to the supplier selection process. The key research highlights of this work are summarized below:

- Common CSR practices were collected from a review of existing literatures and shortlisted with the opinions of field experts and experienced industrial managers, using the fuzzy Delphi method.
- A framework was proposed to evaluate essential suppliers based on their CSR practices. We considered multi-stakeholder perspectives, and were assisted by the hybrid MCDM tool.
- The proposed framework was validated with a case study methodology, supported by a case firm situated in India.
- Results were discussed with feedback from case industry managers, and were compared to existing literatures.

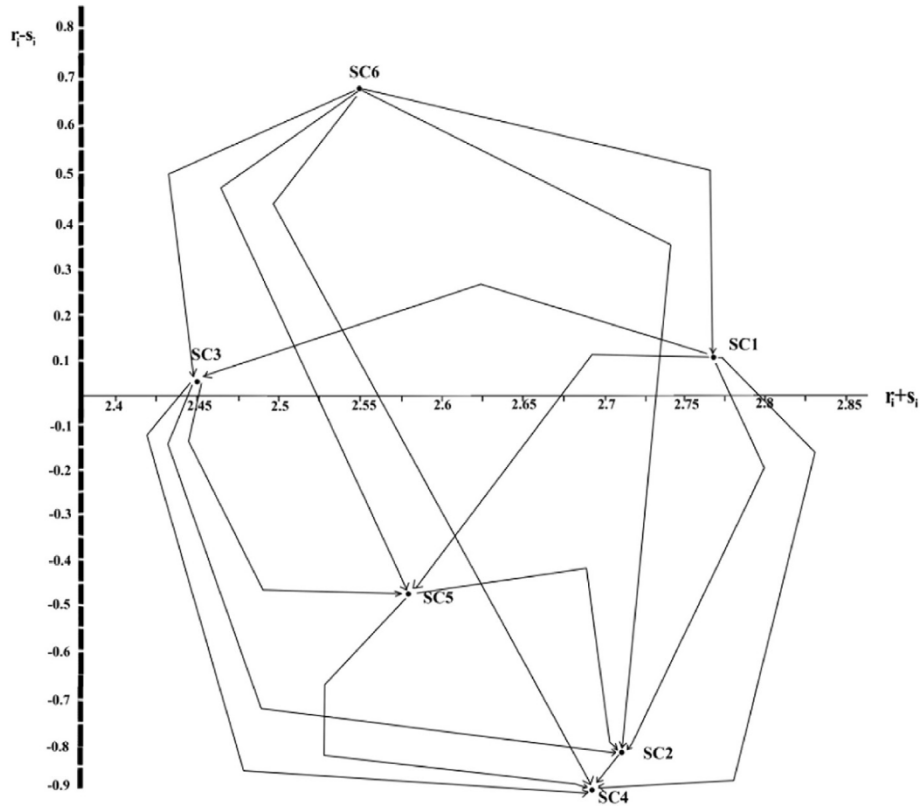

Fig. 4. Casual influence diagram for under criteria D1.

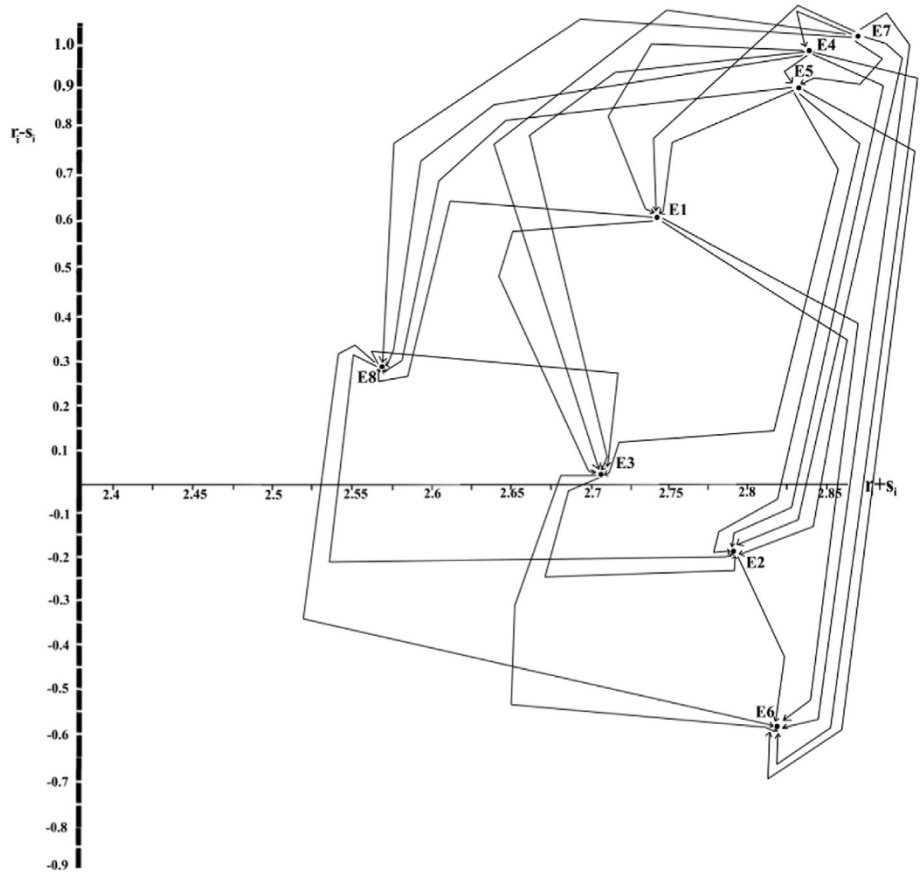

Fig. 5. Casual influence diagram for under criteria D2.

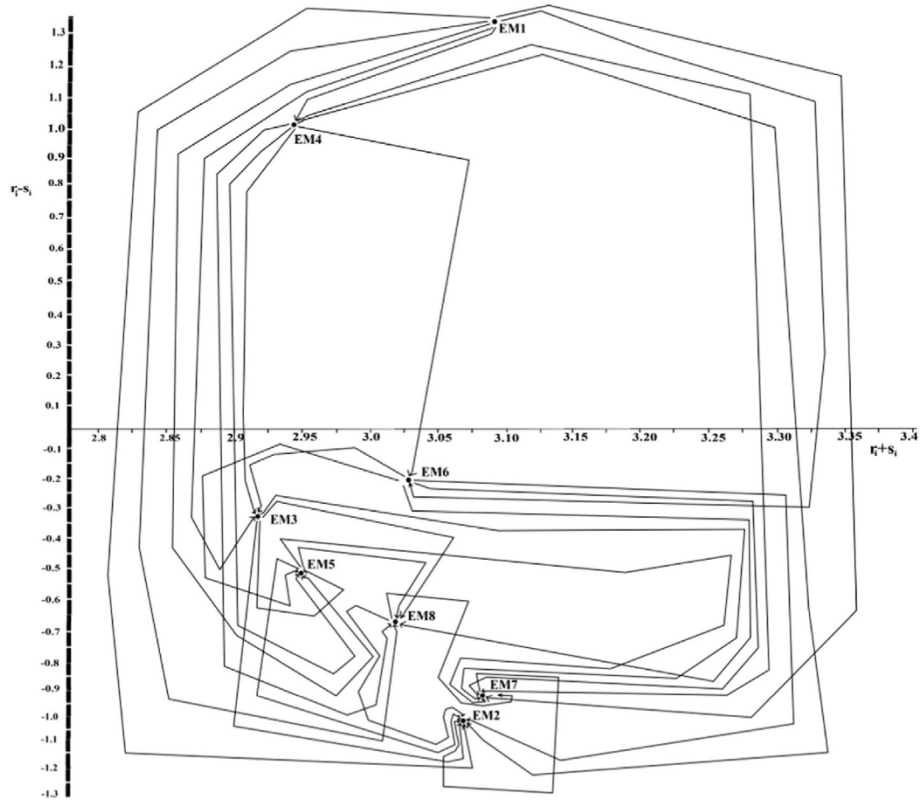

Fig. 6. Casual influence diagram for under criteria D3.

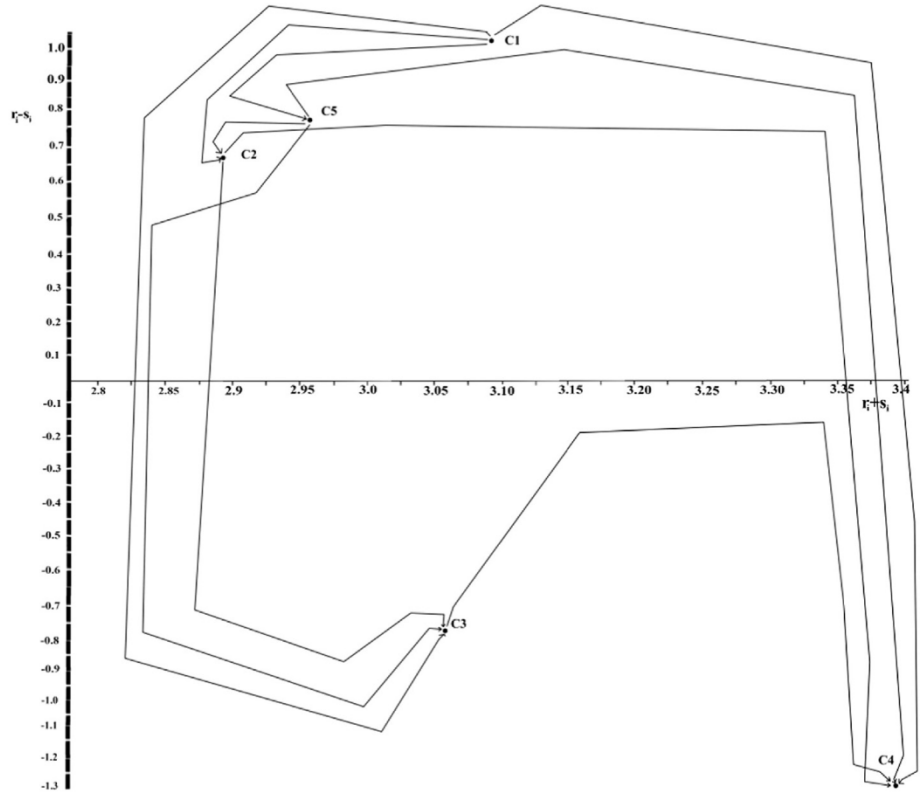

Fig. 7. Casual influence diagram for under criteria D4.

3. Research framework and multi-stakeholder considerations

Many pressures exist on business owners, including staying competitive in the global marketplaces and integrating CSR into their business plans. Moreover, those pressures may be even more dominant in a developing nation like India. India has a long history in CSR but also has uneven economic growth; social disparities exist around the nation (Dhanesh, 2012). According to Gowda (2013), CSR is a key business issue

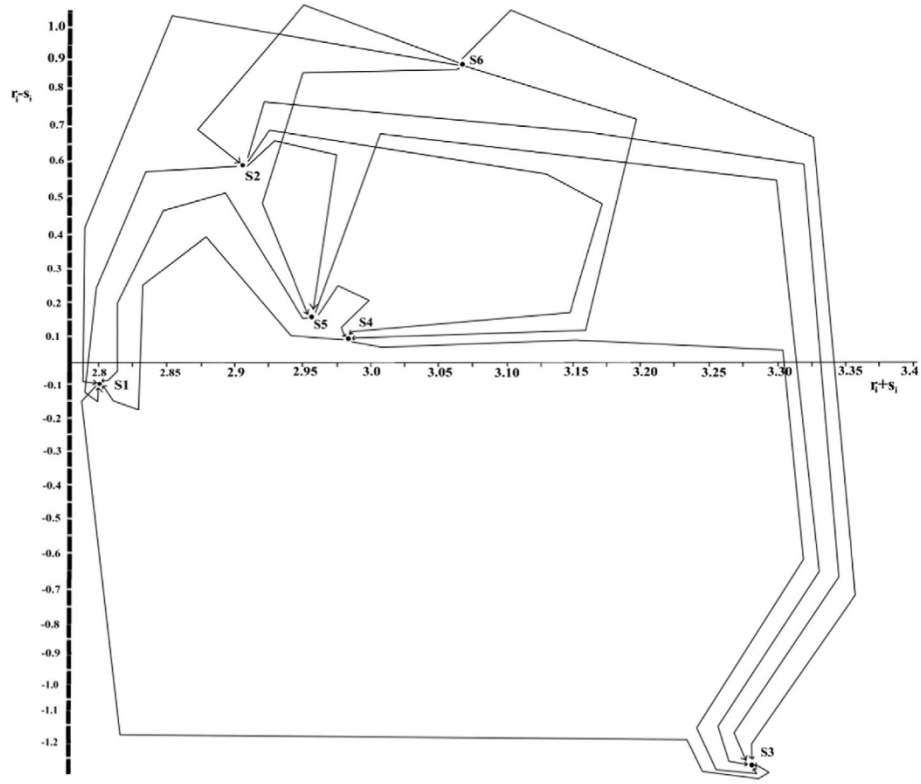

Fig. 8. Casual influence diagram for under criteria D5.

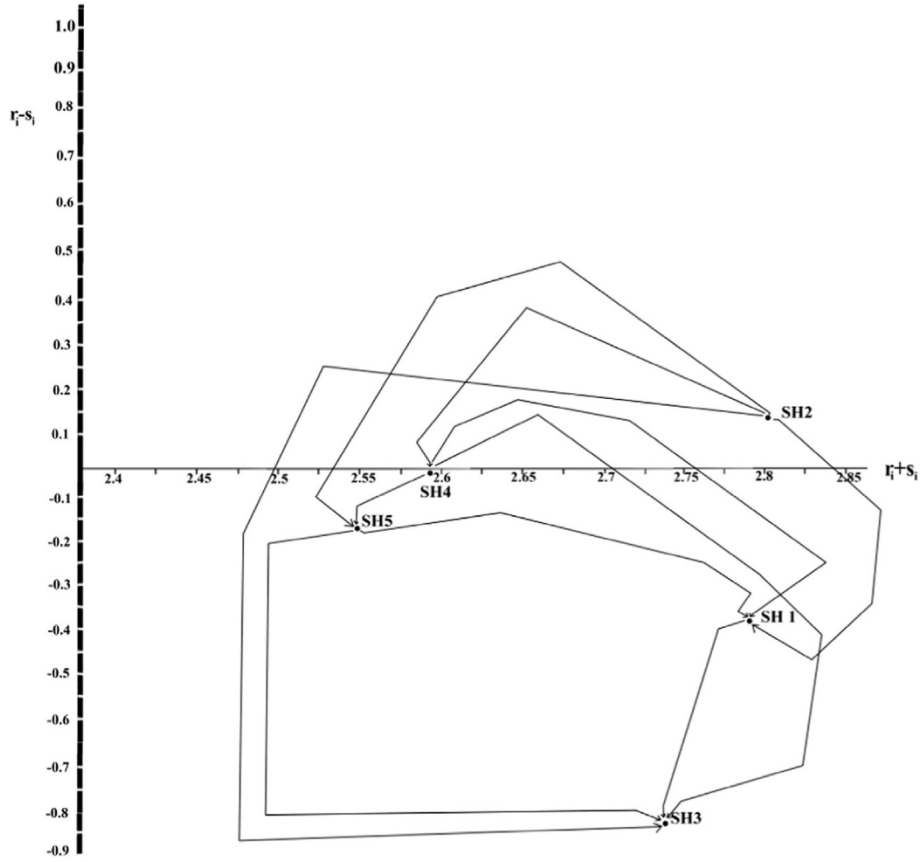

Fig. 9. Casual influence diagram for under criteria D6.

irrelevant to the location or size of the Indian company that adopts it. With these foundations, this study considers the Indian context as a means by which to explore CSR practices in the supplier selection process while still regarding multi-stakeholder perspectives. Although many stakeholders may support the implementation of CSR in a firm, often one stakeholder has the highest impact. For simplicity, stakeholders will be broadly classified into two categories: external or internal stakeholders. According to several researchers (see Mitchell et al., 1997; Maignan et al., 2005; Kannan et al., 2014; Dong et al., 2014), the most powerful stakeholders are those with high levels of power, legitimacy, and urgency with regard to issues. From a review of the literature and the above criteria, four stakeholders are selected for this study: shareholders, governments,

Table 7
The new matrix "T_c^{α}" obtained by normalizing matrix in criteria.

	SC1	SC2	SC3	SC4	SC5	SC6	E1	E2	E3	E4	E5	E6	E7	E8
SC1	0.084	0.219	0.173	0.231	0.194	0.099	0.103	0.163	0.156	0.096	0.098	0.175	0.079	0.130
SC2	0.179	0.126	0.153	0.213	0.194	0.135	0.109	0.156	0.149	0.102	0.104	0.169	0.100	0.113
SC3	0.172	0.225	0.080	0.227	0.186	0.111	0.102	0.161	0.144	0.095	0.098	0.191	0.085	0.124
SC4	0.168	0.218	0.159	0.130	0.183	0.141	0.112	0.160	0.126	0.104	0.107	0.173	0.103	0.115
SC5	0.140	0.236	0.159	0.252	0.098	0.116	0.104	0.149	0.141	0.097	0.099	0.184	0.095	0.131
SC6	0.161	0.215	0.162	0.218	0.183	0.059	0.113	0.156	0.142	0.106	0.108	0.168	0.097	0.110
E1	0.151	0.206	0.143	0.209	0.191	0.100	0.068	0.160	0.143	0.102	0.104	0.192	0.100	0.131
E2	0.158	0.200	0.136	0.203	0.184	0.119	0.113	0.093	0.162	0.105	0.108	0.187	0.103	0.128
E3	0.162	0.202	0.130	0.205	0.187	0.113	0.123	0.158	0.086	0.104	0.106	0.195	0.102	0.127
E4	0.147	0.216	0.138	0.218	0.184	0.097	0.115	0.167	0.152	0.057	0.116	0.182	0.091	0.119
E5	0.147	0.216	0.138	0.218	0.184	0.097	0.118	0.173	0.157	0.088	0.060	0.187	0.094	0.123
E6	0.156	0.211	0.134	0.213	0.169	0.117	0.116	0.177	0.157	0.108	0.110	0.106	0.106	0.120
E7	0.157	0.209	0.141	0.212	0.178	0.102	0.112	0.163	0.148	0.104	0.106	0.190	0.055	0.123
E8	0.152	0.211	0.132	0.214	0.175	0.116	0.113	0.165	0.148	0.105	0.108	0.198	0.094	0.069
EM1	0.149	0.213	0.139	0.215	0.183	0.102	0.113	0.155	0.147	0.087	0.102	0.182	0.085	0.129
EM2	0.165	0.194	0.141	0.197	0.179	0.124	0.113	0.149	0.129	0.105	0.108	0.175	0.103	0.117
EM3	0.160	0.212	0.128	0.214	0.174	0.112	0.118	0.162	0.144	0.099	0.102	0.167	0.098	0.111
EM4	0.151	0.216	0.141	0.219	0.171	0.103	0.109	0.154	0.145	0.094	0.096	0.183	0.092	0.127
EM5	0.168	0.198	0.134	0.201	0.182	0.117	0.112	0.148	0.128	0.104	0.106	0.185	0.102	0.116
EM6	0.167	0.196	0.137	0.199	0.181	0.120	0.120	0.144	0.135	0.103	0.105	0.176	0.101	0.115
EM7	0.160	0.191	0.150	0.194	0.174	0.131	0.115	0.139	0.130	0.106	0.109	0.178	0.105	0.119
EM8	0.151	0.208	0.141	0.211	0.165	0.124	0.111	0.157	0.149	0.103	0.105	0.160	0.101	0.114
C1	0.152	0.210	0.142	0.213	0.180	0.104	0.115	0.157	0.142	0.088	0.103	0.178	0.086	0.131

(*continued on next page*)

Table 7 (*continued*)

	SC1	SC2	SC3	SC4	SC5	SC6	E1	E2	E3	E4	E5	E6	E7	E8
C2	0.159	0.204	0.150	0.207	0.172	0.108	0.110	0.157	0.141	0.095	0.097	0.179	0.093	0.129
C3	0.155	0.186	0.145	0.203	0.184	0.127	0.115	0.139	0.130	0.106	0.109	0.178	0.105	0.119
C4	0.148	0.192	0.139	0.209	0.190	0.122	0.115	0.139	0.130	0.106	0.109	0.178	0.105	0.119
C5	0.154	0.214	0.145	0.216	0.167	0.105	0.110	0.157	0.140	0.095	0.097	0.179	0.093	0.129
S1	0.168	0.198	0.135	0.201	0.182	0.117	0.118	0.152	0.133	0.099	0.102	0.187	0.098	0.111
S2	0.149	0.219	0.140	0.222	0.171	0.099	0.101	0.159	0.141	0.093	0.095	0.190	0.091	0.129
S3	0.155	0.185	0.146	0.203	0.184	0.128	0.116	0.140	0.132	0.108	0.111	0.167	0.106	0.120
S4	0.163	0.202	0.134	0.205	0.187	0.107	0.113	0.156	0.138	0.096	0.098	0.189	0.094	0.117
S5	0.157	0.214	0.129	0.216	0.180	0.104	0.104	0.165	0.147	0.096	0.098	0.179	0.094	0.117
S6	0.147	0.215	0.138	0.218	0.184	0.098	0.114	0.166	0.150	0.085	0.102	0.180	0.084	0.118
SH1	0.168	0.196	0.137	0.199	0.181	0.120	0.123	0.150	0.128	0.101	0.104	0.179	0.099	0.115
SH2	0.148	0.214	0.139	0.217	0.180	0.103	0.122	0.152	0.129	0.099	0.102	0.184	0.097	0.115
SH3	0.170	0.197	0.134	0.200	0.182	0.117	0.124	0.153	0.127	0.099	0.102	0.185	0.097	0.114
SH4	0.157	0.207	0.148	0.210	0.169	0.109	0.123	0.153	0.128	0.099	0.102	0.184	0.097	0.114
SH5	0.168	0.196	0.137	0.199	0.181	0.120	0.123	0.150	0.128	0.101	0.104	0.179	0.099	0.115

	EM1	EM2	EM3	EM4	EM5	EM6	EM7	EM8	C1	C2	C3	C4	C5
SC1	0.067	0.158	0.135	0.071	0.132	0.126	0.156	0.156	0.131	0.159	0.267	0.285	0.158
SC2	0.071	0.156	0.135	0.075	0.128	0.122	0.155	0.158	0.137	0.144	0.266	0.311	0.143
SC3	0.066	0.164	0.142	0.069	0.129	0.114	0.153	0.163	0.128	0.135	0.273	0.331	0.134
SC4	0.071	0.156	0.135	0.075	0.128	0.122	0.155	0.159	0.141	0.149	0.258	0.305	0.147
SC5	0.071	0.157	0.134	0.075	0.128	0.123	0.155	0.158	0.125	0.160	0.257	0.299	0.159
SC6	0.071	0.157	0.135	0.075	0.133	0.120	0.156	0.154	0.143	0.150	0.259	0.299	0.149
E1	0.068	0.158	0.123	0.082	0.139	0.129	0.157	0.144	0.126	0.153	0.263	0.306	0.152
E2	0.066	0.165	0.118	0.069	0.144	0.140	0.163	0.135	0.130	0.137	0.262	0.335	0.136
E3	0.064	0.166	0.121	0.067	0.145	0.134	0.164	0.137	0.127	0.134	0.267	0.338	0.133
E4	0.063	0.158	0.130	0.076	0.139	0.130	0.157	0.145	0.142	0.150	0.258	0.301	0.149
E5	0.063	0.158	0.130	0.076	0.139	0.130	0.157	0.145	0.126	0.153	0.262	0.307	0.151
E6	0.072	0.155	0.120	0.075	0.141	0.137	0.162	0.138	0.139	0.146	0.253	0.317	0.145
E7	0.073	0.157	0.129	0.076	0.138	0.129	0.156	0.144	0.142	0.150	0.258	0.301	0.149
E8	0.065	0.161	0.130	0.068	0.141	0.130	0.160	0.146	0.132	0.139	0.265	0.326	0.138
EM1	0.040	0.162	0.134	0.080	0.142	0.133	0.160	0.148	0.140	0.148	0.261	0.305	0.146
EM2	0.089	0.103	0.127	0.093	0.132	0.126	0.179	0.149	0.144	0.152	0.229	0.326	0.150
EM3	0.073	0.172	0.074	0.076	0.149	0.137	0.171	0.148	0.135	0.143	0.259	0.321	0.141
EM4	0.063	0.165	0.135	0.045	0.144	0.134	0.163	0.150	0.125	0.151	0.266	0.310	0.149
EM5	0.077	0.173	0.128	0.080	0.080	0.136	0.171	0.155	0.137	0.145	0.249	0.326	0.143
EM6	0.074	0.174	0.139	0.077	0.129	0.077	0.173	0.157	0.133	0.142	0.256	0.329	0.140
EM7	0.086	0.164	0.144	0.090	0.128	0.122	0.100	0.165	0.146	0.154	0.233	0.315	0.152
EM8	0.077	0.175	0.120	0.081	0.151	0.146	0.164	0.086	0.143	0.151	0.245	0.311	0.150
C1	0.064	0.158	0.130	0.077	0.139	0.130	0.157	0.145	0.086	0.159	0.271	0.327	0.157
C2	0.068	0.169	0.128	0.071	0.138	0.127	0.156	0.144	0.142	0.096	0.272	0.332	0.159
C3	0.076	0.163	0.127	0.079	0.131	0.126	0.153	0.145	0.158	0.167	0.167	0.343	0.165
C4	0.079	0.152	0.133	0.083	0.128	0.123	0.150	0.152	0.165	0.174	0.282	0.208	0.172
C5	0.069	0.159	0.130	0.072	0.139	0.129	0.158	0.145	0.136	0.154	0.280	0.338	0.092
S1	0.069	0.169	0.122	0.072	0.140	0.129	0.161	0.139	0.132	0.140	0.252	0.338	0.138
S2	0.065	0.163	0.127	0.067	0.136	0.132	0.161	0.148	0.129	0.157	0.267	0.312	0.135
S3	0.086	0.152	0.132	0.089	0.126	0.121	0.150	0.143	0.148	0.157	0.219	0.321	0.155
S4	0.065	0.165	0.122	0.068	0.145	0.134	0.164	0.138	0.134	0.142	0.258	0.325	0.141
S5	0.064	0.163	0.127	0.067	0.137	0.132	0.162	0.149	0.137	0.145	0.263	0.310	0.144
S6	0.060	0.160	0.132	0.073	0.141	0.131	0.158	0.146	0.127	0.153	0.262	0.307	0.152
SH1	0.083	0.153	0.134	0.087	0.130	0.117	0.152	0.145	0.147	0.155	0.243	0.303	0.153
SH2	0.063	0.161	0.125	0.079	0.141	0.130	0.160	0.141	0.123	0.153	0.258	0.314	0.152
SH3	0.082	0.154	0.136	0.085	0.129	0.114	0.153	0.146	0.144	0.152	0.245	0.310	0.150
SH4	0.068	0.174	0.128	0.070	0.138	0.127	0.158	0.137	0.132	0.166	0.252	0.313	0.138
SH5	0.083	0.153	0.134	0.087	0.130	0.117	0.152	0.145	0.147	0.155	0.243	0.303	0.153

	S1	S2	S3	S4	S5	S6	SH1	SH2	SH3	SH4	SH5
SC1	0.141	0.099	0.219	0.203	0.200	0.138	0.216	0.194	0.233	0.191	0.166
SC2	0.145	0.109	0.231	0.191	0.188	0.137	0.218	0.196	0.235	0.194	0.157
SC3	0.157	0.113	0.237	0.181	0.178	0.134	0.207	0.201	0.237	0.198	0.157
SC4	0.151	0.114	0.225	0.202	0.164	0.144	0.218	0.197	0.234	0.194	0.157
SC5	0.144	0.108	0.215	0.216	0.183	0.134	0.218	0.196	0.235	0.193	0.159
SC6	0.144	0.114	0.218	0.190	0.186	0.148	0.208	0.198	0.238	0.195	0.161
E1	0.172	0.137	0.265	0.164	0.152	0.110	0.216	0.190	0.236	0.188	0.170
E2	0.180	0.118	0.299	0.157	0.132	0.114	0.216	0.192	0.234	0.190	0.168
E3	0.174	0.125	0.298	0.153	0.139	0.111	0.213	0.203	0.231	0.186	0.166
E4	0.170	0.130	0.252	0.162	0.159	0.127	0.209	0.194	0.239	0.191	0.166
E5	0.173	0.132	0.255	0.165	0.161	0.114	0.209	0.194	0.239	0.192	0.166
E6	0.168	0.123	0.258	0.167	0.164	0.120	0.213	0.184	0.234	0.181	0.188
E7	0.170	0.130	0.251	0.163	0.159	0.127	0.209	0.194	0.239	0.191	0.166
E8	0.180	0.122	0.262	0.160	0.157	0.119	0.205	0.194	0.238	0.192	0.171
EM1	0.166	0.135	0.253	0.159	0.163	0.124	0.217	0.183	0.240	0.173	0.187
EM2	0.158	0.138	0.257	0.158	0.155	0.134	0.208	0.159	0.253	0.157	0.223
EM3	0.165	0.135	0.266	0.165	0.150	0.120	0.227	0.168	0.243	0.153	0.210
EM4	0.171	0.139	0.259	0.164	0.154	0.114	0.221	0.170	0.244	0.176	0.190

(*continued on next page*)

Table 7 (*continued*)

	S1	S2	S3	S4	S5	S6	SH1	SH2	SH3	SH4	SH5
EM5	0.159	0.140	0.275	0.147	0.156	0.124	0.213	0.170	0.253	0.167	0.198
EM6	0.160	0.141	0.267	0.149	0.157	0.127	0.203	0.185	0.252	0.172	0.188
EM7	0.168	0.135	0.264	0.153	0.150	0.130	0.212	0.169	0.253	0.167	0.199
EM8	0.173	0.130	0.254	0.173	0.145	0.125	0.231	0.161	0.246	0.158	0.203
C1	0.172	0.132	0.255	0.158	0.162	0.122	0.216	0.181	0.240	0.170	0.192
C2	0.168	0.157	0.254	0.151	0.156	0.113	0.218	0.179	0.243	0.167	0.192
C3	0.165	0.133	0.273	0.151	0.149	0.129	0.232	0.165	0.247	0.163	0.194
C4	0.170	0.136	0.254	0.156	0.152	0.132	0.215	0.195	0.230	0.193	0.167
C5	0.178	0.137	0.262	0.162	0.152	0.110	0.220	0.167	0.244	0.173	0.196
S1	0.097	0.135	0.310	0.176	0.151	0.131	0.215	0.184	0.243	0.181	0.176
S2	0.183	0.078	0.282	0.175	0.163	0.118	0.229	0.158	0.244	0.173	0.197
S3	0.176	0.155	0.171	0.176	0.173	0.150	0.210	0.164	0.253	0.162	0.210
S4	0.162	0.132	0.310	0.100	0.158	0.138	0.215	0.184	0.241	0.182	0.178
S5	0.185	0.125	0.295	0.165	0.099	0.131	0.228	0.169	0.244	0.166	0.193
S6	0.177	0.134	0.272	0.161	0.165	0.091	0.223	0.163	0.246	0.177	0.191
SH1	0.157	0.150	0.235	0.157	0.167	0.134	0.128	0.208	0.260	0.191	0.212
SH2	0.165	0.139	0.253	0.165	0.153	0.126	0.241	0.104	0.258	0.171	0.226
SH3	0.155	0.151	0.238	0.156	0.168	0.133	0.219	0.234	0.156	0.192	0.200
SH4	0.154	0.170	0.248	0.154	0.163	0.112	0.230	0.182	0.273	0.100	0.214
SH5	0.157	0.150	0.235	0.157	0.167	0.134	0.207	0.214	0.268	0.197	0.113

Table 8
Unweighted supermatirx "W".

	SC1	SC2	SC3	SC4	SC5	SC6	E1	E2	E3	E4	E5	E6	E7	E8
SC1	0.084	0.179	0.172	0.168	0.140	0.161	0.151	0.158	0.162	0.147	0.147	0.156	0.157	0.152
SC2	0.219	0.126	0.225	0.218	0.236	0.215	0.206	0.200	0.202	0.216	0.216	0.211	0.209	0.211
SC3	0.173	0.153	0.080	0.159	0.159	0.162	0.143	0.136	0.130	0.138	0.138	0.134	0.141	0.132
SC4	0.231	0.213	0.227	0.130	0.252	0.218	0.209	0.203	0.205	0.218	0.218	0.213	0.212	0.214
SC5	0.194	0.194	0.186	0.183	0.098	0.183	0.191	0.184	0.187	0.184	0.184	0.169	0.178	0.175
SC6	0.099	0.135	0.111	0.141	0.116	0.059	0.100	0.119	0.113	0.097	0.097	0.117	0.102	0.116
E1	0.103	0.109	0.102	0.112	0.104	0.113	0.068	0.113	0.123	0.115	0.118	0.116	0.112	0.113
E2	0.163	0.156	0.161	0.160	0.149	0.156	0.160	0.093	0.158	0.167	0.173	0.177	0.163	0.165
E3	0.156	0.149	0.144	0.126	0.141	0.142	0.143	0.162	0.086	0.152	0.157	0.157	0.148	0.148
E4	0.096	0.102	0.095	0.104	0.097	0.106	0.102	0.105	0.104	0.057	0.088	0.108	0.104	0.105
E5	0.098	0.104	0.098	0.107	0.099	0.108	0.104	0.108	0.106	0.116	0.060	0.110	0.106	0.108
E6	0.175	0.169	0.191	0.173	0.184	0.168	0.192	0.187	0.195	0.182	0.187	0.106	0.190	0.198
E7	0.079	0.100	0.085	0.103	0.095	0.097	0.100	0.103	0.102	0.091	0.094	0.106	0.055	0.094
E8	0.130	0.113	0.124	0.115	0.131	0.110	0.131	0.128	0.127	0.119	0.123	0.120	0.123	0.069
EM1	0.067	0.071	0.066	0.071	0.071	0.071	0.068	0.066	0.064	0.063	0.063	0.072	0.073	0.065
EM2	0.158	0.156	0.164	0.156	0.157	0.157	0.158	0.165	0.166	0.158	0.158	0.155	0.157	0.161
EM3	0.135	0.135	0.142	0.135	0.134	0.135	0.123	0.118	0.121	0.130	0.130	0.120	0.129	0.130
EM4	0.071	0.075	0.069	0.075	0.075	0.075	0.082	0.069	0.067	0.076	0.076	0.075	0.076	0.068
EM5	0.132	0.128	0.129	0.128	0.128	0.133	0.139	0.144	0.145	0.139	0.139	0.141	0.138	0.141
EM6	0.126	0.122	0.114	0.122	0.123	0.120	0.129	0.140	0.134	0.130	0.130	0.137	0.129	0.130
EM7	0.156	0.155	0.153	0.155	0.155	0.156	0.157	0.163	0.164	0.157	0.157	0.162	0.156	0.160
EM8	0.156	0.158	0.163	0.159	0.158	0.154	0.144	0.135	0.137	0.145	0.145	0.138	0.144	0.146
C1	0.131	0.137	0.128	0.141	0.125	0.143	0.126	0.130	0.127	0.142	0.126	0.139	0.142	0.132
C2	0.159	0.144	0.135	0.149	0.160	0.150	0.153	0.137	0.134	0.150	0.153	0.146	0.150	0.139
C3	0.267	0.266	0.273	0.258	0.257	0.259	0.263	0.262	0.267	0.258	0.262	0.253	0.258	0.265
C4	0.285	0.311	0.331	0.305	0.299	0.299	0.306	0.335	0.338	0.301	0.307	0.317	0.301	0.326
C5	0.158	0.143	0.134	0.147	0.159	0.149	0.152	0.136	0.133	0.149	0.151	0.145	0.149	0.138
S1	0.141	0.145	0.157	0.151	0.144	0.144	0.172	0.180	0.174	0.170	0.173	0.168	0.170	0.180
S2	0.099	0.109	0.113	0.114	0.108	0.114	0.137	0.118	0.125	0.130	0.132	0.123	0.130	0.122
S3	0.219	0.231	0.237	0.225	0.215	0.218	0.265	0.299	0.298	0.252	0.255	0.258	0.251	0.262
S4	0.203	0.191	0.181	0.202	0.216	0.190	0.164	0.157	0.153	0.162	0.165	0.167	0.163	0.160
S5	0.200	0.188	0.178	0.164	0.183	0.186	0.152	0.132	0.139	0.159	0.161	0.164	0.159	0.157
S6	0.138	0.137	0.134	0.144	0.134	0.148	0.110	0.114	0.111	0.127	0.114	0.120	0.127	0.119
SH1	0.216	0.218	0.207	0.218	0.218	0.208	0.216	0.216	0.213	0.209	0.209	0.213	0.209	0.205
SH2	0.194	0.196	0.201	0.197	0.196	0.198	0.190	0.192	0.203	0.194	0.194	0.184	0.194	0.194
SH3	0.233	0.235	0.237	0.234	0.235	0.238	0.236	0.234	0.231	0.239	0.239	0.234	0.239	0.238
SH4	0.191	0.194	0.198	0.194	0.193	0.195	0.188	0.190	0.186	0.191	0.192	0.181	0.191	0.192
SH5	0.166	0.157	0.157	0.157	0.159	0.161	0.170	0.168	0.166	0.166	0.166	0.188	0.166	0.171

	EM1	EM2	EM3	EM4	EM5	EM6	EM7	EM8	C1	C2	C3	C4	C5
SC1	0.149	0.165	0.160	0.151	0.168	0.167	0.160	0.151	0.152	0.159	0.155	0.148	0.154
SC2	0.213	0.194	0.212	0.216	0.198	0.196	0.191	0.208	0.210	0.204	0.186	0.192	0.214
SC3	0.139	0.141	0.128	0.141	0.134	0.137	0.150	0.141	0.142	0.150	0.145	0.139	0.145
SC4	0.215	0.197	0.214	0.219	0.201	0.199	0.194	0.211	0.213	0.207	0.203	0.209	0.216
SC5	0.183	0.179	0.174	0.171	0.182	0.181	0.174	0.165	0.180	0.172	0.184	0.190	0.167
SC6	0.102	0.124	0.112	0.103	0.117	0.120	0.131	0.124	0.104	0.108	0.127	0.122	0.105
E1	0.113	0.113	0.118	0.109	0.112	0.120	0.115	0.111	0.115	0.110	0.115	0.115	0.110
E2	0.155	0.149	0.162	0.154	0.148	0.144	0.139	0.157	0.157	0.157	0.139	0.139	0.157

(*continued on next page*)

Table 8 (*continued*)

	EM1	EM2	EM3	EM4	EM5	EM6	EM7	EM8	C1	C2	C3	C4	C5
E3	0.147	0.129	0.144	0.145	0.128	0.135	0.130	0.149	0.142	0.141	0.130	0.130	0.140
E4	0.087	0.105	0.099	0.094	0.104	0.103	0.106	0.103	0.088	0.095	0.106	0.106	0.095
E5	0.102	0.108	0.102	0.096	0.106	0.105	0.109	0.105	0.103	0.097	0.109	0.109	0.097
E6	0.182	0.175	0.167	0.183	0.185	0.176	0.178	0.160	0.178	0.179	0.178	0.178	0.179
E7	0.085	0.103	0.098	0.092	0.102	0.101	0.105	0.101	0.086	0.093	0.105	0.105	0.093
E8	0.129	0.117	0.111	0.127	0.116	0.115	0.119	0.114	0.131	0.129	0.119	0.119	0.129
EM1	0.040	0.089	0.073	0.063	0.077	0.074	0.086	0.077	0.064	0.068	0.076	0.079	0.069
EM2	0.162	0.103	0.172	0.165	0.173	0.174	0.164	0.175	0.158	0.169	0.163	0.152	0.159
EM3	0.134	0.127	0.074	0.135	0.128	0.139	0.144	0.120	0.130	0.128	0.127	0.133	0.130
EM4	0.080	0.093	0.076	0.045	0.080	0.077	0.090	0.081	0.077	0.071	0.079	0.083	0.072
EM5	0.142	0.132	0.149	0.144	0.080	0.129	0.128	0.151	0.139	0.138	0.131	0.128	0.139
EM6	0.133	0.126	0.137	0.134	0.136	0.077	0.122	0.146	0.130	0.127	0.126	0.123	0.129
EM7	0.160	0.179	0.171	0.163	0.171	0.173	0.100	0.164	0.157	0.156	0.153	0.150	0.158
EM8	0.148	0.149	0.148	0.150	0.155	0.157	0.165	0.086	0.145	0.144	0.145	0.152	0.145
C1	0.140	0.144	0.135	0.125	0.137	0.133	0.146	0.143	0.086	0.142	0.158	0.165	0.136
C2	0.148	0.152	0.143	0.151	0.145	0.142	0.154	0.151	0.159	0.096	0.167	0.174	0.154
C3	0.261	0.229	0.259	0.266	0.249	0.256	0.233	0.245	0.271	0.272	0.167	0.282	0.280
C4	0.305	0.326	0.321	0.310	0.326	0.329	0.315	0.311	0.327	0.332	0.343	0.208	0.338
C5	0.146	0.150	0.141	0.149	0.143	0.140	0.152	0.150	0.157	0.159	0.165	0.172	0.092
S1	0.166	0.158	0.165	0.171	0.159	0.160	0.168	0.173	0.172	0.168	0.165	0.170	0.178
S2	0.135	0.138	0.135	0.139	0.140	0.141	0.135	0.130	0.132	0.157	0.133	0.136	0.137
S3	0.253	0.257	0.266	0.259	0.275	0.267	0.264	0.254	0.255	0.254	0.273	0.254	0.262
S4	0.159	0.158	0.165	0.164	0.147	0.149	0.153	0.173	0.158	0.151	0.151	0.156	0.162
S5	0.163	0.155	0.150	0.154	0.156	0.157	0.150	0.145	0.162	0.156	0.149	0.152	0.152
S6	0.124	0.134	0.120	0.114	0.124	0.127	0.130	0.125	0.122	0.113	0.129	0.132	0.110
SH1	0.217	0.208	0.227	0.221	0.213	0.203	0.212	0.231	0.216	0.218	0.232	0.215	0.220
SH2	0.183	0.159	0.168	0.170	0.170	0.185	0.169	0.161	0.181	0.179	0.165	0.195	0.167
SH3	0.240	0.253	0.243	0.244	0.253	0.252	0.253	0.246	0.240	0.243	0.247	0.230	0.244
SH4	0.173	0.157	0.153	0.176	0.167	0.172	0.167	0.158	0.170	0.167	0.163	0.193	0.173
SH5	0.187	0.223	0.210	0.190	0.198	0.188	0.199	0.203	0.192	0.192	0.194	0.167	0.196

	S1	S2	S3	S4	S5	S6	SH1	SH2	SH3	SH4	SH5
SC1	0.168	0.149	0.155	0.163	0.157	0.147	0.168	0.148	0.170	0.157	0.168
SC2	0.198	0.219	0.185	0.202	0.214	0.215	0.196	0.214	0.197	0.207	0.196
SC3	0.135	0.140	0.146	0.134	0.129	0.138	0.137	0.139	0.134	0.148	0.137
SC4	0.201	0.222	0.203	0.205	0.216	0.218	0.199	0.217	0.200	0.210	0.199
SC5	0.182	0.171	0.184	0.187	0.180	0.184	0.181	0.180	0.182	0.169	0.181
SC6	0.117	0.099	0.128	0.107	0.104	0.098	0.120	0.103	0.117	0.109	0.120
E1	0.118	0.101	0.116	0.113	0.104	0.114	0.123	0.122	0.124	0.123	0.123
E2	0.152	0.159	0.140	0.156	0.165	0.166	0.150	0.152	0.153	0.153	0.150
E3	0.133	0.141	0.132	0.138	0.147	0.150	0.128	0.129	0.127	0.128	0.128
E4	0.099	0.093	0.108	0.096	0.096	0.085	0.101	0.099	0.099	0.099	0.101
E5	0.102	0.095	0.111	0.098	0.098	0.102	0.104	0.102	0.102	0.102	0.104
E6	0.187	0.190	0.167	0.189	0.179	0.180	0.179	0.184	0.185	0.184	0.179
E7	0.098	0.091	0.106	0.094	0.094	0.084	0.099	0.097	0.097	0.097	0.099
E8	0.111	0.129	0.120	0.117	0.117	0.118	0.115	0.115	0.114	0.114	0.115
EM1	0.069	0.065	0.086	0.065	0.064	0.060	0.083	0.063	0.082	0.068	0.083
EM2	0.169	0.163	0.152	0.165	0.163	0.160	0.153	0.161	0.154	0.174	0.153
EM3	0.122	0.127	0.132	0.122	0.127	0.132	0.134	0.125	0.136	0.128	0.134
EM4	0.072	0.067	0.089	0.068	0.067	0.073	0.087	0.079	0.085	0.070	0.087
EM5	0.140	0.136	0.126	0.145	0.137	0.141	0.130	0.141	0.129	0.138	0.130
EM6	0.129	0.132	0.121	0.134	0.132	0.131	0.117	0.130	0.114	0.127	0.117
EM7	0.161	0.161	0.150	0.164	0.162	0.158	0.152	0.160	0.153	0.158	0.152
EM8	0.139	0.148	0.143	0.138	0.149	0.146	0.145	0.141	0.146	0.137	0.145
C1	0.132	0.129	0.148	0.134	0.137	0.127	0.147	0.123	0.144	0.132	0.147
C2	0.140	0.157	0.157	0.142	0.145	0.153	0.155	0.153	0.152	0.166	0.155
C3	0.252	0.267	0.219	0.258	0.263	0.262	0.243	0.258	0.245	0.252	0.243
C4	0.338	0.312	0.321	0.325	0.310	0.307	0.303	0.314	0.310	0.313	0.303
C5	0.138	0.135	0.155	0.141	0.144	0.152	0.153	0.152	0.150	0.138	0.153
S1	0.097	0.183	0.176	0.162	0.185	0.177	0.157	0.165	0.155	0.154	0.157
S2	0.135	0.078	0.155	0.132	0.125	0.134	0.150	0.139	0.151	0.170	0.150
S3	0.310	0.282	0.171	0.310	0.295	0.272	0.235	0.253	0.238	0.248	0.235
S4	0.176	0.175	0.176	0.100	0.165	0.161	0.157	0.165	0.156	0.154	0.157
S5	0.151	0.163	0.173	0.158	0.099	0.165	0.167	0.153	0.168	0.163	0.167
S6	0.131	0.118	0.150	0.138	0.131	0.091	0.134	0.126	0.133	0.112	0.134
SH1	0.215	0.229	0.210	0.215	0.228	0.223	0.128	0.241	0.219	0.230	0.207
SH2	0.184	0.158	0.164	0.184	0.169	0.163	0.208	0.104	0.234	0.182	0.214
SH3	0.243	0.244	0.253	0.241	0.244	0.246	0.260	0.258	0.156	0.273	0.268
SH4	0.181	0.173	0.162	0.182	0.166	0.177	0.191	0.171	0.192	0.100	0.197
SH5	0.176	0.197	0.210	0.178	0.193	0.191	0.212	0.226	0.200	0.214	0.113

Table 9
The total influences matrix "T_D" for dimensions.

Dimensions	D1	D2	D3	D4	D5	D6
D1	0.032552	0.030625	0.029949	0.036782	0.031709	0.029203
D2	0.041251	0.034107	0.049327	0.043706	0.044693	0.036138
D3	0.036732	0.031381	0.040268	0.038516	0.038373	0.042715
D4	0.040992	0.03484	0.046729	0.039498	0.042721	0.046384
D5	0.039387	0.032655	0.045548	0.041615	0.038882	0.045674
D6	0.033819	0.022474	0.036991	0.034731	0.033865	0.03318

Table 10
New matrix obtained by dimensions "T_D^{α}".

Dimensions	D1	D2	D3	D4	D5	D6
D1	0.170592	0.165519	0.161117	0.163207	0.161579	0.173377
D2	0.160489	0.136853	0.137643	0.138713	0.133965	0.115215
D3	0.156947	0.197923	0.176624	0.186049	0.186857	0.18964
D4	0.192757	0.175371	0.168941	0.157262	0.170719	0.178054
D5	0.166174	0.179331	0.168315	0.170093	0.159508	0.173614
D6	0.153041	0.145003	0.187359	0.184677	0.187372	0.1701

customers, and community. In many studies (see Torres et al., 2012; Orlitzky et al., 2003; Sen et al., 2006; Tang and Tang, 2012; McDonald and Young, 2012; Aschehoug et al., 2012; Dong et al., 2014), these four stakeholders are considered key entities for CSR implementation. For example, Ditlev-Simonsen and Wenstøp (2013) made a study on the impact of various stakeholders on CSR motivation, and they identified these four stakeholders as essential to the implementation of CSR. It is helpful to note that internal stakeholders (shareholders) and external stakeholders (government, customers, and community) may hold different views in the decision making process. Because this study examines an Indian business, Mishra and Suar (2010) state that CSR practices are more effective with a focus on primary stakeholders rather than on any other group. Along with these considerations, the case study methodology is used to achieve the aim of the research, because case studies are best suited for understanding the original values and for providing in-depth insights of the case firm. According to Rowley (2002), case studies are particularly helpful when unclear phenomena exist, and because CSR includes confusing terminology, this study will utilize the case study as the research methodology. A model framework is proposed along with hybrid MCDM as a solution methodology as shown in Fig. 1. The research framework is divided into three categories: conceptual development, data analysis, and empirical approach. The first division defines the concepts of CSR and its relationship with stakeholder theory in the field of supply chain management. The research scope emphasizes the supply chain through a careful review of existing literature published in reputable English speaking journals. Data analysis, the second division, is completed through hybrid MCDM tools. The last division presents the empirical approach, built primarily on the responses received from technical experts (field and industrial experts) and from case managers.

4. Research methodology

This study utilizes a four-step solution methodology to solve the focal problem. The first methodology used is Fuzzy Delphi, which assists in determining which criteria are essential from those received through experts' opinions and from the literature review. DEMATEL is the second methodology; it is used to analyze interrelationships between the scrutinized criteria. The third methodology is ANP, which estimates the weights of evaluated criteria. PROMETHEE is used as the fourth methodology, and it aids in the selection of the best alternative based on the evaluated criteria. Of the four steps, the Fuzzy Delphi method serves as a pilot study in this research, so detailed descriptions of this method are limited but results are discussed in forthcoming sections.

4.1. DEMATEL – ANP (DANP)

Analytical network process (ANP) is a modified version of the analytical hierarchical process (AHP) first proposed by Saaty (1996). Many studies successfully applied ANP in their work (Agarwal and Shankar, 2002; Chung et al., 2005; Coulter and Sarkis, 2005; Kahraman et al., 2006; Karsak et al., 2003; Lee and Kim, 2001; Niemira and Saaty, 2004; Partovi, 2001; Partovi and Corredoira, 2002; Partovi, 2006; Shang et al., 2004; Tesfamariam and Lindberg, 2005; Yurdakul, 2004). This approach has continued to be used in more recent studies as well (Van Horenbeek and Pintelon, 2014; Pang and Bai, 2013; El-Abbasy et al., 2014). The ability to consider interdependencies among criteria is the main advantage of ANP over other MCDM tools. Other MCDM tools, such as the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) or AHP, do not deal with the interdependencies between elements. Because all real life problems are interlinked, it is important to utilize a methodology that addresses interdependencies (Wu, 2008). ANP does consider interdependencies, but it represents those interlinks in a reciprocal manner. Thus, to overcome ANP's shortcomings, the decision making trial and evaluation laboratory (DEMATEL) method is combined with ANP. DEMATEL is a MCDM tool first proposed by Fontela and Gabus (1976) and it is widely used in many applications. In DEMATEL, the levels of interdependence are not represented as reciprocals, so interdependencies will be reflected in a manner very close to real systems as compared to ANP. Hence, this study utilizes DANP to evaluate essential CSR practices and their relationships.

4.2. PROMETHEE

The Preference Ranking Organization METHod (PROMETHEE) is a partial aggregation or outranking method first developed by Brans (1982). Since then, its use has been extended by various researchers (Brans and Vincke, 1985; Brans and Mareschal, 1992; Brans and Mareschal, 1995; Kabir et al., 2013; Kabir and Sumi, 2014) with minor distinctions between the versions. Currently, the PROMETHEE methods offer six versions (I, II, III, IV, V, and VI), but PROMETHEE I and II still receive the most attention from researchers (Kabir and Sumi, 2014). PROMETHEE provides various potential benefits such as neglecting the scaling effect, determining the numbers of incomparability, acting as a sensitivity tool, and evaluating alternatives by figuring the amplitudes of deviations that exist within factors (Brans and Mareschal, 2005; Tavana et al., 2013). Many researchers (Kabir and Sumi, 2014; Herva and Roca, 2013; Kalogeras et al., 2005) have validated that the PROMETHEE method is a most efficient outranking method. Because of these benefits, this study adopts PROMETHEE to find alternatives in the supplier

Table 11
Weighted supermatrix "W^{α}".

	SC1	SC2	SC3	SC4	SC5	SC6	E1	E2	E3	E4	E5	E6	E7	E8
SC1	0.014	0.031	0.029	0.029	0.024	0.028	0.025	0.026	0.027	0.024	0.024	0.026	0.026	0.025
SC2	0.037	0.021	0.038	0.037	0.040	0.037	0.034	0.033	0.033	0.036	0.036	0.035	0.035	0.035
SC3	0.030	0.026	0.014	0.027	0.027	0.028	0.024	0.023	0.022	0.023	0.023	0.022	0.023	0.022
SC4	0.039	0.036	0.039	0.022	0.043	0.037	0.035	0.034	0.034	0.036	0.036	0.035	0.035	0.035
SC5	0.033	0.033	0.032	0.031	0.017	0.031	0.032	0.031	0.031	0.030	0.030	0.028	0.030	0.029
SC6	0.017	0.023	0.019	0.024	0.020	0.010	0.017	0.020	0.019	0.016	0.016	0.019	0.017	0.019
E1	0.016	0.017	0.016	0.018	0.017	0.018	0.009	0.016	0.017	0.016	0.016	0.016	0.015	0.015
E2	0.026	0.025	0.026	0.026	0.024	0.025	0.022	0.013	0.022	0.023	0.024	0.024	0.022	0.023
E3	0.025	0.024	0.023	0.020	0.023	0.023	0.020	0.022	0.012	0.021	0.021	0.021	0.020	0.020
E4	0.015	0.016	0.015	0.017	0.016	0.017	0.014	0.014	0.014	0.008	0.012	0.015	0.014	0.014
E5	0.016	0.017	0.016	0.017	0.016	0.017	0.014	0.015	0.015	0.016	0.008	0.015	0.015	0.015
E6	0.028	0.027	0.031	0.028	0.030	0.027	0.026	0.026	0.027	0.025	0.026	0.014	0.026	0.027
E7	0.013	0.016	0.014	0.016	0.015	0.016	0.014	0.014	0.014	0.012	0.013	0.014	0.007	0.013
E8	0.021	0.018	0.020	0.019	0.021	0.018	0.018	0.018	0.017	0.016	0.017	0.016	0.017	0.009
EM1	0.010	0.011	0.010	0.011	0.011	0.011	0.013	0.013	0.013	0.013	0.013	0.014	0.014	0.013
EM2	0.025	0.025	0.026	0.025	0.025	0.025	0.031	0.033	0.033	0.031	0.031	0.031	0.031	0.032
EM3	0.021	0.021	0.022	0.021	0.021	0.021	0.024	0.023	0.024	0.026	0.026	0.024	0.026	0.026
EM4	0.011	0.012	0.011	0.012	0.012	0.012	0.016	0.014	0.013	0.015	0.015	0.015	0.015	0.013
EM5	0.021	0.020	0.020	0.020	0.020	0.021	0.027	0.028	0.029	0.028	0.028	0.028	0.027	0.028
EM6	0.020	0.019	0.018	0.019	0.019	0.019	0.025	0.028	0.027	0.026	0.026	0.027	0.026	0.026
EM7	0.025	0.024	0.024	0.024	0.024	0.024	0.031	0.032	0.033	0.031	0.031	0.032	0.031	0.032
EM8	0.024	0.025	0.026	0.025	0.025	0.024	0.029	0.027	0.027	0.029	0.029	0.027	0.028	0.029
C1	0.025	0.026	0.025	0.027	0.024	0.028	0.022	0.023	0.022	0.025	0.022	0.024	0.025	0.023
C2	0.031	0.028	0.026	0.029	0.031	0.029	0.027	0.024	0.024	0.026	0.027	0.026	0.026	0.024
C3	0.051	0.051	0.053	0.050	0.050	0.050	0.046	0.046	0.047	0.045	0.046	0.044	0.045	0.047
C4	0.055	0.060	0.064	0.059	0.058	0.058	0.054	0.059	0.059	0.053	0.054	0.056	0.053	0.057
C5	0.030	0.027	0.026	0.028	0.031	0.029	0.027	0.024	0.023	0.026	0.027	0.025	0.026	0.024
S1	0.024	0.024	0.026	0.025	0.024	0.024	0.031	0.032	0.031	0.031	0.031	0.030	0.031	0.032
S2	0.016	0.018	0.019	0.019	0.018	0.019	0.025	0.021	0.022	0.023	0.024	0.022	0.023	0.022
S3	0.036	0.038	0.039	0.037	0.036	0.036	0.048	0.054	0.053	0.045	0.046	0.046	0.045	0.047
S4	0.034	0.032	0.030	0.033	0.036	0.032	0.029	0.028	0.027	0.029	0.030	0.030	0.029	0.029
S5	0.033	0.031	0.030	0.027	0.030	0.031	0.027	0.024	0.025	0.029	0.029	0.029	0.029	0.028
S6	0.023	0.023	0.022	0.024	0.022	0.025	0.020	0.020	0.020	0.023	0.020	0.022	0.023	0.021
SH1	0.033	0.033	0.032	0.033	0.033	0.032	0.031	0.031	0.031	0.030	0.030	0.031	0.030	0.030
SH2	0.030	0.030	0.031	0.030	0.030	0.030	0.028	0.028	0.029	0.028	0.028	0.027	0.028	0.028
SH3	0.036	0.036	0.036	0.036	0.036	0.036	0.034	0.034	0.034	0.035	0.035	0.034	0.035	0.034
SH4	0.029	0.030	0.030	0.030	0.030	0.030	0.027	0.028	0.027	0.028	0.028	0.026	0.028	0.028
SH5	0.025	0.024	0.024	0.024	0.024	0.025	0.025	0.024	0.024	0.024	0.024	0.027	0.024	0.025

	EM1	EM2	EM3	EM4	EM5	EM6	EM7	EM8	C1	C2	C3	C4	C5
SC1	0.024	0.027	0.026	0.024	0.027	0.027	0.026	0.024	0.025	0.026	0.025	0.024	0.025
SC2	0.034	0.031	0.034	0.035	0.032	0.032	0.031	0.034	0.034	0.033	0.030	0.031	0.035
SC3	0.022	0.023	0.021	0.023	0.022	0.022	0.024	0.023	0.023	0.024	0.024	0.023	0.024
SC4	0.035	0.032	0.035	0.035	0.032	0.032	0.031	0.034	0.035	0.034	0.033	0.034	0.035
SC5	0.029	0.029	0.028	0.028	0.029	0.029	0.028	0.027	0.029	0.028	0.030	0.031	0.027
SC6	0.016	0.020	0.018	0.017	0.019	0.019	0.021	0.020	0.017	0.018	0.021	0.020	0.017
E1	0.016	0.016	0.016	0.015	0.015	0.017	0.016	0.015	0.016	0.015	0.016	0.016	0.015
E2	0.021	0.021	0.022	0.021	0.020	0.020	0.019	0.022	0.022	0.022	0.019	0.019	0.022
E3	0.020	0.018	0.020	0.020	0.018	0.019	0.018	0.020	0.020	0.020	0.018	0.018	0.019
E4	0.012	0.014	0.014	0.013	0.014	0.014	0.015	0.014	0.012	0.013	0.015	0.015	0.013
E5	0.014	0.015	0.014	0.013	0.015	0.015	0.015	0.014	0.014	0.013	0.015	0.015	0.013
E6	0.025	0.024	0.023	0.025	0.025	0.024	0.024	0.022	0.025	0.025	0.025	0.025	0.025
E7	0.012	0.014	0.013	0.013	0.014	0.014	0.014	0.014	0.012	0.013	0.015	0.015	0.013
E8	0.018	0.016	0.015	0.017	0.016	0.016	0.016	0.016	0.018	0.018	0.016	0.016	0.018
EM1	0.007	0.016	0.013	0.011	0.014	0.013	0.015	0.014	0.012	0.013	0.014	0.015	0.013
EM2	0.029	0.018	0.030	0.029	0.031	0.031	0.029	0.031	0.029	0.031	0.030	0.028	0.030
EM3	0.024	0.023	0.013	0.024	0.023	0.025	0.025	0.021	0.024	0.024	0.024	0.025	0.024
EM4	0.014	0.016	0.013	0.008	0.014	0.014	0.016	0.014	0.014	0.013	0.015	0.015	0.013
EM5	0.025	0.023	0.026	0.025	0.014	0.023	0.023	0.027	0.026	0.026	0.024	0.024	0.026
EM6	0.024	0.022	0.024	0.024	0.024	0.014	0.022	0.026	0.024	0.024	0.023	0.023	0.024
EM7	0.028	0.032	0.030	0.029	0.030	0.030	0.018	0.029	0.029	0.029	0.028	0.028	0.029
EM8	0.026	0.026	0.026	0.027	0.027	0.028	0.029	0.015	0.027	0.027	0.027	0.028	0.027
C1	0.024	0.024	0.023	0.021	0.023	0.023	0.025	0.024	0.014	0.022	0.025	0.026	0.021
C2	0.025	0.026	0.024	0.025	0.025	0.024	0.026	0.026	0.025	0.015	0.026	0.027	0.024
C3	0.044	0.039	0.044	0.045	0.042	0.043	0.039	0.041	0.043	0.043	0.026	0.044	0.044
C4	0.052	0.055	0.054	0.052	0.055	0.056	0.053	0.053	0.051	0.052	0.054	0.033	0.053
C5	0.025	0.025	0.024	0.025	0.024	0.024	0.026	0.025	0.025	0.025	0.026	0.027	0.014
S1	0.028	0.027	0.028	0.029	0.027	0.027	0.028	0.029	0.029	0.029	0.028	0.029	0.030
S2	0.023	0.023	0.023	0.023	0.024	0.024	0.023	0.022	0.023	0.027	0.023	0.023	0.023
S3	0.043	0.043	0.045	0.044	0.046	0.045	0.044	0.043	0.043	0.043	0.046	0.043	0.045
S4	0.027	0.027	0.028	0.028	0.025	0.025	0.026	0.029	0.027	0.026	0.026	0.026	0.028
S5	0.027	0.026	0.025	0.026	0.026	0.026	0.025	0.024	0.027	0.027	0.025	0.026	0.026
S6	0.021	0.023	0.020	0.019	0.021	0.021	0.022	0.021	0.021	0.019	0.022	0.022	0.019
SH1	0.041	0.039	0.042	0.041	0.040	0.038	0.040	0.043	0.040	0.040	0.043	0.040	0.041

(*continued on next page*)

Table 11 (*continued*)

	EM1	EM2	EM3	EM4	EM5	EM6	EM7	EM8	C1	C2	C3	C4	C5
SH2	0.034	0.030	0.031	0.032	0.032	0.035	0.032	0.030	0.033	0.033	0.030	0.036	0.031
SH3	0.045	0.047	0.045	0.046	0.047	0.047	0.047	0.046	0.044	0.045	0.046	0.043	0.045
SH4	0.032	0.029	0.029	0.033	0.031	0.032	0.031	0.030	0.031	0.031	0.030	0.036	0.032
SH5	0.035	0.042	0.039	0.036	0.037	0.035	0.037	0.038	0.036	0.036	0.036	0.031	0.036

	S1	S2	S3	S4	S5	S6	SH1	SH2	SH3	SH4	SH5
SC1	0.027	0.024	0.025	0.026	0.025	0.024	0.029	0.026	0.029	0.027	0.029
SC2	0.032	0.035	0.030	0.033	0.035	0.035	0.034	0.037	0.034	0.036	0.034
SC3	0.022	0.023	0.024	0.022	0.021	0.022	0.024	0.024	0.023	0.026	0.024
SC4	0.032	0.036	0.033	0.033	0.035	0.035	0.034	0.038	0.035	0.036	0.034
SC5	0.029	0.028	0.030	0.030	0.029	0.030	0.031	0.031	0.032	0.029	0.031
SC6	0.019	0.016	0.021	0.017	0.017	0.016	0.021	0.018	0.020	0.019	0.021
E1	0.016	0.014	0.016	0.015	0.014	0.015	0.014	0.014	0.014	0.014	0.014
E2	0.020	0.021	0.019	0.021	0.022	0.022	0.017	0.018	0.018	0.018	0.017
E3	0.018	0.019	0.018	0.018	0.020	0.020	0.015	0.015	0.015	0.015	0.015
E4	0.013	0.012	0.014	0.013	0.013	0.011	0.012	0.011	0.011	0.011	0.012
E5	0.014	0.013	0.015	0.013	0.013	0.014	0.012	0.012	0.012	0.012	0.012
E6	0.025	0.025	0.022	0.025	0.024	0.024	0.021	0.021	0.021	0.021	0.021
E7	0.013	0.012	0.014	0.013	0.013	0.011	0.011	0.011	0.011	0.011	0.011
E8	0.015	0.017	0.016	0.016	0.016	0.016	0.013	0.013	0.013	0.013	0.013
EM1	0.013	0.012	0.016	0.012	0.012	0.011	0.016	0.012	0.016	0.013	0.016
EM2	0.032	0.030	0.028	0.031	0.030	0.030	0.029	0.031	0.029	0.033	0.029
EM3	0.023	0.024	0.025	0.023	0.024	0.025	0.025	0.024	0.026	0.024	0.025
EM4	0.013	0.013	0.017	0.013	0.013	0.014	0.016	0.015	0.016	0.013	0.016
EM5	0.026	0.026	0.024	0.027	0.026	0.026	0.025	0.027	0.025	0.026	0.025
EM6	0.024	0.025	0.023	0.025	0.025	0.024	0.022	0.025	0.022	0.024	0.022
EM7	0.030	0.030	0.028	0.031	0.030	0.030	0.029	0.030	0.029	0.030	0.029
EM8	0.026	0.028	0.027	0.026	0.028	0.027	0.027	0.027	0.028	0.026	0.027
C1	0.022	0.022	0.025	0.023	0.023	0.022	0.026	0.022	0.026	0.023	0.026
C2	0.024	0.027	0.027	0.024	0.025	0.026	0.028	0.027	0.027	0.030	0.028
C3	0.043	0.046	0.037	0.044	0.045	0.045	0.043	0.046	0.044	0.045	0.043
C4	0.058	0.053	0.055	0.056	0.053	0.052	0.054	0.056	0.055	0.056	0.054
C5	0.024	0.023	0.026	0.024	0.025	0.026	0.027	0.027	0.027	0.025	0.027
S1	0.016	0.029	0.028	0.026	0.030	0.028	0.027	0.029	0.027	0.027	0.027
S2	0.022	0.012	0.025	0.021	0.020	0.021	0.026	0.024	0.026	0.029	0.026
S3	0.049	0.045	0.027	0.049	0.047	0.043	0.041	0.044	0.041	0.043	0.041
S4	0.028	0.028	0.028	0.016	0.026	0.026	0.027	0.029	0.027	0.027	0.027
S5	0.024	0.026	0.028	0.025	0.016	0.026	0.029	0.027	0.029	0.028	0.029
S6	0.021	0.019	0.024	0.022	0.021	0.014	0.023	0.022	0.023	0.019	0.023
SH1	0.040	0.043	0.039	0.040	0.043	0.042	0.022	0.041	0.037	0.039	0.035
SH2	0.034	0.030	0.031	0.035	0.032	0.031	0.035	0.018	0.040	0.031	0.036
SH3	0.046	0.046	0.047	0.045	0.046	0.046	0.044	0.044	0.026	0.046	0.046
SH4	0.034	0.032	0.030	0.034	0.031	0.033	0.033	0.029	0.033	0.017	0.034
SH5	0.033	0.037	0.039	0.033	0.036	0.036	0.036	0.038	0.034	0.036	0.019

Table 12
The sum of influences given and received on dimensions.

Dimensions	r_i	s_i	r_i+s_i	r_i-s_i
D1	0.19082	0.224733	0.415553	-0.03391
D2	0.249221	0.186081	0.435302	0.063141
D3	0.227985	0.248811	0.476797	-0.02083
D4	0.251163	0.234848	0.486011	0.016315
D5	0.243761	0.230244	0.474005	0.013517
D6	0.19506	0.233294	0.428354	-0.03823

selection problem.

5. Application of proposed framework: case illustration

To apply and validate the proposed framework, our research team approached a private firm located in southern India. This company designs and manufactures access control hardware such as electromagnetic locks, electric drop bolts and strike plates, door holders, and other access control systems. This firm has a worldwide customer base, works with suppliers from throughout India, and employs more than 600 staff members per shift. The firm was formed a decade ago, but they are still trying to implement CSR strategies in their operations; more recently, their motivation to engage in these activities has heightened due to various pressures. They are currently engaging in CSR activities in their firm's operations, but they understand that they might improve their supply chain with greater attention to CSR practices. That awareness motivated them to accept this research. They also wish to establish a good relationship among the various stakeholders, including customers, to assist them with their decision making. Thus, our research focus coincides well with their expectations to adopt CSR strategies in their supply chain, especially in supplier selection. For this research, four stakeholders were considered: shareholders, governments (auditing government officials), customers, and the local community; the reason for choosing these stakeholders was discussed in the previous section. The shareholder is the firm's owner, so shareholder motivation is a big part of the decision to implement CSR practices. Presently the firm has four main suppliers, but they wish to use this research as a means by which they may rate the suppliers based on their CSR practices. In order to satisfy their needs, this study provides a proposed model that is applied to this particular case firm. The model is divided into three phases: data collection and validation, data processing and analysis, and results and feedback. A detailed description of these three phases is given below.

Phase I. : Data collection and validation

The first phase of this study is data collection and validation. Initially, data is collected through the literature review, and it is comprised of the CSR practices. Leading journals such as Elsevier, Springer, Emerald, Taylor & Francis, were analysed using the key words "CSR," "CSR practices," "CSR in supplier selection," and so forth. Spiller (2000a,

Table 13
Limit the weighted supermatrix "$\lim_{g\to\infty}(W^{\alpha})^{g}$".

	SC1	SC2	SC3	SC4	SC5	SC6	E1	E2	E3	E4	E5	E6	E7	E8
SC1	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026
SC2	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034
SC3	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023
SC4	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034
SC5	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030
SC6	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
E1	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
E2	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021
E3	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
E4	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
E5	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
E6	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024
E7	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
E8	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
EM1	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
EM2	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029
EM3	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023
EM4	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
EM5	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024
EM6	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023
EM7	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029
EM8	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027
C1	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024
C2	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026
C3	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044
C4	0.054	0.054	0.054	0.054	0.054	0.054	0.054	0.054	0.054	0.054	0.054	0.054	0.054	0.054
C5	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026
S1	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027
S2	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022
S3	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043
S4	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028
S5	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027
S6	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022
SH1	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037
SH2	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031
SH3	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042
SH4	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030
SH5	0.032	0.032	0.032	0.032	0.032	0.032	0.032	0.032	0.032	0.032	0.032	0.032	0.032	0.032

	EM1	EM2	EM3	EM4	EM5	EM6	EM7	EM8	C1	C2	C3	C4	C5
SC1	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026
SC2	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034
SC3	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023
SC4	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034
SC5	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030
SC6	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
E1	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
E2	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021
E3	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
E4	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
E5	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
E6	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024
E7	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
E8	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
EM1	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
EM2	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029
EM3	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023
EM4	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
EM5	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024
EM6	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023
EM7	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029
EM8	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027
C1	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024
C2	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026
C3	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044
C4	0.054	0.054	0.054	0.054	0.054	0.054	0.054	0.054	0.054	0.054	0.054	0.054	0.054
C5	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026
S1	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027
S2	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022
S3	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043
S4	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028
S5	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027
S6	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022
SH1	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037

(*continued on next page*)

Table 13 (*continued*)

	EM1	EM2	EM3	EM4	EM5	EM6	EM7	EM8	C1	C2	C3	C4	C5
SH2	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031
SH3	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042
SH4	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030
SH5	0.032	0.032	0.032	0.032	0.032	0.032	0.032	0.032	0.032	0.032	0.032	0.032	0.032

	S1	S2	S3	S4	S5	S6	SH1	SH2	SH3	SH4	SH5
SC1	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026
SC2	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034
SC3	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023
SC4	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034
SC5	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030
SC6	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
E1	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
E2	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021
E3	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
E4	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
E5	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
E6	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024
E7	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
E8	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
EM1	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
EM2	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029
EM3	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023
EM4	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
EM5	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024
EM6	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023
EM7	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029
EM8	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027
C1	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024
C2	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026
C3	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044
C4	0.054	0.054	0.054	0.054	0.054	0.054	0.054	0.054	0.054	0.054	0.054
C5	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026
S1	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027
S2	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022
S3	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043
S4	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028
S5	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027
S6	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022
SH1	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037
SH2	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031
SH3	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042
SH4	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030
SH5	0.032	0.032	0.032	0.032	0.032	0.032	0.032	0.032	0.032	0.032	0.032

2000b) provided a particularly robust collection of CSR practices, so this study considers his identified practices and adds on some additional literature support. Once the data is collected, it is then validated through external auditing with the assistance of experienced professionals who check the reliability of the collected data. The collected and validated CSR practices are shown in Table 1.

Phase II. : Data processing and analysis

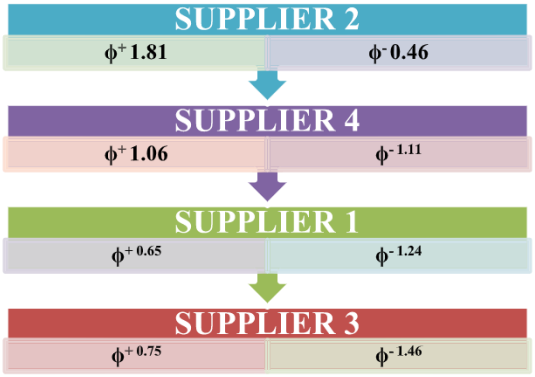

Fig. 10. PROMETHEE I – Partial ranking.

In Phase II, the problem was converted into a hierarchy model which is shown in Fig. 2. The hierarchy includes two applications, Fuzzy Delphi and DEMATEL, which are discussed below.

a) *Application of Fuzzy Delphi Method*

The initial step of the Fuzzy Delphi Method is to obtain opinions

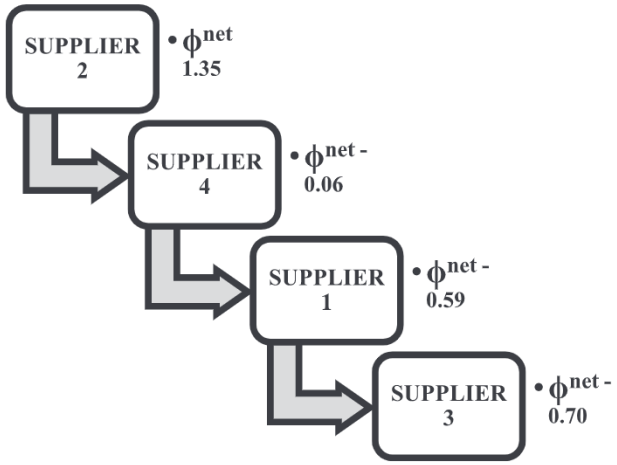

Fig. 11. PROMETHEE II Complete ranking.

Table 14
Leaving and entering flow.

	S1	S2	S3	S4
Leaving flow	0.65	1.81	0.75	1.06
Entering flow	1.24	0.46	1.46	1.11
Net flow	-0.59	1.35	-0.70	-0.06
PROMETHEE I outranked	X		X	X
PROMETHEE I (no preferences)		X		
PROMETHEE II rank	3	1	4	2

from the decision group on CSR practices through a linguistic representation. In this study, for scrutinizing the relevant CSR practices, the threshold value is set as (0.345, 0.661, 0.908) by the decision group and the final scrutinized CSR practices are shown in Table 2.

b) *Application of DANP*

DANP is applied through nine steps as detailed below.

Step 1: Initial relationship matrix "A"

The initial relationship matrix "A" is formed based on the responses from multi stakeholders (recall that the four stakeholders are shareholders, governments, customers, and the community). Four decision makers are identified to represent these stakeholders; they are selected based on their experiences, field interest, knowledge of the supply chain, and so forth. The government stakeholder is a senior auditing officer, and the three remaining decision makers are NGOs for the community. A client represents customers, and one major shareholder comprises the shareholder category. Based on the decision makers' responses, the initial relationship matrix is first prepared individually. Then, for mathematical ease, it is manipulated to reflect the average of all the initial relationship matrices; it is shown in Table 3.

Step 2: Normalized relationship matrix "X"

The initial relationship matrix obtained from Step 1 is normalized based on Equations (2) and (3) to form the normalized relationship matrix "X" as shown in Table 4.

Step 3: Total direct relationship matrix "TC"

The total direct relationship matrix "T_c" is obtained through Equation (4) by applying the normalized matrix in the equation shown in Table 5.

Step 4: Sum of rows and columns

Use Eqs (5) and (6) to calculate the sum of influences given and received on criteria though the sum of rows r_i and the sum of columns s_i, as shown in Table 6.

Step 5: Causal relationship diagram – Criteria

Consider the addition of sum of rows and columns (r_i+s_i) as the 'x' axis, and the subtraction of sum of row and columns (r_i-s_i) as the 'y' axis. Based on these axes the causal relationship over criteria was drawn as shown in Figs. 4–9.

Step 6: Unweighted supermatrix "W"

To obtain the unweighted supermatrix "W," first the total influence matrix of criteria (T_c) is normalized through Eqs. (9) and (10). To obtained the normalized total influence matrix of criteria (T_c^{α}) (shown in Table 7), then this T_c^{α} inversed through Eqs. (11) and (12) to form the unweighted supermatrix ($T_c^{\alpha'}$ or W) which is shown in Table 8.

Step 7: Weighted supermatrix "Wα"

The weighted supermatrix "W^{α}" (shown in Table 11) is found by multiplying the unweighted supermatrix with normalized total influence matrix of dimensions (T_D^{α}) (shown in Tables 9, 10 and 11 through Eqs. (13)–(15). However, like the criteria, the total relationship matrix for dimension "T_D" and the sum of influences given and received was calculated and tabulated in Table 12. With the assistance of the sum of influence, the causal relationship among dimensions is found and plotted in Fig. 3.

Step 8: Limit the weighted supermatrix

The weighted supermatrix is stabilized by limiting the matrix which is shown in Table 13 and this limiting of weighted supermatrix is denoted as $\lim_{g\to\infty}(W^{\alpha})^{g}$. *c) Application of PROMETHEE to evaluate the best supplier:*

Based on the results of DANP which were obtained from the previous step, the best supplier embodying CSR practices is evaluated through PROMETHEE. The results of PROMETHEE are shown in Figs. 10 and 11 and tabulated in Table 14.

Phase III. : Results and Feedback

In Phase III, the results obtained from the study will be discussed with reference to both the existing literatures and to the feedback from case industrial managers. A detailed description of Phase III is summarized in upcoming sections.

6. Results and discussions

This section summarizes the results of the study and also posts the discussion against the results which argues the validation of the study's results.

The criteria and dimensions of CSR practices are first analysed through DEMATEL to reveal the influence and interdependencies over one another. In this study, six dimensions and 38 criteria (scrutinized by fuzzy Delphi method were considered, and Fig. 3 shows the influence roadmap of dimensions. From this figure, it is clear that the most influential dimension is environment (D2); suppliers hold the next rank (D5), and the third is customers (D4). The other three dimensions fall into the effect group. This result is somewhat surprising because society appears in the effect group; most existing studies concentrate on community issues. Some recent literature has focussed on CSR from multiple perspectives; David et al. (2005), for instance, approached CSR practices with purchase intentions and they highlighted CSR practices from the supplier's perspective. Similarly, Öberseder et al. (2013) and Wang (2011) relate CSR practices to customer perceptions and explore CSR practices from customers' viewpoints. Albareda et al. (2007) discussed CSR practices and policies under the consideration of government. All these studies considered the single stakeholder perspective individually, but according to Kannan et al. (2014), the conflicted CSR strategy has different views and perspectives among its practitioners and researchers and may vary from one person to the next. This study combines the major four stakeholders' opinions with the average responses, and the environment dimension is credited as most influential. It is natural to presume that when different people and their views unite, unexpected outcomes may occur. Hence, this study provides an unexpected outcome. Due to the lack of literature in this approach, this result could not be validated with existing studies, so this study may be considered a pioneer work. Apart from D2, the influential priority is as follows: D2>D4>D5>D3>D1>D6.

After the DANP calculations, suppliers were evaluated with PROMETHEE, and the partial and full rankings of suppliers are shown in Table 14. Also, the partial ranking of PROMETHEE I and the full ranking of PROMETHEE II is shown in Figs. 10 and 11. From these tables and figures, it is evident that Supplier 2 is the best supplier based on their CSR practices because this supplier reflected a net flow of ϕ^{net} 1.35. The other

suppliers are ranked as follows: S2>S4>S1>S3.

Our research team shared the results with the purchasing managers of the case firm to get their feedback. First, they were shocked because prior to the study, they thought that CSR only addressed social welfare, but these results demonstrated impacts in more dimensions, including environment, employees, and customers. An experienced senior manager said that these results were highly informative. He also observed that if the firm pays attention to environmental issues, they should also attend to employee satisfaction through fair remuneration, and to customer satisfaction through ethical promotions and product values. In other words, the firm should be respectful to both ethical and societal concerns. Because society is composed of the environment, customers, and employees, results that consider all dimensions are highly acceptable. If a firm can satisfy the needs of these dimensions, then it will benefit from improved business performance which, in turn, will increase shareholder value.

One of the junior managers at the case industry revealed that most of the time, the company procures goods without considering any criteria except cost and quality. He also said that top level management pressured them to act urgently and to decrease time spent. He said he knew that India has a long history of CSR, although some firms still practice unethical activities under some unavoidable situations. According to Gupta (2014), Indian firms still face many issues and challenges with the task of implementing CSR. Hence, there is a real need to explore and to eliminate these hidden issues and challenges of CSR when practices are supported by case industrial managers. This study reveals the essential CSR practice and a means by which to select suppliers.

7. Managerial implications

As we have mentioned earlier, supplier selection is one of the toughest process in the supply chain; it requires a lot of efficient decision making skills and the decision concerns multiple criteria. Hence, this study attempts to provide a model framework to ease the process. While this study serves many beneficial insights, some of its most important implications are summarized here.

- Allows the purchasing managers to select the best and most efficient supplier based on CSR practices.
- Helps the firm to improve bonding between stakeholders by considering their varied opinions in the firm's decision making processes.
- Identifies efficient and most influential CSR practices. Hence, the firm can improve its own CSR strategies through employee training programmes, and managers can share successful results with top level management, which should increase the chance of CSR integration in the company's operations and management.
- Positions the firm as socially responsible in front of society, which will increase the firm's reputation and should result in an increase in their social license to operate.
- Establishes stakeholders' expectations, not only in supplier selection but also on the management of the entire firm.
- Acts as a pioneering work which can assist other emerging markets and developing contexts with changes that respect their diversity.

8. Conclusion

When CSR practices are successfully integrated in a company, many potential benefits occur, including competitive advantages, new market opportunities, a more positive company image, a privileged reputation, higher profit returns, and other good results (Garay and Font, 2012). CSR is important in many business operations, including supplier selection. Companies want to select their suppliers based on their socially responsible ratings. In order to assist in this effort, this study proposes a research framework model to evaluate the best supplier with multi-stakeholder perspectives based on CSR practices collected from various reliable sources. The hybrid MCDM methodologies used to solve this problem are Fuzzy Delphi, DANP, and PROMETHEE; furthermore, the model is validated with an actual case industry located in southern India. The study reveals that among six dimensions, environment issues command more weight from multi-stakeholders. Based on the criteria weights, Supplier 2 ranks above the other suppliers. Hence, this study recommends Supplier 2 as the best supplier for the case industry due to their intention to integrate CSR practices into their business operations. Despite this study's helpful managerial advice and its strengths, a few limitations exist, which are classified into methodological limitations and scientific/managerial limitations. PROMETHEE is the methodological limitation, because according to studies by Gervasio and da Silva (2012), Turcksin et al. (2011), and Kabir and Sumi (2014), PROMETHEE does not provide guidelines to estimate weights. Instead, it just assumes approximate criteria weight. The scientific/managerial limitation is that this study involves a single case industry only. A broader study may offer different results because what constitutes CSR is still a term being debated. Hence, the priorities of CSR may differ from region to region and application to application. Statistical evidence is needed to overcome regional generalizations. By considering these two limitations, future studies may extend research by examining more CSR practices with different research tools and by utilizing statistical tools such as structural equation modelling (SEM). This study provides a good contribution to the literature and sheds light on future enhancements in the field of CSR in supply chain management.

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