

DOES SOCIAL MEDIA MARKETING ENABLER MATTER? WHAT WE REALLY KNOW

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ABSTRACT

The fragmented nature of the Indian industry, coupled with its dynamic nature, demands innovative technologies to record better performance in social media marketing. In this respect, social media-based marketing tools and techniques post a viable means to attain requisite efficiency in performance and elevate productivity in terms of marketing effectiveness. The study aims to identify potential issues as enablers in the adoption of social media marketing by conducting a broad literature review and interacting with the industry and academic professionals. The exercise resulted in the selection of 19 important issues affecting the adoption of social media marketing by Indian organizations, which were later prioritized using the fuzzy decision-making trial and evaluation laboratory (DEMATEL) approach. The outcome of the research reveals that “Trust on the platform”, “Reliable”, “Public opinion”, “Customer Support”, and “User friendliness” are the top five causal issues that impact the adoption of social media marketing in the Indian industry. The research is a new attempt to identify and prioritize possible concerns in using social media platforms for marketing in the Indian context.

Keywords: DEMATEL approach, Indian Organizations, Social Media, Social Media Marketing Enablers.

INTRODUCTION

Social Media is operative in recognizing customers’ needs and wants by offering solutions to their problems competently by enabling businesses which has made it very vital for marketers in this catastrophic global business environment (Järvinen & Taiminen, 2016; Kaplan & Haenlein, 2010). Yet, the term “Social media” appears to have limited awareness among the business community despite its whizzing volume of business information that can be favorable for marketing purposes. Social media is an internet-based communication platform that enables virtual engagement between users. However, the definition of social media by Kaplan and Haenlein (2010) states that social media is a platform that allows the designing and interchange of user-created content using internet-based applications for engagement. In general, businesses are more likely to utilize traditional media that they believe will assist them in attaining improved business performance. Moreover, these days, social media has been ubiquitous in people’s lives and has become more pervasive in businesses and emerged as a critical tool (Chaker et al., 2022).

Furthermore, global consumers are gradually exploiting Web 2.0 technologies, such as social media platforms, to source information before buying and are progressively linking with each other over social media (Majid et al., 2019; Santos et al., 2022).

Also, the emergence of social media reflects people's curiosity in social interactions, which are now possible in the online virtual world, thanks to social networking sites (Habib et al., 2022; Lee & Hsieh, 2022). Social media-based communications between consumers and businesses have gained substantial consideration in the contemporary era of digital transformation, and with the occurrence of social media-based communications, consumers have several prospects to present their thoughts to businesses. Thus, this made it very imperative to explore the SMM enablers to support the growth of businesses in this disruptive business environment (Obeidat et al., 2017; Bozkurt et al., 2021). The internet has further evolved numerous forms of media and applications over time. It has also built new bridges for communication across the globe. Companies have latched to this widespread range of media users for various organizational events, and the exchange of information and interactions between businesses and consumers has been happening via social media networks (Cuomo et al., 2017).

However, social media's propagation has altered the marketer–customer experience, permitting consumers to connect immediately over real-time social interactions with businesses in the competitive business environment and the advent of Web 2.0 technologies such as social media platforms has transformed market dynamics across the globe (Alves et al. 2016; Chaker et al. 2022; Habib et al. 2022; Lee & Hsieh, 2022). With a change in the global environment, businesses are promoting innovative ecosystems by developing new information and communication technologies (ICTs), including social media (Palacios-Marqués et al., 2015). Still, “Social media” phenomenon is transforming itself into a gifted marketing tool for global businesses that may build and balance a healthy relationship with customers (Heller Baird & Parasnis, 2011). Furthermore, this phenomenon indicates that businesses have started incorporating social media as a key component of their online marketing plans. Chen and Lin (2019) explained social media marketing (SMM) as commercial marketing activities that employ social media to influence consumers' purchasing decisions favorably. However, prior SMM research persists disintegrated (Wu et al., 2020). Additionally, the prevalent usage of SMM throughout the previous era has been accountable for appealing to a substantial amount of scholarly work (Li et al., 2023).

Likewise, several businesses use social media as their marketing and communication tools subsequently. People are progressively using it to trade and share information about various issues, including their personal lives and reviews of commercial products (Chen & Lin, 2019; Sullivan & Koh, 2019; Effing & Spil, 2016). Hence, social media converted gradually an essential tool for businesses and marketers to deliberately design and control it to deliver better business performance and gain a competitive advantage. Moreover, this has brought a drastic change in the application of Social media as an effective tool for businesses that can predict customers' behavior through data available on social media platforms (Zhang et al., 2022a; Li et al., 2021). Hence, the challenge for most businesses is to integrate social media into their marketing plan to engage customers for long-term relations (Effing & Spil, 2016). Although several researchers have examined various social media phenomena in multiple contexts, cultures, geographies, and from varied points of view (Li et al., 2021; Jacobson et al., 2020; Aladwani & Dwivedi, 2018), exploring the enablers of SMM from academic and industry experts have few takers (Cenfetelli, 2004; Sullivan & Koh, 2019). It is important to examine both enablers and their prioritization in the social media setting for two reasons. Firstly, when

marketers use social media as a tool for marketing, they must understand the factors that draw users' attention to it (Nemati & Weber, 2022; Noguti, 2022).

Secondly, prioritization will further assist marketers in understanding the factors that need to be prioritized while planning the SMM strategy to boost business performance (Nemati & Weber, 2022; Noguti, 2022). Extant works of the literature reveal that social media has totally renovated the way businesses and marketers connect to the target market and deliver a convenient means to accumulate information related to diverse stakeholders of businesses (Albanna et al., 2022; Cepeda-Carrion et al., 2022). Though, social media as a concept has been accepted across diverse sectoral and geographical contexts, still, there is a need to address the existing research gaps by locating the key enablers of SMM (Albanna et al., 2022; Cepeda-Carrion et al., 2022; Nemati & Weber, 2022; Noguti, 2022). Hence, the current study is an attempt to uncover the key enablers and their causes and effects in the social media setting by addressing the answers to the stated research questions from a marketing perspective.

RQ1: What are the key enablers of Social Media Marketing (SMM)?

RQ2: Which enabler should be given more priority over others in the social media setting?

RQ3: How will prioritization of Social Media Marketing Enablers (SMME) assist global businesses in better designing and utilizing their business strategies in the social media setting?

RQ4: In what way does social media usage emerges as a pertinent enabler of innovative business practices for business sustainability?

The present study will identify enablers in the context of the social media ecosystem after reviewing the available works of literature. Once the enablers are identified, a questionnaire listing and validating the enablers from the industry and academic experts in the field of SMM will be generated. Through quantitative data analysis, a priority list will be generated stating the key enablers which will be the key contributions of the study. The article's remainder is structured as follows. Section 2 reviews key works of literature related to enablers of Social Media Marketing (SMM). The research methodology and design of the study are outlined in section 3. Results and Discussions are discussed in section 4 followed by implications of the study, limitations of the study, and future research directions of the study in section 5. Finally, the conclusion is presented in the last section of the article. All the related data and information of this study are presented in Appendix Table 1A & Appendix Table 1B; Appendix Figure 1.

LITERATURE REVIEW

Marketing Strategy

The marketing function is centered on creating and implementing marketing strategies. Research pertinent to understanding the activities involved in designing and implementing marketing strategy indicates that both practice and theory are essential for optimal business results and improved customer experience (Li et al., 2021). Marketing strategy is defined as

“Marketing strategy is an organization's integrated pattern of decisions that specify its crucial choices concerning products, markets, marketing activities, and marketing resources in the creation, communication and/or delivery of products that offer value to customers in exchange with the organization and thereby enables the organization to achieve specific objectives” (Varadarajan, 2010).

With time there are several sub-domains in the field of marketing strategy which are underdeveloped. The use of social media as a medium of marketing is one of the developing areas that need attention. Furthermore, Feng et al. (2019) find that a study on enablers of SMM is also one of the under-researched areas within the marketing function. Exploring the enablers will help the marketers answer questions relating to the marketing strategy content on social media and its implementation. It further will indicate the utilization of other resources, including financial and human. Along similar lines, the authors of the present study argue that identifying and prioritizing enablers for SMM is essential in designing and implementing an effective marketing strategy. Hence, addressing this gap, the present study explores the enablers of SMM in literature and validates the same with marketing field experts both in academia and practice.

Social Media Marketing (SMM)

Social media is viewed as a platform in the marketing world where people connect with one another and exchange knowledge and opinions (Kaplan & Haenlein, 2010). With the extensive use of social media, there have been three significant changes in the market relating to social connectedness, social interaction and influence, and improved decision-making with better access to customer data (Li et al., 2021). First, social media enables “social connectedness” or “*social ties*” (Muller & Peres, 2019) between businesses and customers and facilitates them to connect in ways that were not feasible in the past decade. Social networking platforms, including sites like Facebook, Twitter, and YouTube, have further strengthened social connectedness leading to better customer reach for businesses. Second, social media have changed how businesses and customers communicate and influence one another. Such social interactions are referred to as the “*word-of-mouth (WOM) effect*” or “*contagion effects*” by Nair et al. (2010). Recent research has demonstrated that people’s connection patterns and the depth of social connectedness can indicate the intensity of social interactions. In social media studies, researchers have long acknowledged the significance of social influence in impacting consumer decisions. Third, the availability of vast social media data has given businesses more opportunities to improve business decision-making and manage consumer interactions. Further, with the help of current information technology services, a large amount of social media data derived from diverse venues (e.g., social networks, blogs, forums) and in various formats (e.g., text, video, image) can now be retrieved and usefully used (Moe & Schweidel, 2017). Hence, the authors of the present study argue that by understanding customer requirements better through social media data, businesses can enhance the customer experience leading to better business results.

Dimensions of SMM

Literature has explored several definitions and dimensions of SMM (Cenfetelli, 2004; Chen & Lin, 2019; Bhimani et al., 2019). SMM encourages customer interactions that spread through online communities, brand and fan pages, and information about promotions created by businesses/organizations on social media networking sites (Muller & Peres, 2019). SMM is described by Jara et al. (2014) as a new-generation marketing tool that uses social networks to encourage greater consumer attention and participation. In this work, Debatin et al. (2009) provide an SMM solution that employs semantic and artificial intelligence to gather and manage user attitudes and opinions online. They suggest using artificial intelligence to manage

information about brands and products available on social media efficiently for both marketers and users. Venkatesh & Speier (2002) conducted a case study of brands from the premier league to examine the SMM performance metrics on Facebook. The study makes a number of different assumptions concluding that these sports brands should work hard to increase their fan base while their managers should guard against any fraudulent acts carried out in their names by conceited supporters on social media. Trainor (2013) highlights the benefits and drawbacks of using SMM. The author advises business owners and entrepreneurs to be fully informed by maintaining an active social media presence to reap the benefits of SMM. SMM supports conventional marketing tactics by providing timely information, supporting dialogue, and maintaining openness. Overall, the studies conducted in the field of SMM indicate that it has wide reach from technology to customer attitude to brand equity and loyalty. As explained above, the literature on SMM is vast. Hence, the authors of the present study attempt to synthesize relevant literature exploring the factors and enablers for SMM and present it in Table 1.

Table 1
SUMMARY OF LITERATURE PRESENTING FACTORS/ENABLERS OF SMM

Author (s)	Context of the study	Factors identified	Methodology used
Bhimani et al. (2019)	Linkage between social media marketing and innovation	Firm Innovativeness	Conceptual
Warner-Söderholm et al. (2018)	Linkage between social media data and trust	Trust in data, Assurance, Information relevance, customized control	Empirical-Quantitative
Singaraju et al. (2016)	Value co-creation through customer, firm, and social media	Value creation, Customer relationships, Appropriate for business	Conceptual
Trainor (2013)	Exploring CRM and social media technologies	Customer relationships, Value creation Advancement of technology	Conceptual
Alaimo and Kallinikos (2017)	Social media as data platforms	Information and data availability and sharing, Value creation, Public conversations, User assistance	Conceptual
Ebrahim (2020)	Linkage between social media marketing and trust relating to brand equity and loyalty	Loyalty, Trust, Reliable, customer relationship	Empirical-Quantitative
Drouin et al. (2015)	Linkage between social media for employment decisions	Legal knowledge, legal support, self-control	Empirical-Quantitative
Chen and Lin (2019)	Effect of social media marketing activities	Social identification, perceived value, and satisfaction	Empirical-Quantitative
Sullivan and Koh (2019)	Social media enablers and inhibitors	Technology usage, perceived usefulness, perceived enjoyment and perceived communication quality	Empirical-Quantitative
Debatin et al. (2009)	Linkage between Facebook and Online Privacy concerns	Risk of privacy invasion, free available data, legal control systems	Empirical-Quantitative
Venkatesh and Speier (2002)	Integrated model of Enablers in Individual Decision Making About Technology	Social influence, loyalty, intention to continue	Empirical-Quantitative
Razak and Latip (2016)	Social media marketing and Technology Acceptance Model	Usefulness, Ease of Use, Enjoyment	Empirical-Quantitative
Akar and Topçu (2011)	Factors Influencing Consumers' Attitudes Toward Social Media Marketing	Social media use, social media knowledge, customer relationship and support	Empirical-Quantitative
Mohammadian and Mohammadreza (2012)	Social media success factors	User-friendliness, ease of use, information content, information sharing	Empirical-Quantitative

There were studies that indicated both enablers and inhibitors of SMM. The linkage between technology and SMM was another common theme that emerged from most studies. This was followed by a focus on customer orientation and long-term association. Brand loyalty and trust were other factors that were common across some studies. Firm innovativeness was found to be a unique variable only in one study. Legal support and knowledge were also important parameters researched as a challenge or inhibitor in SMM. While some studies were conceptual, others were survey and opinion based. These studies were conducted in the U.S., Australia, China, Malaysia, Indonesia, and India, covering a wide range of geography, as stated in (Cui et al., 2019).

Identification of enablers of SMM

Drawing insights from SMM literature, the authors designed a questionnaire to examine the enablers of SMM and prioritize them in order of importance. Table 2 presents the enablers identified for the present study contributing to the existing body of knowledge of SMM. The authors identified 19 critical success factors as social media marketing enablers (SMME) for SMM, and with the help of expert interviews from industry and academia, SMME were prioritized. This further will facilitate marketers to plan their marketing strategies related to social media according to the priority of SMME for organizational benefits.

Code	CSF (Enabler)	Definition	Author (s)
SMME1	Simple and Easy to use	A straightforward approach to engage customers with minimum complex tasks.	Constantinides (2014); Razak and Latip (2016)
SMME2	Perceived Value	The evaluation of a product's overall usefulness based on an impression of what is gained and what is given.	Yu et al. (2013)
SMME3	Customer Support	All interactions that increase the customer experience and their relationship with the business.	Trainor (2012)
SMME4	Assurance	A pledge or an affirmative statement meant to inspire confidence	Yang et al. (2021)
SMME5	Speed of Response	The speed at which a device or measurement system reacts and gives the output.	Alaimo and Kallinikos (2017)
SMME6	Perceived Firm Innovativeness	Stakeholder perception that social media yields original, innovative, and effective ideas and solutions.	Bhimani et al. (2019)
SMME7	Loyalty Intentions	The determination to make another purchase after having a good experience.	Balakrishnan et al. (2014); Ebrahim (2020)
SMME8	User friendly	Easy to use and suits the requirement of the customer.	Constantinides (2014)
SMME9	Reliable	Dependable and true to what it has promised to deliver	Ma and Kirilenko (2021)
SMME10	Safe for Data Sharing	It enables stakeholders to safely communicate data within their ecosystem.	Sullivan and Koh (2019)

SMME11	Useful for Information	Information should serve the purpose for which it is obtained via social media platforms and tools.	Chung and Austria (2010)	
SMME12	Content creativity	Marketing that engages onsumer which novel ideas and content on social media platforms.	Ashley and Tuten (2015)	
SMME13	Consumer Involvement	Participation and interest of the consumer in any event or activity on social media.	Singaraju et al. (2016)	
SMME14	Control Mechanism	Mechanism used to maintain the constant or within predetermined limits of the activities on social media.	Debatin et al. (2009)	
SMME15	Public opinion	A collection of the individual opinions, attitudes, and beliefs regarding a given subject a portion of a community has expressed on social media.	Poluan et al. (2022)	
SMME16	Legal support	Support given to safeguard and advance interactions on social media and offer legal knowledge and counselling about rights and violations.	Drouin et al. (2015)	
SMME17	Appropriateness for business	The suitability or relevance of social media for a specific purpose or event of a business.	Vinerean (2017)	
SMME18	Customized Engagement	Giving customized and personalized solutions implies addressing each customer's unique needs.	Cabiddu et al. (2014)	
SMME19	Trust on the platform	Users' faith in people, technology, and processes to use a secure digital platform.	Warner-Søderholm et al. (2018)	

The next section on research methodology further elaborates on the research and questionnaire design, taking contributions.

RESEARCH METHODOLOGY

The section on research methodologies is divided into two parts. The first section provides concise information on the selected experts as well as data-gathering details. The second section goes over the many stages of the Grey DEMATEL method. The study's framework is displayed in Singh, (2024).

Development of Questionnaire and Data Gathering

The information for this work was acquired from Indian professionals from academia, business, and government. A questionnaire, was created to highlight several elements that aid in social media marketing. Opinions from experienced experts were collected on the influence of each component. Furthermore, This I am not understanding states experts' profiles who were asked to rate the component using linguistic scale's words (i.e., No/VL/L/H/VH) which has been stated in Cui et al (2019). A total of 28 specialists were asked to take part in data collecting. Out of 28, eleven experts responded, with three coming from the academic side, three from the government sector, and the other four from the industry. The persons involved in the inquiry have a combined experience of more than ten years.

Table 3 EXPERTS' PROFILE		
Expert Number	Domain	Experience
Experts 1 and 2	Academia	More than 15 years
Experts 3 and 4	Manufacturing	More than 10 years

Experts 5 and 6	IT and Pharma	More than 15 years
Expert 7,8, and 9	Academia	More than 10 years
Experts 10,11 and 12	Financial Sector Companies	More than 10 years

Table 4	
LINGUISTIC SCALE	
Linguistic terms	Grey numbers
No influence (No)	[0, 0]
Very low influence (VL)	[0, 0.25]
Low influence (L)	[0.25, 0.5]
High influence (H)	[0.5, 0.75]
Very high influence (VH)	[0.75, 1]

Grey DEMATEL Methodology

The DEMATEL method is a technique that uses cause-based diagramming to find cause-effect correlations between elements. This concept has been used effectively in numerous circumstances to expose the structure of complicated cause-and-effect interactions (Wu, 2008). While DEMATEL assists in the determination of factor interactions, an expert's opinion is that it is well suited to cope with uncertainty and ambiguity. Grey DEMATEL was utilized in the study to achieve the desired outcome since it aids in the resolution of this issue. Deng's (1982) grey numbers are used in the Grey DEMATEL approach. It facilitates the translation of the uncertainty reflected in the qualitative comments of the experts into numerical ranges (Fu et al., 2001). Inconsistency in experts' views during the group decision-making process is also captured by the Grey System theory. Furthermore, it offers for greater decision-making flexibility (Li et al., 2016).

The application of grey theory can be seen in various problems of different domains. Grey DEMATEL was used by Dwivedi et al. (2023) to rank the practices of circular economy in supply chains focussing on global disruption. Paul et al. (2021) used it to examine the difficulties in the supply chain recovery following COVID-19. Haleem et al. (2019) used it to evaluate if a traceability system has been adopted in the food supply chain (FSC). It was also employed by Mokterdir et al. (2018) to quantify the cause-and-effect relationship between the leather industry's SSC adoption hurdles. Su et al. (2016) improved the hierarchical grey DEMATEL approach and used it to manage SSCs. This approach was utilized by Xia et al. (2015) to evaluate internal constraints faced by Chinese remanufacturers in the auto-parts sector. The method's numerous uses show that it has become popular as a valuable tool for making decisions when a problem contains various components with intricate relationships. The steps are as follows in the grey DEMATEL:

Step 1: Prepare Linguistic Scale for Analysis

The linguistic scale for the Grey number is shown in Table 4 (Cui et al., 2019, Paul et al., 2021).

Step 2: Develop an Initial Matrix

Using the grey linguistic scale displayed in Table 3, all experts were asked to provide their ratings for the correlation between components in this step. There will be K initial matrices if there are K experts. Additionally, utilizing the scale values, the data acquired in the linguistic form is transformed into grey numeric form.

Let, $\otimes p_{ij}^k$ is the grey number, Then it is given as,

$$\otimes p_{ij}^k = (\underline{\otimes p_{ij}^k}, \overline{\otimes p_{ij}^k}) \tag{1}$$

where, n is the number of selected factors, and K is the number of experts following relationship $1 \leq k \leq K$; and $\underline{\otimes p_{ij}^k}, \overline{\otimes p_{ij}^k}$ represent the lower and upper limit for grey numbers respectively for K^{th} expert. The individual direct-influence grey matrix is shown in Table 4.

Linguistic terms	Grey numbers
No influence (No)	[0, 0]
Very low influence (VL)	[0, 0.25]
Low influence (L)	[0.25, 0.5]
High influence (H)	[0.5, 0.75]
Very high influence (VH)	[0.75, 1]

$$\tilde{Z}_k = [\otimes p_{ij}^k]_{n \times n} \tag{2}$$

Step 3: Average Direct Relation Matrix

Further, all the matrices were integrated using the method of aggregation as given by the grey theory using equation (3).

$$\otimes \tilde{p}_{ij} = \left(\frac{\sum_k \underline{\otimes p_{ij}^k}}{K}, \frac{\sum_k \overline{\otimes p_{ij}^k}}{K} \right) \tag{3}$$

The group direct-influence grey matrix is shown in Table 5.

Code	S	S	S	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM
	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	19
SMME1		VH	H	L	VH	VH	L	VH	H	L	L	L	L	L	L	L	H	L	VH	
SMME2	VH		H	H	VH	L	H	H	VH	L	L	VH	H	L	L	L	L	H	VH	
SMME3	H	VH		VH	VH	H	VH	L	H	L	L	L	VH	H	H	L	L	H	VH	
SMME4	L	H	H		L	L	L	L	H	L	L	L	VH	L	H	L	L	H	VH	
SMME5	V	H	H	H		H	H	H	H	H	H	H	H	L	H	L	H	H	VH	

	H																		
	V																		
SMME6	H	H	L	VH		H	H	H	H	H	H	H	H	L	H	L	H	H	VH
SMME7	L	L	L	VH	VH		VH	H	L	H	H	H	H	L	H	L	H	H	H
	V	V	V																
SMME8	H	H	H	H	VH	VH	L		H	L	H	L	H	L	L	L	VH	H	VH
	V	V	V																
SMME9	H	H	H	H	VH	VH	VH	VH		VH	VH	VH	VH	VH	VH	VH	VH	VH	VH
SMME10	L	H	L	L	L	L	L	L	L		L	L	H	H	H	L	L	L	VH
SMME11	L	L	H	H	H	H	H	H	H	H		H	H	H	H	H	H	H	H
SMME12	L	H	L	L	H	L	L	H	H	L	H		VH	L	H	L	L	H	VH
SMME13	L	H	H	H	H	H	H	H	H	H	H	H		H	H	H	H	H	H
SMME14	L	L	L	L	L	L	L	L	L	L	L	L	L		L	L	L	L	L
	V																		
SMME15	L	H	H	H	VH	VH	VH	VH	VH	VH	VH	VH	VH	VH	VH		VH	VH	VH
SMME16	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L		L	L
SMME17	H	L	L	H	L	L	L	L	L	L	L	L	L	L	L	L		L	L
SMME18	L	L	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
	V	V																	
SMME19	H	H	H	L	VH	VH	L	VH	H	L	L	L	L	L	L	L	L	H	L

$$\tilde{Z} = [\otimes \tilde{p}_{ij}]_{n \times n} \tag{4}$$

Step 4: Develop Normalized Direct Relation grey Matrix

The normalized direct-influence grey matrix *X* was attained using equation (12), and corresponding data are shown in Table 6.

Code	SM ME 1	SM ME 2	SM ME 3	SM ME 4	SM ME 5	SM ME 6	SM ME 7	SM ME 8	SM ME 9	SM ME 10	SM ME 11	SM ME 12	SM ME 13	SM ME 14	SM ME 15	SM ME 16	SM ME 17	SM ME 18	SM ME 19	
SMME1	(0.6 82.0, (0,0)	(0.4 55.0, 932)	(0.3 18.0, 705)	(0.7 05.0, 568)	(0.6 36.0, 955)	(0.1 82.0, 864)	(0.6 82.0, 409)	(0.4 77.0, 932)	(0.2 05.0, 409)	(0.2 5.0,5)	(0.2 95.0, 545)	(0.2 95.0, 545)	(0.2 5.0,5)	(0.3 64.0, 614)	(0.2 73.0, 523)	(0.5, 0.75)	(0.3 64.0, 614)	(0.3 64.0, 614)	(0.59 1,0.7 95)	
SMME2	(0.6 82.0, 932)	(0.4 09.0, (0,0)	(0.4 55.0, 705)	(0.6 36.0, 886)	(0.3 18.0, 568)	(0.5, 0.75)	(0.3 86.0, 636)	(0.7 27.0, 977)	(0.3 18.0, 568)	(0.1 82.0, 386)	(0.5 91.0, 818)	(0.4 77.0, 727)	(0.2 27.0, 455)	(0.3 18.0, 568)	(0.2 27.0, 455)	(0.3 18.0, 455)	(0.2 18.0, 455)	(0.3 18.0, 568)	(0.5 45.0, 795)	(0.65 9,0.9 09)
SMME3	(0.4 77.0, 727)	(0.6 36.0, 886)	(0.6 14.0, (0,0)	(0.7 05.0, 864)	(0.5, 0.75)	(0.7 05.0, 955)	(0.2 95.0, 545)	(0.5 23.0, 773)	(0.2 27.0, 477)	(0.3 18.0, 568)	(0.1 73.0, 523)	(0.5 82.0, 932)	(0.2 86.0, 636)	(0.3 0.75)	(0.5, 73.0, 523)	(0.2 41.0, 591)	(0.3 68.0, 818)	(0.5 68.0, 818)	(0.75 ,1)	
SMME4	(0.3 18.0, 568)	(0.4 77.0, 727)	(0.4 32.0, 682)	(0.2 95.0, (0,0)	(0.2 95.0, 545)	(0.2 73.0, 523)	(0.2 95.0, 545)	(0.2 55.0, 705)	(0.4 27.0, 432)	(0.2 18.0, 568)	(0.3 82.0, 364)	(0.1 82.0, 932)	(0.6 18.0, 568)	(0.3 18.0,)	(0.5, 0.75)	(0.3 18.0, 568)	(0.3 18.0, 568)	(0.4 09.0, 659)	(0.4 09.0, 77)	
SMME5	(0.6 59.0, 909)	(0.4 77.0, 727)	(0.5 45.0, 795)	(0.4 55.0, 705)	(0.4 32.0, (0,0)	(0.4 55.0, 682)	(0.5, 0.75)	(0.5 45.0, 795)	(0.4 09.0, 614)	(0.3 64.0, 568)	(0.3 64.0, 568)	(0.5, 32.0, 682)	(0.4 27.0, 432)	(0.2 0.75)	(0.5, 73.0, 523)	(0.2 45.0, 795)	(0.5 0.75)	(0.5, 0.75)	(0.65 9,0.9 09)	
SMME6	(0.5 91.0, 795)	(0.5, 0.75)	(0.5, 0.75)	(0.2 73.0, 523)	(0.6 14.0, 864)	(0.4 32.0, (0,0)	(0.4 32.0, 636)	(0.4 32.0, 682)	(0.3 64.0, 568)	(0.3 64.0, 568)	(0.5, 0.75)	(0.4 77.0, 727)	(0.2 27.0, 455)	(0.4 09.0, 636)	(0.1 82.0, 364)	(0.4 09.0, 636)	(0.4 77.0, 727)	(0.4 77.0, 727)	(0.65 9,0.9 09)	

SMME7	(0.1 82.0. 386)	(0.3 18.0. 568)	(0.3 64.0. 614)	(0.2 95.0. 545)	(0.6 59.0. 909)	(0.6 82.0. 909)	(0.6 82.0. (0,0)	(0.6 82.0. 932)	(0.5, 0.75)	(0.2 27.0. 432)	(0.4 09.0. 614)	(0.3 64.0. 568)	(0.5, 0.75)	(0.2 5,0.5)	(0.4 55.0. 705)	(0.1 82.0. 364)	(0.4 55.0. 705)	(0.3 86.0. 636)	(0.40 9,0.6 59)
SMME8	(0.6 82.0. 932)	(0.5 91.0. 841)	(0.7 05.0. 955)	(0.4 55.0. 705)	(0.6 82.0. 932)	(0.6 14.0. 864)	(0.3 18.0. 568)	(0,0)	(0.4 32.0. 682)	(0.2 05.0. 409)	(0.4 55.0. 705)	(0.3 18.0. 568)	(0.5, 0.75)	(0.2 95.0. 545)	(0.3 18.0. 568)	(0.2 27.0. 432)	(0.6 82.0. 932)	(0.5, 0.75)	(0.63 6,0.8 86)
SMME9	(0.4 55.0. 705)	(0.7 05.0. 955)	(0.7 27.0. 977)	(0.4 77.0. 727)	(0.7 05.0. 955)	(0.6 14.0. 864)	(0.6 82.0. 932)	(0.6 14.0. 864)	(0,0)	(0.5 91.0. 795)	(0.6 82.0. 932)	(0.5 91.0. 818)	(0.6 82.0. 932)	(0.6 59.0. 909)	(0.6 82.0. 932)	(0.5 68.0. 773)	(0.7 05.0. 955)	(0.5 45.0. 773)	(0.68 2,0.9 32)
SMME10	(0.2 27.0. 455)	(0.4 32.0. 682)	(0.2 73.0. 523)	(0.2 73.0. 5)	(0.2 73.0. 5)	(0.1 82.0. 409)	(0.2 73.0. 5)	(0.2 27.0. 455)	(0.2 73.0. 5)	(0,0)	(0.1 82.0. 364)	(0.2 73.0. 5)	(0.4 55.0. 682)	(0.4 09.0. 636)	(0.5, 0.75)	(0.2 27.0. 432)	(0.2 73.0. 523)	(0.1 82.0. 364)	(0.68 2,0.9 32)
SMME11	(0.2 5,0.5)	(0.1 82.0. 409)	(0.5, 0.75)	(0.5, 0.75)	(0.3 64.0. 591)	(0.3 64.0. 614)	(0.4 55.0. 682)	(0.4 77.0. 727)	(0.5, 0.75)	(0.3 64.0. 545)	(0,0)	(0.4 77.0. 727)	(0.4 55.0. 705)	(0.4 09.0. 636)	(0.4 09.0. 636)	(0.4 09.0. 614)	(0.5, 0.75)	(0.4 09.0. 614)	(0.47 7,0.7 27)
SMME12	(0.2 73.0. 523)	(0.3 86.0. 591)	(0.2 27.0. 477)	(0.1 82.0. 364)	(0.3 64.0. 591)	(0.3 18.0. 568)	(0.1 82.0. 409)	(0.5, 0.75)	(0.3 86.0. 591)	(0.2 27.0. 432)	(0.4 55.0. 705)	(0,0)	(0.6 82.0. 932)	(0.2 27.0. 455)	(0.5, 0.75)	(0.1 82.0. 364)	(0.3 18.0. 568)	(0.5 23.0. 773)	(0.59 1,0.8 18)
SMME13	(0.2 73.0. 523)	(0.4 55.0. 705)	(0.5, 0.75)	(0.5, 0.75)	(0.4 32.0. 682)	(0.4 55.0. 705)	(0.5, 0.75)	(0.5, 0.75)	(0.5, 0.75)	(0.4 09.0. 614)	(0.4 77.0. 727)	(0.5, 0.75)	(0,0)	(0.4 32.0. 682)	(0.4 55.0. 705)	(0.4 09.0. 659)	(0.5, 0.75)	(0.5, 0.75)	(0.54 5,0.7 95)
SMME14	(0.2 5,0.5)	(0.2 05.0. 409)	(0.2 27.0. 477)	(0.3 18.0. 568)	(0.2 73.0. 5)	(0.2 05.0. 409)	(0.2 5,0.5 523)	(0.3 73.0. 591)	(0.2 05.0. 409)	(0.2 05.0. 409)	(0.2 05.0. 409)	(0.2 05.0. 409)	(0.2 5,0.5)	(0,0)	(0.2 73.0. 523)	(0.2 73.0. 523)	(0.3 41.0. 591)	(0.2 05.0. 523)	(0.27 3,0.5 23)
SMME15	(0.3 41.0. 591)	(0.6 82.0. 932)	(0.5, 0.75)	(0.5, 0.75)	(0.6 82.0. 932)	(0.6 68.0. 773)	(0.6 59.0. 909)	(0.6 82.0. 932)	(0.6 82.0. 932)	(0.6 82.0. 932)	(0.5 68.0. 773)	(0.6 82.0. 932)	(0.6 59.0. 909)	(0.6 59.0. 909)	(0,0)	(0.6 82.0. 932)	(0.6 82.0. 932)	(0.6 14.0. 864)	(0.72 7,0.9 77)
SMME16	(0.2 95.0. 545)	(0.2 05.0. 409)	(0.2 95.0. 545)	(0.3 18.0. 568)	(0.2 95.0. 545)	(0.1 82.0. 364)	(0.1 82.0. 364)	(0.2 73.0. 5)	(0.2 27.0. 455)	(0.2 73.0. 5)	(0.2 73.0. 5)	(0.1 82.0. 364)	(0.2 45.0. 545)	(0.2 95.0. 545)	(0.3 18.0. 568)	(0,0)	(0.2 73.0. 523)	(0.2 5,0.5)	(0.27 3,0.5 23)
SMME17	(0.5, 0.75)	(0.3 18.0. 568)	(0.3 64.0. 614)	(0.5, 0.75)	(0.3 41.0. 591)	(0.2 05.0. 409)	(0.2 95.0. 545)	(0.3 18.0. 568)	(0.3 64.0. 614)	(0.2 95.0. 545)	(0.3 18.0. 568)	(0.3 18.0. 568)	(0.3 18.0. 568)	(0.3 64.0. 614)	(0.3 18.0. 568)	(0.2 95.0. 545)	(0,0)	(0.2 95.0. 545)	(0.34 1,0.5 91)
SMME18	(0.3 41.0. 591)	(0.3 41.0. 591)	(0.3 86.0. 636)	(0.3 86.0. 636)	(0.5, 0.75)	(0.4 55.0. 705)	(0.4 09.0. 659)	(0.5, 0.75)	(0.3 64.0. 568)	(0.3 64.0. 545)	(0.4 55.0. 682)	(0.5 45.0. 795)	(0.5, 0.75)	(0.4 77.0. 727)	(0.4 32.0. 682)	(0.4 32.0. 682)	(0.5 23.0. 773)	(0,0)	(0.52 3,0.7 73)
SMME19	(0.6 36.0. 864)	(0.6 36.0. 886)	(0.7 27.0. 977)	(0.6 59.0. 909)	(0.6 36.0. 886)	(0.6 36.0. 886)	(0.5 91.0. 841)	(0.6 59.0. 909)	(0.6 59.0. 909)	(0.6 36.0. 886)	(0.5 91.0. 841)	(0.5 23.0. 727)	(0.6 59.0. 909)	(0.6 14.0. 864)	(0.6 59.0. 909)	(0.6 14.0. 864)	(0.7 05.0. 955)	(0.6 14.0. 864)	(0,0)

$$\tilde{X} = \frac{1}{r} * \tilde{Z} \tag{5}$$

where,

$$r = \max_{1 \leq i \leq n} (\sum_{j=1}^n \otimes \tilde{p}_{ij}) \tag{6}$$

Step 5: Construction of Grey Total Relation Matrix

The Grey total relation matrix \tilde{T} is defined as,

$$\tilde{T} = \tilde{X}(I - \tilde{X})^{-1} \tag{7}$$

where I is the identity matrix, and \tilde{X} is the normalized direct-influence matrix. The Grey total relation matrix \tilde{T} is presented in Table 7.

Table 8
NORMALIZED DIRECT-INFLUENCE GREY MATRIX

Co de	SMM E 1	SMM E 2	SMM E 3	SMM E 4	SMM E 5	SMM E 6	SMM E 7	SMM E 8	SM ME 9	SM ME 10	SM ME 11	SM ME 12	SM ME 13	SM ME 14	SM ME 15	SM ME 16	SM ME 17	SM ME 18	SM ME 19
SM ME 1	(0.04, 3,0,0, (0,0) 59)	(0.02, 9,0,0, (0,0) 44)	(0.02, 0.036, (0,0) 44)	(0.04, 4,0,0, (0,0) 6)	(0.04, 0.054, (0,0) 26)	(0.01, 1,0,0, (0,0) 26)	(0.04, 3,0,0, (0,0) 59)	(0.03, 0.046, (0,0) 26)	(0.01, 3,0,0, (0,0) 26)	(0.01, 6,0,0, (0,0) 31)	(0.01, 9,0,0, (0,0) 34)	(0.01, 9,0,0, (0,0) 34)	(0.01, 6,0,0, (0,0) 31)	(0.01, 6,0,0, (0,0) 31)	(0.02, 3,0,0, (0,0) 39)	(0.01, 7,0,0, (0,0) 33)	(0.03, 1,0,0, (0,0) 47)	(0.02, 3,0,0, (0,0) 39)	(0.03, 7,0,0, (0,0) 5)
SM ME 2	(0.04, 3,0,0, (0,0) 59)	(0.02, 6,0,0, (0,0) 41)	(0.02, 9,0,0, (0,0) 44)	(0.04, 0.056, (0,0) 44)	(0.02, 0.036, (0,0) 47)	(0.03, 1,0,0, (0,0) 4)	(0.02, 4,0,0, (0,0) 62)	(0.04, 6,0,0, (0,0) 24)	(0.01, 7,0,0, (0,0) 29)	(0.01, 7,0,0, (0,0) 29)	(0.03, 4,0,0, (0,0) 29)	(0.03, 0.046, (0,0) 29)	(0.01, 4,0,0, (0,0) 29)	(0.03, 4,0,0, (0,0) 29)	(0.01, 4,0,0, (0,0) 29)	(0.02, 0.036, (0,0) 29)	(0.01, 4,0,0, (0,0) 29)	(0.02, 0.036, (0,0) 29)	(0.03, 4,0,0, (0,0) 5)
SM ME 3	(0.03, 0.046, (0,0) 47)	(0.04, 0.056, (0,0) 47)	(0.03, 9,0,0, (0,0) 54)	(0.04, 4,0,0, (0,0) 6)	(0.03, 1,0,0, (0,0) 47)	(0.04, 4,0,0, (0,0) 6)	(0.01, 4,0,0, (0,0) 34)	(0.01, 3,0,0, (0,0) 49)	(0.01, 4,0,0, (0,0) 3)	(0.02, 7,0,0, (0,0) 33)	(0.01, 7,0,0, (0,0) 59)	(0.04, 3,0,0, (0,0) 5)	(0.02, 4,0,0, (0,0) 4)	(0.03, 4,0,0, (0,0) 47)	(0.01, 7,0,0, (0,0) 33)	(0.01, 1,0,0, (0,0) 37)	(0.02, 1,0,0, (0,0) 37)	(0.03, 6,0,0, (0,0) 52)	(0.04, 7,0,0, (0,0) 63)
SM ME 4	(0.02, 0.036, (0,0) 43)	(0.03, 0.046, (0,0) 43)	(0.02, 7,0,0, (0,0) 43)	(0.01, 9,0,0, (0,0) 34)	(0.01, 9,0,0, (0,0) 34)	(0.01, 7,0,0, (0,0) 33)	(0.01, 9,0,0, (0,0) 34)	(0.02, 9,0,0, (0,0) 44)	(0.01, 4,0,0, (0,0) 27)	(0.02, 1,0,0, (0,0) 23)	(0.01, 3,0,0, (0,0) 59)	(0.04, 0.036, (0,0) 5)	(0.02, 1,0,0, (0,0) 47)	(0.03, 1,0,0, (0,0) 47)	(0.02, 0.036, (0,0) 47)	(0.02, 0.036, (0,0) 47)	(0.02, 0.036, (0,0) 47)	(0.02, 6,0,0, (0,0) 41)	(0.04, 6,0,0, (0,0) 62)
SM ME 5	(0.04, 1,0,0, (0,0) 57)	(0.03, 0.046, (0,0) 5)	(0.03, 4,0,0, (0,0) 44)	(0.02, 9,0,0, (0,0) 44)	(0.02, 7,0,0, (0,0) 43)	(0.02, 9,0,0, (0,0) 44)	(0.03, 1,0,0, (0,0) 47)	(0.03, 4,0,0, (0,0) 5)	(0.02, 6,0,0, (0,0) 39)	(0.02, 3,0,0, (0,0) 36)	(0.02, 3,0,0, (0,0) 36)	(0.02, 7,0,0, (0,0) 43)	(0.02, 7,0,0, (0,0) 43)	(0.01, 4,0,0, (0,0) 27)	(0.03, 1,0,0, (0,0) 47)	(0.01, 7,0,0, (0,0) 33)	(0.03, 4,0,0, (0,0) 5)	(0.03, 1,0,0, (0,0) 47)	(0.04, 1,0,0, (0,0) 57)
SM ME 6	(0.03, 7,0,0, (0,0) 5)	(0.03, 1,0,0, (0,0) 47)	(0.03, 1,0,0, (0,0) 47)	(0.01, 7,0,0, (0,0) 33)	(0.03, 9,0,0, (0,0) 54)	(0.02, 7,0,0, (0,0) 4)	(0.02, 7,0,0, (0,0) 43)	(0.02, 7,0,0, (0,0) 43)	(0.02, 3,0,0, (0,0) 36)	(0.02, 3,0,0, (0,0) 39)	(0.03, 1,0,0, (0,0) 47)	(0.03, 0.046, (0,0) 29)	(0.01, 4,0,0, (0,0) 29)	(0.03, 4,0,0, (0,0) 4)	(0.02, 6,0,0, (0,0) 23)	(0.01, 1,0,0, (0,0) 23)	(0.02, 6,0,0, (0,0) 4)	(0.03, 6,0,0, (0,0) 4)	(0.04, 0.046, (0,0) 57)
SM ME 7	(0.01, 1,0,0, (0,0) 24)	(0.02, 0.036, (0,0) 39)	(0.02, 3,0,0, (0,0) 34)	(0.01, 9,0,0, (0,0) 57)	(0.04, 1,0,0, (0,0) 57)	(0.04, 3,0,0, (0,0) 57)	(0.04, 3,0,0, (0,0) 59)	(0.03, 1,0,0, (0,0) 47)	(0.01, 4,0,0, (0,0) 27)	(0.02, 6,0,0, (0,0) 39)	(0.02, 3,0,0, (0,0) 36)	(0.03, 1,0,0, (0,0) 47)	(0.01, 6,0,0, (0,0) 31)	(0.02, 6,0,0, (0,0) 44)	(0.01, 9,0,0, (0,0) 23)	(0.02, 1,0,0, (0,0) 44)	(0.02, 9,0,0, (0,0) 44)	(0.02, 4,0,0, (0,0) 4)	(0.02, 6,0,0, (0,0) 41)
SM ME 8	(0.04, 3,0,0, (0,0) 59)	(0.03, 7,0,0, (0,0) 53)	(0.04, 4,0,0, (0,0) 6)	(0.02, 9,0,0, (0,0) 59)	(0.04, 3,0,0, (0,0) 54)	(0.03, 9,0,0, (0,0) 54)	(0.02, 0.036, (0,0) 5)	(0.02, 7,0,0, (0,0) 43)	(0.01, 3,0,0, (0,0) 26)	(0.02, 9,0,0, (0,0) 44)	(0.02, 0.036, (0,0) 47)	(0.03, 1,0,0, (0,0) 52)	(0.01, 9,0,0, (0,0) 34)	(0.02, 9,0,0, (0,0) 34)	(0.01, 4,0,0, (0,0) 27)	(0.04, 3,0,0, (0,0) 59)	(0.03, 1,0,0, (0,0) 59)	(0.04, 1,0,0, (0,0) 47)	(0.04, 0.056, (0,0) 5)
SM ME 9	(0.02, 9,0,0, (0,0) 44)	(0.04, 4,0,0, (0,0) 6)	(0.04, 6,0,0, (0,0) 62)	(0.03, 4,0,0, (0,0) 6)	(0.04, 9,0,0, (0,0) 54)	(0.03, 9,0,0, (0,0) 54)	(0.04, 3,0,0, (0,0) 5)	(0.03, 9,0,0, (0,0) 5)	(0.03, 7,0,0, (0,0) 5)	(0.04, 3,0,0, (0,0) 59)	(0.04, 7,0,0, (0,0) 59)	(0.03, 7,0,0, (0,0) 52)	(0.04, 3,0,0, (0,0) 59)	(0.04, 1,0,0, (0,0) 57)	(0.04, 3,0,0, (0,0) 59)	(0.03, 6,0,0, (0,0) 49)	(0.04, 4,0,0, (0,0) 6)	(0.03, 4,0,0, (0,0) 49)	(0.04, 3,0,0, (0,0) 59)
SM ME 10	(0.01, 4,0,0, (0,0) 29)	(0.02, 7,0,0, (0,0) 43)	(0.01, 7,0,0, (0,0) 33)	(0.01, 7,0,0, (0,0) 31)	(0.01, 7,0,0, (0,0) 31)	(0.01, 1,0,0, (0,0) 26)	(0.01, 7,0,0, (0,0) 31)	(0.01, 4,0,0, (0,0) 29)	(0.01, 7,0,0, (0,0) 31)	(0.01, 1,0,0, (0,0) 23)	(0.01, 7,0,0, (0,0) 31)	(0.02, 1,0,0, (0,0) 31)	(0.02, 7,0,0, (0,0) 43)	(0.02, 9,0,0, (0,0) 4)	(0.03, 6,0,0, (0,0) 47)	(0.01, 4,0,0, (0,0) 27)	(0.01, 7,0,0, (0,0) 33)	(0.01, 1,0,0, (0,0) 23)	(0.04, 3,0,0, (0,0) 59)
SM ME 11	(0.01, 6,0,0, (0,0) 31)	(0.01, 1,0,0, (0,0) 26)	(0.03, 1,0,0, (0,0) 47)	(0.03, 1,0,0, (0,0) 47)	(0.02, 3,0,0, (0,0) 37)	(0.02, 3,0,0, (0,0) 39)	(0.02, 9,0,0, (0,0) 43)	(0.03, 0.046, (0,0) 47)	(0.02, 1,0,0, (0,0) 34)	(0.03, 3,0,0, (0,0) 4)	(0.02, 0.046, (0,0) 44)	(0.02, 6,0,0, (0,0) 44)	(0.02, 6,0,0, (0,0) 4)	(0.02, 6,0,0, (0,0) 4)	(0.02, 6,0,0, (0,0) 39)	(0.03, 6,0,0, (0,0) 47)	(0.01, 1,0,0, (0,0) 39)	(0.02, 6,0,0, (0,0) 39)	(0.03, 0.046, (0,0) 39)
SM ME 12	(0.01, 7,0,0, (0,0) 33)	(0.02, 4,0,0, (0,0) 37)	(0.01, 4,0,0, (0,0) 3)	(0.01, 1,0,0, (0,0) 23)	(0.02, 3,0,0, (0,0) 37)	(0.02, 0.036, (0,0) 26)	(0.01, 1,0,0, (0,0) 26)	(0.03, 1,0,0, (0,0) 47)	(0.02, 4,0,0, (0,0) 37)	(0.01, 4,0,0, (0,0) 27)	(0.02, 9,0,0, (0,0) 44)	(0.03, 3,0,0, (0,0) 59)	(0.01, 4,0,0, (0,0) 29)	(0.03, 1,0,0, (0,0) 47)	(0.01, 1,0,0, (0,0) 23)	(0.02, 1,0,0, (0,0) 23)	(0.03, 0.036, (0,0) 49)	(0.01, 3,0,0, (0,0) 49)	(0.03, 7,0,0, (0,0) 52)
SM ME 13	(0.01, 7,0,0, (0,0) 33)	(0.02, 9,0,0, (0,0) 44)	(0.03, 1,0,0, (0,0) 47)	(0.03, 1,0,0, (0,0) 47)	(0.02, 7,0,0, (0,0) 43)	(0.02, 9,0,0, (0,0) 44)	(0.03, 1,0,0, (0,0) 47)	(0.03, 1,0,0, (0,0) 47)	(0.03, 1,0,0, (0,0) 47)	(0.02, 6,0,0, (0,0) 39)	(0.03, 0.046, (0,0) 47)	(0.03, 1,0,0, (0,0) 47)	(0.03, 1,0,0, (0,0) 47)	(0.02, 7,0,0, (0,0) 43)	(0.02, 9,0,0, (0,0) 44)	(0.02, 6,0,0, (0,0) 41)	(0.03, 1,0,0, (0,0) 47)	(0.01, 1,0,0, (0,0) 47)	(0.03, 4,0,0, (0,0) 5)
SM ME 14	(0.01, 6,0,0, (0,0) 31)	(0.01, 3,0,0, (0,0) 26)	(0.01, 4,0,0, (0,0) 3)	(0.02, 0.036, (0,0) 31)	(0.01, 7,0,0, (0,0) 31)	(0.01, 3,0,0, (0,0) 26)	(0.01, 6,0,0, (0,0) 31)	(0.01, 7,0,0, (0,0) 33)	(0.02, 1,0,0, (0,0) 26)	(0.01, 3,0,0, (0,0) 26)	(0.01, 3,0,0, (0,0) 26)	(0.01, 3,0,0, (0,0) 26)	(0.01, 6,0,0, (0,0) 31)	(0.01, 6,0,0, (0,0) 31)	(0.01, 7,0,0, (0,0) 33)	(0.01, 7,0,0, (0,0) 33)	(0.01, 1,0,0, (0,0) 37)	(0.02, 7,0,0, (0,0) 33)	(0.01, 7,0,0, (0,0) 33)
SM ME 15	(0.02, 1,0,0, (0,0) 37)	(0.04, 3,0,0, (0,0) 59)	(0.03, 1,0,0, (0,0) 47)	(0.03, 1,0,0, (0,0) 47)	(0.04, 3,0,0, (0,0) 59)	(0.03, 6,0,0, (0,0) 49)	(0.04, 1,0,0, (0,0) 57)	(0.04, 3,0,0, (0,0) 59)	(0.04, 3,0,0, (0,0) 59)	(0.03, 6,0,0, (0,0) 49)	(0.04, 3,0,0, (0,0) 59)	(0.04, 3,0,0, (0,0) 59)	(0.04, 1,0,0, (0,0) 57)	(0.04, 1,0,0, (0,0) 57)	(0.04, 3,0,0, (0,0) 59)	(0.04, 3,0,0, (0,0) 59)	(0.04, 3,0,0, (0,0) 59)	(0.03, 9,0,0, (0,0) 54)	(0.04, 6,0,0, (0,0) 62)
SM ME 16	(0.01, 9,0,0, (0,0) 34)	(0.01, 3,0,0, (0,0) 26)	(0.01, 9,0,0, (0,0) 34)	(0.02, 0.036, (0,0) 34)	(0.01, 9,0,0, (0,0) 23)	(0.01, 1,0,0, (0,0) 23)	(0.01, 1,0,0, (0,0) 31)	(0.01, 7,0,0, (0,0) 29)	(0.01, 4,0,0, (0,0) 31)	(0.01, 7,0,0, (0,0) 31)	(0.01, 7,0,0, (0,0) 31)	(0.01, 1,0,0, (0,0) 23)	(0.01, 3,0,0, (0,0) 29)	(0.01, 9,0,0, (0,0) 34)	(0.02, 0.036, (0,0) 34)	(0.01, 7,0,0, (0,0) 33)	(0.01, 6,0,0, (0,0) 33)	(0.01, 3,0,0, (0,0) 31)	(0.01, 7,0,0, (0,0) 33)
SM ME 17	(0.03, 1,0,0, (0,0) 47)	(0.02, 0.036, (0,0) 39)	(0.02, 3,0,0, (0,0) 47)	(0.03, 1,0,0, (0,0) 37)	(0.02, 1,0,0, (0,0) 26)	(0.01, 3,0,0, (0,0) 34)	(0.01, 9,0,0, (0,0) 34)	(0.02, 0.036, (0,0) 39)	(0.02, 3,0,0, (0,0) 34)	(0.01, 9,0,0, (0,0) 34)	(0.02, 0.036, (0,0) 39)	(0.02, 0.036, (0,0) 39)	(0.02, 0.036, (0,0) 39)	(0.02, 0.036, (0,0) 39)	(0.02, 3,0,0, (0,0) 39)	(0.01, 9,0,0, (0,0) 34)	(0.01, 9,0,0, (0,0) 34)	(0.01, 9,0,0, (0,0) 34)	(0.02, 1,0,0, (0,0) 37)
SM ME 18	(0.02, 1,0,0, (0,0) 24)	(0.02, 0.036, (0,0) 39)	(0.02, 3,0,0, (0,0) 34)	(0.02, 0.036, (0,0) 34)	(0.03, 1,0,0, (0,0) 26)	(0.02, 1,0,0, (0,0) 34)	(0.02, 0.036, (0,0) 34)	(0.03, 1,0,0, (0,0) 39)	(0.02, 3,0,0, (0,0) 34)	(0.02, 3,0,0, (0,0) 34)	(0.02, 3,0,0, (0,0) 34)	(0.03, 6,0,0, (0,0) 49)	(0.02, 3,0,0, (0,0) 57)	(0.02, 3,0,0, (0,0) 57)	(0.03, 1,0,0, (0,0) 57)	(0.02, 3,0,0, (0,0) 57)	(0.02, 3,0,0, (0,0) 57)	(0.03, 6,0,0, (0,0) 52)	(0.04, 7,0,0, (0,0) 63)
SM ME 19	(0.02, 1,0,0, (0,0) 24)	(0.02, 0.036, (0,0) 39)	(0.02, 3,0,0, (0,0) 34)	(0.02, 0.036, (0,0) 34)	(0.03, 1,0,0, (0,0) 26)	(0.02, 1,0,0, (0,0) 34)	(0.02, 0.036, (0,0) 34)	(0.03, 1,0,0, (0,0) 39)	(0.02, 3,0,0, (0,0) 34)	(0.02, 3,0,0, (0,0) 34)	(0.02, 3,0,0, (0,0) 34)	(0.03, 6,0,0, (0,0) 49)	(0.02, 3,0,0, (0,0) 57)	(0.02, 3,0,0, (0,0) 57)	(0.03, 1,0,0, (0,0) 57)	(0.02, 3,0,0, (0,0) 57)	(0.02, 3,0,0, (0,0) 57)	(0.03, 6,0,0, (0,0) 52)	(0.04, 7,0,0, (0,0) 63)

ME 18	1,0,0 37)	1,0,0 37)	4,0,0 4)	4,0,0 4)	1,0,0 47)	9,0,0 44)	6,0,0 41)	1,0,0 47)	3,0,0 36)	3,0,0 34)	9,0,0 43)	4,0,0 5)	1,0,0 47)	0.046)	7,0,0 43)	7,0,0 43)	3,0,0 49)		3,0,0 49)
SM ME 19	(0.04, 0.054)	(0.04, 0.056)	(0.04, 6,0,0 62)	(0.04, 1,0,0 57)	(0.04, 0.056)	(0.04, 0.056)	(0.03, 7,0,0 53)	(0.04, 1,0,0 57)	(0.04, 1,0,0 57)	(0.04, 0.056)	(0.03, 7,0,0 53)	(0.03, 3,0,0 46)	(0.04, 1,0,0 57)	(0.03, 9,0,0 54)	(0.04, 1,0,0 57)	(0.03, 9,0,0 54)	(0.04, 4,0,0 6)	(0.03, 9,0,0 54)	(0.03, 9,0,0 54)

Step 6: Develop the crisp Total Relation Matrix

Subsequently, the value in crisp form was gained by using the modified “Converting fuzzy data into Crisp Scores (CFCS)” method, which was given by Opricovic and Tzeng (2003), and subsequently advanced by Dou and Sarkis (2013). The step-by-step outline of the modified CFCS method in the context of grey numbers is given as:

i) Transforming into a crisp number

$$\underline{\otimes} \tilde{p}_{ij} = \left(\underline{\otimes} \tilde{p}_{ij} - \min_j \underline{\otimes} \tilde{p}_{ij} \right) / \Delta_{\min}^{max} \tag{8}$$

$$\overline{\otimes} \tilde{p}_{ij} = \left(\overline{\otimes} \tilde{p}_{ij} - \min_j \overline{\otimes} \tilde{p}_{ij} \right) / \Delta_{\min}^{max} \tag{9}$$

where $\Delta_{\min}^{max} = \max_j \overline{\otimes} p_{ij} - \min_j \underline{\otimes} p_{ij}$ \tag{10}

ii) Determine the total normalized crisp values:

$$p_{ij} = \left(\frac{(\underline{\otimes} \tilde{p}_{ij}(1-\underline{\otimes} \tilde{p}_{ij})) + (\overline{\otimes} \tilde{p}_{ij} \times \overline{\otimes} \tilde{p}_{ij})}{(1-\underline{\otimes} \tilde{p}_{ij} + \overline{\otimes} \tilde{p}_{ij})} \right) \tag{11}$$

iii) Determine the crisp values:

$$p_{ij}^* = \left(\min_j \underline{\otimes} \tilde{p}_{ij} + (p_{ij} \times \Delta_{\min}^{max}) \right) \tag{12}$$

As shown in the below equation (13), the crisp Total Relation Matrix was obtained.

$$T = [\tilde{p}_{ij}^*] \tag{13}$$

Step 7: Calculation of Prominence and Influence Values

In the crisp total relation matrix, as shown in Table 8.

Cod e	SMME 1	SMME 2	SMME 3	SMME 4	SMME 5	SMME 6	SMME 7	SMME 8	SMME 9	SMME 10	SMME 11	SMME 12	SMME 13	SMME 14	SMME 15	SMME 16	SMME 17	SMME 18	SMME 19
SM ME1	(0.027, 0.135)	(0.07,0 .197)	(0.056, 0.185)	(0.045, 0.169)	(0.074, 0.209)	(0.065, 0.186)	(0.037, 0.157)	(0.069, 0.198)	(0.058, 0.187)	(0.034, 0.14)	(0.039, 0.155)	(0.043, 0.161)	(0.048, 0.182)	(0.038, 0.154)	(0.049, 0.175)	(0.037, 0.146)	(0.059, 0.19)	(0.05,0 .176)	(0.07,0 .21)
SM ME2	(0.068, 0.194)	(0.03,0 .148)	(0.055, 0.188)	(0.054, 0.181)	(0.072, 0.211)	(0.048, 0.175)	(0.057, 0.182)	(0.054, 0.188)	(0.074, 0.207)	(0.042, 0.154)	(0.036, 0.154)	(0.062, 0.181)	(0.061, 0.199)	(0.038, 0.157)	(0.048, 0.179)	(0.036, 0.147)	(0.05,0 .185)	(0.062, 0.192)	(0.076, 0.223)
SM ME3	(0.059, 0.192)	(0.071, 0.21)	(0.032, 0.158)	(0.067, 0.201)	(0.079, 0.226)	(0.061, 0.195)	(0.072, 0.204)	(0.051, 0.192)	(0.065, 0.206)	(0.039, 0.157)	(0.047, 0.173)	(0.045, 0.173)	(0.076, 0.222)	(0.05,0 .177)	(0.061, 0.199)	(0.041, 0.159)	(0.054, 0.196)	(0.066, 0.203)	(0.084, 0.24)
SM ME4	(0.043, 0.161)	(0.055, 0.178)	(0.052, 0.176)	(0.024, 0.128)	(0.047, 0.178)	(0.042, 0.161)	(0.04,0 .157)	(0.044, 0.169)	(0.054, 0.179)	(0.034, 0.136)	(0.041, 0.153)	(0.034, 0.144)	(0.069, 0.198)	(0.041, 0.153)	(0.055, 0.176)	(0.039, 0.144)	(0.046, 0.172)	(0.05,0 .172)	(0.075, 0.212)
SM ME5	(0.068, 0.196)	(0.06,0 .194)	(0.064, 0.199)	(0.056, 0.185)	(0.034, 0.162)	(0.055, 0.184)	(0.055, 0.182)	(0.061, 0.197)	(0.064, 0.2)	(0.048, 0.159)	(0.048, 0.167)	(0.049, 0.17)	(0.059, 0.2)	(0.039, 0.159)	(0.06,0 .192)	(0.04,0 .154)	(0.065, 0.201)	(0.06,0 .192)	(0.077, 0.227)
SM ME6	(0.063, 0.183)	(0.06,0 .189)	(0.059, 0.19)	(0.043, 0.168)	(0.07,0 .206)	(0.027, 0.137)	(0.052, 0.172)	(0.056, 0.186)	(0.056, 0.187)	(0.044, 0.151)	(0.047, 0.164)	(0.056, 0.175)	(0.06,0 .196)	(0.037, 0.154)	(0.053, 0.179)	(0.033, 0.139)	(0.055, 0.185)	(0.057, 0.185)	(0.075, 0.219)
SM ME7	(0.037, 0.154)	(0.047, 0.172)	(0.05,0 .176)	(0.043, 0.164)	(0.07,0 .202)	(0.067, 0.185)	(0.025, 0.128)	(0.069, 0.195)	(0.058, 0.184)	(0.035, 0.138)	(0.048, 0.159)	(0.046, 0.159)	(0.06,0 .191)	(0.037, 0.151)	(0.053, 0.177)	(0.031, 0.134)	(0.056, 0.183)	(0.05,0 .174)	(0.058, 0.198)
SM ME8	(0.071, 0.201)	(0.068, 0.204)	(0.074, 0.212)	(0.067, 0.188)	(0.076, 0.221)	(0.067, 0.198)	(0.048, 0.178)	(0.031, 0.155)	(0.059, 0.197)	(0.036, 0.15)	(0.054, 0.178)	(0.047, 0.173)	(0.064, 0.207)	(0.043, 0.168)	(0.049, 0.185)	(0.037, 0.151)	(0.073, 0.213)	(0.061, 0.196)	(0.077, 0.23)
SM ME9	(0.064, 0.214)	(0.082, 0.239)	(0.084, 0.241)	(0.066, 0.217)	(0.087, 0.253)	(0.075, 0.224)	(0.078, 0.225)	(0.077, 0.236)	(0.041, 0.185)	(0.067, 0.195)	(0.075, 0.216)	(0.071, 0.213)	(0.084, 0.248)	(0.073, 0.215)	(0.08,0 .234)	(0.064, 0.194)	(0.083, 0.243)	(0.072, 0.225)	(0.09,0 .265)
SM ME10	(0.033, 0.137)	(0.047, 0.157)	(0.037, 0.148)	(0.036, 0.141)	(0.04,0 .155)	(0.031, 0.135)	(0.036, 0.139)	(0.035, 0.145)	(0.038, 0.148)	(0.016, 0.095)	(0.029, 0.125)	(0.035, 0.135)	(0.05,0 .164)	(0.042, 0.141)	(0.05,0 .159)	(0.03,0 .121)	(0.038, 0.15)	(0.032, 0.137)	(0.066, 0.189)

SM ME1	(0.04,0.16)	(0.038,0.163)	(0.057,0.184)	(0.055,0.176)	(0.052,0.184)	(0.047,0.168)	(0.052,0.169)	(0.056,0.183)	(0.058,0.184)	(0.043,0.145)	(0.023,0.122)	(0.052,0.168)	(0.057,0.188)	(0.047,0.16)	(0.051,0.173)	(0.045,0.149)	(0.058,0.186)	(0.051,0.172)	(0.062,0.202)
SM ME1	(0.039,0.152)	(0.048,0.164)	(0.039,0.158)	(0.034,0.144)	(0.049,0.173)	(0.043,0.156)	(0.034,0.145)	(0.055,0.175)	(0.049,0.165)	(0.033,0.131)	(0.049,0.156)	(0.022,0.116)	(0.068,0.191)	(0.034,0.141)	(0.054,0.17)	(0.03,0.127)	(0.045,0.166)	(0.056,0.172)	(0.065,0.196)
SM ME1	(0.044,0.173)	(0.057,0.192)	(0.06,0.196)	(0.058,0.187)	(0.059,0.202)	(0.056,0.184)	(0.057,0.185)	(0.06,0.196)	(0.061,0.197)	(0.048,0.159)	(0.054,0.176)	(0.057,0.18)	(0.032,0.159)	(0.051,0.173)	(0.056,0.189)	(0.047,0.161)	(0.061,0.198)	(0.059,0.192)	(0.07,0.22)
SM ME1	(0.031,0.13)	(0.03,0.131)	(0.031,0.135)	(0.035,0.134)	(0.035,0.144)	(0.028,0.125)	(0.031,0.128)	(0.034,0.138)	(0.038,0.142)	(0.026,0.111)	(0.027,0.118)	(0.027,0.12)	(0.033,0.142)	(0.014,0.093)	(0.033,0.135)	(0.029,0.118)	(0.038,0.144)	(0.033,0.135)	(0.037,0.153)
SM ME1	(0.057,0.206)	(0.08,0.236)	(0.07,0.227)	(0.066,0.216)	(0.085,0.249)	(0.071,0.217)	(0.075,0.222)	(0.081,0.238)	(0.081,0.238)	(0.072,0.202)	(0.068,0.206)	(0.076,0.218)	(0.082,0.245)	(0.072,0.213)	(0.038,0.177)	(0.071,0.202)	(0.082,0.24)	(0.075,0.229)	(0.092,0.265)
SM ME1	(0.033,0.131)	(0.029,0.129)	(0.035,0.137)	(0.035,0.133)	(0.037,0.144)	(0.027,0.121)	(0.026,0.119)	(0.033,0.135)	(0.031,0.133)	(0.03,0.115)	(0.031,0.122)	(0.026,0.116)	(0.031,0.137)	(0.032,0.125)	(0.035,0.136)	(0.012,0.085)	(0.034,0.138)	(0.031,0.132)	(0.037,0.151)
SM ME1	(0.05,0.161)	(0.042,0.158)	(0.044,0.161)	(0.05,0.162)	(0.045,0.169)	(0.033,0.142)	(0.038,0.148)	(0.041,0.159)	(0.044,0.162)	(0.035,0.133)	(0.038,0.143)	(0.038,0.145)	(0.043,0.165)	(0.04,0.146)	(0.04,0.156)	(0.034,0.134)	(0.022,0.126)	(0.039,0.154)	(0.048,0.178)
SM ME1	(0.047,0.171)	(0.049,0.179)	(0.052,0.183)	(0.049,0.174)	(0.061,0.199)	(0.054,0.178)	(0.05,0.173)	(0.059,0.19)	(0.051,0.18)	(0.044,0.149)	(0.052,0.168)	(0.058,0.177)	(0.061,0.197)	(0.052,0.17)	(0.053,0.181)	(0.047,0.158)	(0.061,0.193)	(0.027,0.141)	(0.066,0.211)
SM ME1	(0.075,0.225)	(0.079,0.236)	(0.084,0.243)	(0.077,0.228)	(0.083,0.25)	(0.076,0.227)	(0.072,0.221)	(0.08,0.239)	(0.081,0.24)	(0.069,0.202)	(0.07,0.212)	(0.067,0.209)	(0.083,0.248)	(0.07,0.213)	(0.078,0.234)	(0.067,0.201)	(0.084,0.244)	(0.076,0.231)	(0.049,0.211)

The sum of rows (D) and columns (R) are obtained as:

$$T = [t_{ij}]_{n \times n}, i, j = 1, 2, \dots, n \tag{14}$$

$$D = [\sum_{j=1}^n t_{ij}]_{n \times 1} = [t_i]_{n \times 1} \tag{15}$$

$$R = [\sum_{i=1}^n t_{ij}]_{1 \times n} = [t_j]_{1 \times n} \tag{16}$$

Later, the addition and subtraction of D and R values give us prominence (D+R) and influence (D-R), as shown in Singh, (2024).

Table 10
CRISP TOTAL RELATION MATRIX

Code	SM ME1	SM ME2	SM ME3	SM ME4	SM ME5	SM ME6	SM ME7	SM ME8	SM ME9	SM ME10	SMM EM11	SMM EM12	SMM EM13	SM ME14	SM ME15	SM ME16	SM ME17	SM ME18	SM ME19
	SM ME1	0.10024	0.16867	0.15123	0.13329	0.17951	0.15783	0.12017	0.16877	0.15371	0.108475	0.12046	0.126745	0.143895	0.11943	0.139756	0.114326	0.156273	0.141105
SM ME2	0.16568	0.10989	0.15200	0.14779	0.17929	0.13895	0.14986	0.15138	0.17795	0.12018	0.118188	0.152972	0.164064	0.121328	0.14173	0.11395	0.146861	0.159867	0.190472
SM ME3	0.15735	0.17805	0.11747	0.16877	0.19409	0.16093	0.17440	0.15247	0.17116	0.12012	0.137084	0.136456	0.189369	0.141593	0.163938	0.124702	0.157132	0.170084	0.207904
SM ME4	0.12707	0.14611	0.14302	0.09421	0.13985	0.12647	0.12322	0.13261	0.14582	0.106502	0.121256	0.11077	0.168157	0.121171	0.14507	0.114745	0.135785	0.138646	0.182083
SM ME5	0.16665	0.16027	0.16561	0.15089	0.12121	0.15014	0.14903	0.16270	0.12016	0.12988	0.134262	0.136847	0.163155	0.123051	0.158228	0.120428	0.167675	0.158781	0.1938
SM ME6	0.15473	0.15636	0.15642	0.13143	0.17446	0.10174	0.14076	0.15198	0.15225	0.122349	0.13135	0.144669	0.160963	0.119031	0.145069	0.106938	0.150402	0.151972	0.187173

	1	6	8	4	6	5	9	7	3										
SM	0.11	0.13	0.14	0.12	0.17	0.15	0.09	0.16	0.15										
ME7	855	670	113	865	226	890	527	613	220	0.10	0.129	0.128	0.157	0.11	0.14	0.10	0.15	0.14	0.16
	9	3	8	5	2	4	2	4	3	829	582	271	326	7457	4341	321	005	0017	1149
SM	0.17	0.17	0.18	0.15	0.18	0.16	0.14	0.11	0.16										
ME8	209	200	132	398	936	696	111	532	089	0.11	0.145	0.137	0.171	0.13	0.14	0.11	0.18	0.16	0.19
	4	5	5	5	8	4	4	7	3	5853	063	345	469	1712	644	7089	1335	193	5603
SM	0.17	0.20	0.20	0.17	0.21	0.19	0.19	0.20											
ME9	639	584	843	907	891	029	309	022	0.14	0.16	0.184	0.180	0.213	0.18	0.20	0.16	0.20	0.18	0.23
	9	3	3	4	1	3	3	2	033	5291	642	236	882	23	0252	2799	9487	9197	0061
SM	0.10	0.12	0.11	0.11		0.10	0.10	0.11	0.11										
ME1	636	822	594	054	0.12	358	936	226	653	0.07	0.096	0.106	0.134	0.11	0.13	0.09	0.11	0.10	0.16
0	1	4	4	8	143	6	8	8	3	2721	685	934	088	5491	1227	5723	7511	4971	087
SM	0.12	0.12	0.15	0.14	0.14	0.13	0.13	0.14	0.15										
ME1	424	489	118	473	742	447	863	983	180	0.11	0.090	0.137	0.154	0.12	0.14	0.12	0.15	0.13	0.16
1	7	9	5	1	4	1	6	6	7	7787	48	881	026	9695	0412	1816	3141	9756	624
SM	0.11	0.13	0.12	0.11	0.13		0.11	0.14	0.13										
ME1	934	243	238	065	908	0.12	083	416	383	0.10	0.128	0.086	0.162	0.10	0.14	0.09	0.13	0.14	0.16
2	6	8	3	7	8	401	7	2	9	2993	178	905	885	9303	024	849	1401	297	4622
SM	0.13	0.15	0.16	0.15	0.16		0.15	0.16	0.16										
ME1	52	673	6	3	8	057	6	9	1	929	302	493	886	0152	409	043	3091	8133	3677
SM	0.10	0.10	0.10	0.10	0.11	0.09	0.09	0.10	0.11										
ME1	068	019	361	632	163	649	985	743	281	0.08	0.091	0.093	0.109	0.06	0.10	0.09	0.11	0.10	0.11
4	2	7	4	5	1	1	9	6	4	72	83	028	216	9947	5056	3524	3682	5202	8144
SM	0.16	0.20	0.18	0.17	0.21	0.18	0.18	0.20	0.20										
ME1	592	232	864	921	499	317	943	411	471	0.17	0.172	0.186	0.210	0.18	0.13	0.17	0.20	0.19	0.23
5	1	5	7	3	6	6	3	5	3	3173	855	985	47	1243	3171	2433	6204	3936	1813
SM	0.10	0.09	0.10	0.10	0.11	0.09	0.09	0.10	0.10										
ME1	328	929	779	553	294	308	179	558	251	0.09	0.096	0.089	0.104	0.09	0.10	0.06	0.10	0.10	0.11
6	3	5	2	5	8	5	8	1	1	2228	575	737	632	9018	7535	5348	7326	248	7169
SM	0.13		0.12	0.13		0.10	0.11	0.12	0.12										
ME1	272	0.12	810	330	0.13	932	573	515	905	0.10	0.113	0.114	0.129	0.11	0.12	0.10	0.09	0.12	0.14
7	3	453	1	5	319	8	1	2	7	5451	184	876	728	6477	2122	5447	2213	0538	0849
SM	0.13	0.14	0.14	0.13	0.16	0.14	0.13		0.14										
ME1	592	244	668	990	405	561	967	0.15	428	0.12	0.137	0.147	0.162	0.13	0.14	0.12	0.15	0.10	0.17
8	9	8	1	9	4	7	2	64	8	1118	312	382	076	9156	7082	8252	9612	3931	5256
SM	0.19	0.20	0.20	0.19	0.21	0.19	0.18	0.20	0.20										
ME1	101	189	962	454	463	311	647	481	565	0.17	0.178	0.174	0.213	0.17	0.19	0.16	0.21	0.19	0.16
9	5	6	4	1	4	6	1	9	3	1214	24	536	181	967	9523	8967	0564	6408	3751

Develop the Cause-Effect Diagram

The diagram showing the cause-and-effect relationship for the factors is highlighted in Table10

Code	Name of the Enabler	D	R	D+R	D-R	Rank	Cause/Effect
SMME1	Simple and Easy to use	2.681	2.654	5.335	0.028	11	<i>Cause</i>
SMME2	Perceived Value	2.805	2.847	5.651	-0.042	8	<i>Effect</i>

SMME3	Customer Support	3.025	2.852	5.876	0.173	6	<i>Cause</i>
SMME4	Assurance	2.523	2.667	5.189	-0.144	14	<i>Effect</i>
SMME5	Speed of Response	2.879	3.093	5.972	-0.214	4	<i>Effect</i>
SMME6	Perceived Firm Innovativeness	2.740	2.686	5.426	0.054	10	<i>Cause</i>
SMME7	Loyalty Intentions	2.610	2.621	5.230	-0.011	12	<i>Effect</i>
SMME8	User friendly	2.957	2.873	5.830	0.084	7	<i>Cause</i>
SMME9	Reliable	3.631	2.884	6.515	0.747	2	<i>Cause</i>
SMME10	Safe for Data Sharing	2.160	2.274	4.434	-0.113	17	<i>Effect</i>
SMME11	Useful for Information	2.618	2.472	5.090	0.147	15	<i>Cause</i>
SMME12	Content creativity	2.405	2.541	4.946	-0.136	16	<i>Effect</i>
SMME13	Consumer Involvement	2.867	3.030	5.897	-0.164	5	<i>Effect</i>
SMME14	Control Mechanism	1.926	2.457	4.383	-0.531	18	<i>Effect</i>
SMME15	Public opinion	3.595	2.765	6.360	0.830	3	<i>Cause</i>
SMME16	Legal support	1.904	2.259	4.162	-0.355	19	<i>Effect</i>
SMME17	Appropriateness for business	2.292	2.910	5.202	-0.618	13	<i>Effect</i>
SMME18	Customized Engagement	2.736	2.780	5.516	-0.044	9	<i>Effect</i>
SMME19	Trust on the platform	3.658	3.348	7.006	0.310	1	<i>Cause</i>

In the next section of this study, results and discussions are presented. Table 10 outlines notable findings centered on the causal diagram.

RESULTS AND DISCUSSIONS

The relative significance of identified issues are signified by R+C scores. Consequently, in the issues ranking process, issues with higher R+C scores, signify greater priority. In accordance with R+C score, 12 top issues are “Trust on the platform (SMME19)”, “Speed of response (SMME 5)”, “Consumer involvement (SMME13)”, “Appropriateness for business (SMME17)”, “Reliable (SMME9)”, “User Friendly (SMME 8)”, “Customer support (SMME3)”, “Perceived value (SMME2)”, “Customized engagement (SMME18)”, “Public opinion (SMME15)”, “Perceived firm innovativeness (SMME6)”, “Assurance (SMME4)”, “Simple and easy to use (SMME1)”. In accordance with ranking, the remaining six issues are as stated, namely, “Loyalty intention (SMME7)”, “Content creativity (SMME12)”, “Useful for information (SMME11)”, “Control mechanism (SMME14)”, “Safe for data sharing (SMME10)”, and “Legal support (SMME16)”. However, the influence of these identified issues over businesses in the course of adoption and implication of SMM practices cannot be subverted.

Error! Reference source not found. has presented two categories i.e. first group as “effects” category based on negative (D-R) scores outlining key issues and second group as “cause” category based on positive (D-R) scores outlining key issues which comprise “Trust on the platform (SMME19)”, “Simple and easy to use (SMME1)”, “Customer support (SMME3)”, “Perceived firm innovativeness (SMME6)”, “User friendly (SMME8)”, “Reliable (SMME9)”, “Useful for information (SMME11)”, and “Public opinion (SMME15)” were classified under “cause” criteria group, while “Perceived value (SMME2)”, “Assurance (SMME4)”, “Speed of response (SMME5)”, “Loyalty intentions (SMME7)”, “Safe for data sharing (SMME10)”, “Content creativity (SMME12)”, “Customer involvement (SMME13)”, “Control mechanism (SMME14)”, “Legal support (SMME16)”, “Appropriateness for business (SMME17)”,

“Customized engagement (SMME18)” have been grouped in the “effects” category. Since causal issues influence the issues in the “effects” group, it is essential to give more consideration to the “cause” category of issues in the implementation of social media practices in SMM. Even if the issues in the “effects” category do not employ substantial impact as assessed vis-à-vis to the “causal” group issues which are tremendously among unquestionable issues that further obtain the influence employed by “causal” group issues. Thus, proper attention should be offered to the issues listed in the “effects” category.

In the “cause” category, the first rank has been given to “Trust on the platform” and this is the outcome of perceived value by the customers to satisfy their needs. Trust in the platform has practical implications for the development of such social media platforms and is only good in effectiveness if the trust is built for user engagement (Zhang et al., 2022b). Zhang et al. (2022b) endorsed that the communication on social media carried out by brands is built with long-term user interactions, which enables the brand to be more trustworthy and lovable. Trust on the platform is the catalyst for building and maintaining relationships that impact the usage of social media platforms. In social media marketing, trust in the platform is the proxy for equity that leads to differentiation that is engraved in the minds of consumers. The result of this study is in line with an extant work of literature which has been conducted by Haudi et al. (2022).

The next key issue i.e. “Reliable (SMME9)” is ranked second in the causal group. The social media users have the propensity to include social media platforms as a part of their view about themselves, affecting both their propensity to engage and advocate (Berne-Manero & Marzo-Navarro, 2020). Reliable interactions facilitated online allow users to reflect on their own identity and engage better. Since reliability is integrated with crucial components of social media marketing, the social media platforms need to engage with the users to build trust in the content, thereby enhancing the reliability and credibility of the source of content to be more effective and impactful (Giakoumaki & Krepapa, 2020).

“Public opinion (SMME15)” which is ranked as the third issue in the “Causal” group, is associated with the second issue. It is apparent that public opinion is usually tied up with the perception created by the usage of a specific social media platform. However, incorporating trust in the platform and extending reliability regarding its usage could create positive public opinion. Besides, the integration between the three has to be monitored regularly to accomplish the conditions of frequently disruptive business environments. The source of content and engagement plays a positive role in shaping public opinion. It does impact the public information system and, thereby, shaping/reshaping public opinion towards the usage and adoption of social media (Moreno et al., 2020). Social media, as a tool, is not only a way for media to release information but also an important carrier for users to obtain information and express their opinions. Moreover, social media is a multi-party communication platform, therefore, it is of great significance to know the importance and formation of public opinions (Liu et al., 2022).

“Customer Support (SMME3)” and “User friendly (SMME8)” are important issues of non-adoption of social media platforms as the lack of understanding of the potential of customer support and user-friendly attributes may be disadvantageous in the improvement of SMM and engagement. Support in managing customer experience and user-friendly navigation helps in creating a brand and developing a positive attitude of users toward a social media brand (Khan, 2022). “Perceived firm innovativeness (SMME6)”, “Simple and easy to use (SMME1)”, and “Useful for information (SMME11)” also impact and alter the implementation of social media platforms in SMM. These factors create a subjective expectation of loss resulting in feelings of

uncertainty, psychological discomfort, and anxiety because possible negative consequences may arise (Bauer, 1967; Featherman & Pavlou, 2003; Stone & Gronhaug, 1993). Perceived firm innovativeness leads to perceived ease of use which creates a level of ease in the user's mind (Palumian et al., 2021). The user will not intend to use technology when the user perceives that technology requires an enormous effort (Susanto & Aljoza, 2015). Our results indicate that the perceived benefits of social media adoption do not outweigh the perceived firm innovativeness, simple and easy to use and useful for information. However, low adoption of social media among the users is not only the high perceived risk but also the low perceived firm innovativeness, simple and easy to use, and usefulness for the information. Poor perception management on tools and content be capable of leading to adverse consequences with a small amount of gain or no gain to the accomplishment of organizational objectives. Inadequately created social media content, tools, and navigation can cause substantial losses and no ROI i.e. Return on Investment.

In the “*effect*” category, the issue “*Speed of response (SMME 5)*” is ranked first and is observed to be influenced broadly by issues such as “Trust on the platform”, “Public opinion”, and “Reliable”. SMME 5 issue is the utmost imperative and has demonstrated in the strategy diagram backed with the high ranking (D+R) value i.e. 5.972. However, the basic reason for this is that Indian organizations are not fully cognizant of the SMM's prospects in restructuring their business strategies to accomplish organizational goals in the long run.

In the era of fast-track customer service, the effective utilization of social media marketing and speed of response can enhance productivity and outcomes. The issue of “Customer Involvement” is found to be caused by “Trust on the platform”, “Public opinion”, “Reliable” and “Customer support”. It is evident that customer involvement in any social media tools and marketing is getting impacted by the trust they have in the platform and reliability of the platform, including the peoples' perception about that platform and marketing initiatives. As the industries are fragmented, it is evident that the implications would differ from organization to organization. These issues collectively deteriorate the motivation of employees and organizations to use these tools and practices. The observations made in this study coincided with the findings of the studies by Susanto and Aljoza (2015), Palumian et al. (2021), Stone and Gronhaug (1993), and Liu et al. (2022).

IMPLICATIONS OF THE STUDY, LIMITATIONS OF THE STUDY, AND FUTURE RESEARCH DIRECTIONS

Theoretical implications

The theoretical outline offered in this study as SMME can be utilized to make clear what drives and enables businesses in the acceptance and usage of social media to boost business performances and associated metrics. The research provides a speculative basis to review the social media marketing adoption status among Indian organizations. Notable results of this study can be employed to calibrate the existing status of modern organizations in adopting and using social media tools and information technologies. Numerous issues faced by businesses globally in adopting novel and modern information technologies can be further investigated by using Structural Equation Modelling (SEM) approach to ascertain the association between distinct issues. Scholars and researchers can conduct further studies related to key issues shown in the form of key findings of this work of study and might consider investigating the barriers in

the context of diverse sectors and geographical settings. This will further add value to the theoretical body of knowledge in the field of SMME.

Practical Implications

The present study puts forth several implications for the management of social media space and platforms for the organizations meant to use it for their business growth. There is a profound divide between the employees' and businesses' understanding of social media's entry and exit barriers. This is attributed primarily to the trust in the platform and new dimensions such as perceived value and consumer involvement. Organizations across the globe, particularly in India, should train their personnel to accomplish Information and Communication Technologies (ICT) such as social to deliver benefits for their respective organization.

The findings of the study can be used by the management of any organization to identify the critical challenges plaguing the adoption of social media in their business decisions. The study puts forth the technical and behavioral issues impeding the adoption of social media tools and technologies, especially in developing countries such as India, where most organizations are discovering the usage of such tools and the large employee base is unaware of the full potential of such tools. Though this study highlights the importance of management interventions in developing policies that can encourage the usage, an awareness, and positive environment around the usage would be beneficial. Companies can use this study to emphatically review the major constraints occurring in their businesses.

Furthermore, in the context of social media usage in reaching organizational goals, an in-depth understanding of all stakeholders, especially among their employees, may add value to business performance in the long run. Therefore, organizations must ensure awareness and confidence-building among employees while utilizing social media benefits to the fullest. It is also important to align social media planning with organizational goals. It is likely that in the absence of proper synchronization of strategy and the social media platform specification, the decisions and brand elements go wrong. However, a dearth of confidence in social media's capability may lead to uncertain challenges for businesses. Hence, it is customary substantial for businesses across the globe to ensure that social media marketing strategies should be explained to all stakeholders with extreme lucidity to deal with future challenges. Regular learning webinars, seminars, training workshops, and informal discussions would help in keeping the workforce up-to-date on the modern trends and usage benefits of social media.

Limitations of the Study

The study undoubtedly has several limitations. First limitation of the study is in terms of data collection, as in this study, only 11 experts responded out of 28 experts. Second limitation of the study is the expert's sectoral backgrounds. Experts selected for this study were from only three sectors i.e. education sector, the government sector, and the manufacturing sector. Third limitation was the geographical limitations, as this study discovered new insights into the adoption of social media marketing in Indian organizations only. Fourth limitation is the selection of only SMM. Only 19 substantial issues, like in this study, have been brought into concern. Finally, the last limitation of this study is the use of only the DEMATEL approach.

Future Research Directions

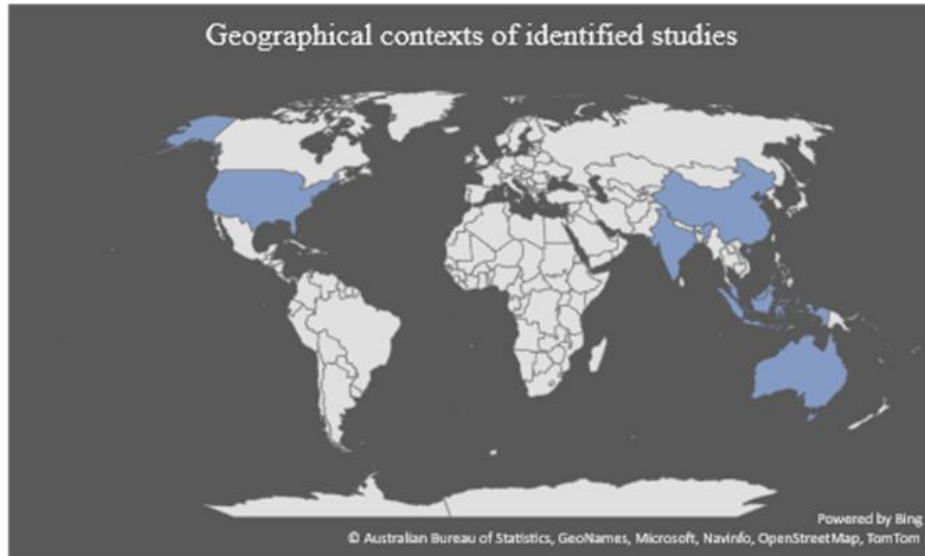
Research insights are dynamic in nature; hence, to overcome the notable limitations of this study, future researchers, academics, and scholars are encouraged to conduct further studies. By selecting more than 11 experts, another study can be conducted by selecting them from diverse sectors, educational qualifications, skills, and experiences. Further study can be conducted investigating the adoption of SMM among global organizations to understand how the SMM enablers differ from the Indian context. Utilizing the “DEMATEL” tool, future study can be conducted with the identified 19 issues for Mobile marketing and Location-based marketing. By identifying more than 19 issues, in-depth research can be conducted in the context of Digital marketing enablers, E-Business enablers, and E-commerce enablers. Future researchers might also consider using other approaches like Interpretive Structural Modelling (ISM) approach, Analytic Network Process (ANP) method, and Analytic Hierarchy Process (AHP) method to conduct a similar study in diverse geographical and sectoral contexts.

CONCLUSION

Social media is appealing an influential base of the interaction and marketing instruments utilized by global businesses. Companies need to exploit the business opportunities offered by social media to endorse themselves globally to overcome marketing challenges to survive in the disruptive business landscapes. Hence, exploring enablers in the context of social media marketing is imperative for sustainable business development across the globe.

The present study is an attempt to investigate the notable issues during the adoption of social media marketing in the context of Indian organizations. To detect key issues, wide-ranging works of literature were reviewed, and extensive dialogues with experts from diverse sectors, namely, the education sector, government sector, and manufacturing sector, were executed. Overall, 19 key issues were documented that hampered the adoption of social media tools and marketing in Indian organizations. Moreover, between the identified 19 key issues, cause-effect relationships were analyzed in the next step and consequently arranged as per their impact level using the DEMATEL approach.

The findings of this research uncovered prominent, influential causal issues that profoundly impacted the adoption of social media marketing in organizations in the Indian context. Furthermore, “Trust on the platform”, “Reliable”, “Public Opinion”, “Customer Support”, and “User Friendly” were among the top five influential causals. Apart from this, the top five effects i.e., “Speed of response”, “Customer Involvement”, “Customized engagement”, “Perceived value”, and “Loyalty intentions,” were identified as a result of causal issues. Several organizations, particularly in India, are looking forward to restructuring their business with disruption in consumer buying behaviors. However, they do not consider the holistic view of social media marketing enablers as digital driving factors to attract consumers and retain them. This study will support Indian organizations by assisting them in understanding the Social Media Marketing enablers and enable them to know what they really want to learn and know to survive profitably.



**APPENDIX FIGURE 1
GEOGRAPHICAL CONTEXTS OF IDENTIFIED STUDIES**

Appendix Table 1A Questionnaire IDENTIFYING AND PRIORITIZING ENABLERS OF SOCIAL MEDIA MARKETING	
The intention of this questionnaire is to accumulate data from the experts. Please spare few minutes in responding to the questions. Your time and assistance are highly appreciated.	
Part 1	
Section A: Details of the Respondent	
Name (Optional):	
Gender:	
Age:	
Industry/Sector:	
Work Experience (Yrs.):	
Area of Expertise:	
Educational Qualification:	
Company/Institute name (Optional):	
Role in the Organization/Institute:	
Address (Optional):	
Mobile No. (Optional):	
Email (Optional):	
Section B: Judgements Scale	
Scale: Very High (VH) High (H) Low (L) Very Low (VL) No influence (No)	
Part 2	
Section C: Judgements of the criteria: Please scale the limit using judgement scale, upto which the criteria are related	
Note: the table for data collection is added in separate sheet (Questionnaire part 2)	
Section D: Remarks/Suggestions (If any):	

Thanks for sharing your valuable input and time

**Appendix Table 1B Questionnaire
SOCIAL MEDIA ECOSYSTEM**

S. No.	Name of factors	C SF 1	C SF 2	C S F 3	C SF 4	C S F 5	C SF 6	C SF 7	C S F 8	C SF 9	C S F 10	C SF 11	C S F 12	C S F 13	C SF 14	C SF 15	C S F 16	C SF 17	C SF 18	C SF 19
SMM E1	Simple and Easy to use																			
SMM E2	Perceived Value																			
SMM E3	Customer Support																			
SMM E4	Assurance																			
SMM E5	Speed of Response																			
SMM E6	Perceived Firm Innovativeness																			
SMM E7	Loyalty Intentions																			
SMM E8	User friendly																			
SMM E9	Reliable																			
SMM E10	Safe for Data Sharing																			
SMM E11	Useful for Information																			
SMM E12	Content creativity																			
SMM E13	Consumer Involvement																			
SMM E14	Control Mechanism																			
SMM E15	Public opinion																			
SMM E16	Legal support																			
SMM E17	Appropriateness for business																			
SMM E18	Customized Engagement																			
SMM E19	Trust on the platform																			

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