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RESEARCH ARTICLE

Sustainable development through corporate social responsibility adoption and its drivers: evidence from corporate industrial sector

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Abstract

Corporate social responsibility (CSR) is a vital strategy for promoting firms' sustainable development goals, encompassing social, environmental, and economic factors. In emerging economies, manufacturing firms face mounting challenges in ensuring their sustainability. This study aims to identify the key drivers of CSR and examine their impact on CSR adoption in the manufacturing industry of Pakistan. The study employs the survey method to collect data, utilizing a one-to-one interview approach with a matrix-style questionnaire administered to a panel of experts selected through purposive sampling technique. Interpretive structural modeling (ISM) combined with Matrices' Impacts Cruise's Multiplication Appliquée a UN Classement (MICMAC) and structural equation model (SEM) are used for data assessment, modeling, and analysis. The findings indicate that compliance with government regulations and stakeholders' pressure are the essential drivers of CSR adoption and positively influence CSR adoption. Consequently, firms should consider adopting CSR strategies to enhance their sustainability based on the outcomes of this analysis.

Keywords Corporate social responsibility · Sustainable development · Drivers · Structural equation modeling · Corporate industrial sector · Pakistan

Introduction

The intensifying competition in today's business environment has underscored the importance of firms achieving sustainable development goals. Development in social, economic, and environmental practices is imperative for effectively managing organizations' survival and growth. Consequently, adopting corporate social responsibility (CSR) strategies has witnessed a surge in recent years due to its contribution to sustainable practices, encompassing ecological protection, ethical standards, fostering a better corporate society, promoting social cohesion, enhancing shareholder satisfaction, and bolstering the nation's economy (Moktadir et al. 2018a, b; Frynas and Yamahaki 2019).

In light of these developments, this study aims to explore the concepts and adoptions of CSR, which encompass how firms integrate social and environmental concerns into their operations (Carroll 1979; Garriga and Melé 2004) and interactions with stakeholders beyond mere economic profits. The rapid expansion of CSR's importance as a tool for promoting long-term sustainability in the corporate landscape has prompted numerous research studies on CSR adoption. For instance, Bux et al. (2020) emphasize that the successful integration of an organization's sustainability cannot be achieved without CSR. They propose a conceptual framework to comprehend CSR adoption. Fatima and Elbanna (2022) conducted systematic reviews of 122 organizations to empirically analyze CSR implementation in fostering organizational interests.

Moreover, Tourky et al. (2020) interviewed senior executives in leading UK-based companies to explore their intentions regarding CSR implementation in business practices. Meanwhile, Mai et al. (2021) examine the competitive advantages of implementing CSR in Vietnam's trade, service, and manufacturing sectors. Adomako and Nguyen (2020) delve into the connection between political ties and

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CSR implementation, drawing on data from 473 small- and medium-sized enterprises (SMEs) in Ghana. Despite the high priority of CSR to enhance organizational performance, the concept has not been widely adopted in developing economies (Vo et al. 2022). Consequently, various studies have been dedicated to devising approaches to promote CSR adoption in different economic contexts (Frynas and Yamahaki 2019).

The study addresses a significant gap in the literature on CSR adoption in the manufacturing industry of developing economies. It proposes a comprehensive, innovative, integrated ISM, MICMAC, and SEM modeling research framework. Firstly, it contributes to the emerging literature on CSR implementation by identifying critical CSR drivers for adopting CSR in the manufacturing industry. Secondly, it contributes to the emerging literature on CSR management by examining the impact of critical drivers (such as compliance with government regulations, stakeholder awareness, environmental protection, and ethical values) on CSR adoption. Lastly, this study expands the literature on corporate sustainability by implementing CSR in developing economies, particularly the manufacturing industry of Pakistan.

The rest of the paper is structured as follows. The "Theoretical background and research hypotheses" section discusses the research context and hypotheses. The "Methodology" section describes the methodologies employed in this investigation. The data analysis and outcomes of the integrated framework (i.e., interpretive structural model, measurement model, and structural model) are described in the "Data analysis and results" section. The "Conclusions and discussion" section ends with a conclusion and discussion.

Theoretical background and research hypotheses

Theoretical background

CSR has a rich tradition dating back to 1930 and was coined by two Harvard professors (Russo and Perrini 2010). It is of substantial present concern and equally significant for decision-makers and business organizations (Colombo et al. 2019). Recently, organizations worldwide have commenced economic, social, and environmental tasks to integrate CSR and deal with global competition (Eweje and Bathurst 2017). Thus, to achieve organizations' sustainability in the marketplace, these CSR aspects must be implemented; for example, in the social sphere, CSR implements social activities to improve society and social behavior (Murmura et al. 2017); in the environmental sphere, CSR implements safe working conditions at the workplace (Hasan and Habib 2017); and from the economic standpoint, CSR acts as a profit gain across all business activities (Haigh and Jones 2006). However, there is no consensus on the importance of CSR since it includes and contains the contribution of several different research streams (Carroll 1999; Peloza 2009), but its adoption and image are constantly developing.

CSR has a vigorous challenge in the manufacturing industry, and basic sustainability practices (i.e., social, environmental, and economic) start with CSR. Hence, it upsets the performance and competence of sustainability. In this study, we consider manufacturing organizations operating in Pakistan. The manufacturing sector is the second-largest sector contributing to the economy after agriculture in Pakistan (Ikram et al. 2019). Manufacturing organizations face environmental degradation and social disparities (Waas et al. 2014; Ahmad and Wong 2018). With the rigorous consumption of resources, this industry faces considerable social, environmental, and economic risks (Ahmad and Wong 2019). As a result of a lack of CSR adoption, the acceptance of sustainability policies (Policy and Regulations on SWM 2010; Ali et al. 2019), economic challenges, and societal issues of organizations in Pakistan is still hindering their sustainable growth (Khan and Hassan 2019).

Currently, the manufacturing sector of Pakistan is facing challenges to its sustainability performance, for example, social behavior, environmental degradation, and lagging economic concern (Ikram et al. 2019). The organization issue related to socially responsible behavior (Sajjad and Eweje 2014), mainly employees' job stability, creating a positive work environment and developing skills, diversity, work-life balance, empowerment, and employee engagement (Altheeb et al. 2023). In the same way, organizations are deeply concerned about environmental sustainability. According to the 2017 climate index of the world, Pakistan ranks seventh, not only as a climate-vulnerable region (Eckstein et al. 2017) but also as a nation that generates carbon emissions from fossil fuels (Shah et al. 2018, Sohail et al. 2022). Economically sustainable constraints, such as tax-to-GDP ratios, current deficits, and financial performance, fail to function well (Ali and Rehman 2015). In light of these challenges, it is imperative to recognize fundamentals that will ensure the adoption of CSR to achieve organizations' sustainable development goals.

Therefore, organizations need to ensure CSR adoption to overcome these challenges. As a result, the current study extent in the literature review presents the theoretical and empirical framework to examine CSR drivers and their contextual relationship, which drivers with the most significant driving power and ability to influence the other drivers are then integrated into an empirical analysis. These driving factors improve organizations' sustainability performance (i.e., social, environmental, and economic) by reducing pollution, improving employee facilities, minimizing risk, and increasing financial returns (Allevi et al. 2018; Li et al. 2022). Thus, the drivers are CSR performance indicators and the promotion of sustainability within firms (Moktadir et al. 2018a,

b). The other literature reviews on the drivers of CSR adoption are given in Table 1. Based on the literature review, 19 drivers were determined. Then, these drivers were discussed with 20 experts from manufacturing organizations, and their numbers decreased to 18 drivers. The drivers used in this study and their explanations are given below.

Drivers of CSR adoption

Corporate social responsibility is a systematic tool for aggregate sustainability and declining instability of industries. Organizations can benefit from implementing CSR by enhancing social, environmental, and economic sustainability. In this regard, driving factors can encourage firms to engage in CSR by ensuring significant profits.

1. *Employment opportunities*. Firms can develop CSR policies to improve economic and social conditions nationwide. Shared experiences identify best practices for employees to live better lives.
2. *Alignment with corporate ethical and moral values*. Firms have adopted CSR as one of the most influential backgrounds for considering moral responsibility. An appeal to values like equality, justice, or rights can justify CSR as a response to ineffective business ethics.
3. *Compliance with government rules and regulations*. Regulatory compliance is frequently described as adhering to laws, regulations, and standards established by government legislation and regulatory agencies that relate to a firm depending on its industry.
4. *Long-term financial and economic benefits*. CSR ensures long-term shareholder value; a solid correlation between CSR and impressive economic success leads to positive social performance. Long-term economic gains are positively connected with more successful firms having more incredible resources to engage in CSR initiatives relating to labor relations, community relations, and the environment.
5. *Competitive advantage in regional and international markets*. CSR enhances competitive advantage, which is the unique capabilities and value the organization provides its customers through valuable products and services. Therefore, the company has a stronger competitive position in the market than its competitors.
6. *Environment protection and natural resource conservation*. Environmental protection can decrease climate change risk through simultaneously tumbling statewide emissions of harmful greenhouse gases, while reservation of natural resources and a rich diversity of habitat, landscapes, plant life, and wildlife drive originations for business sustainability.
7. *Promotion of waste management practices and renewable energy consumption*. To ensure environmental sustainability, firms must promote waste management practices (i.e., recycling, composting, incineration, landfills, bioremediation, waste to energy, and waste minimization). Furthermore, firms must control the use of energy from all renewable sources.
8. *Increased customer loyalty*. CSR strategies increase customer loyalty by building relationships to retain customers. In addition, firms provide the most compelling value proposition and create advocates.
9. *Promotion of transparency and increased investor confidence*. Transferring CSR support criteria from firms can stimulate investment by fostering transparency.
10. *Improve the reputation and image of the company*. Adoption of CSR will increase firms' reputation and image by ensuring high quality and service to customers.
11. *Improved working environment and concentration on employee welfare*. The firm's first objective of offering employee benefits is to improve their employee's work environment (i.e., workers' welfare, safety, job satisfaction, and organizational culture).
12. *Attract capital investment*. When firms adopt CSR strategies, they invest in both financial and non-financial value, either internally or externally. Investing in these strategies will help firms achieve sustainability in a competitive market.
13. *Human rights protection (e.g., prohibition of child labor and women empowerment)*. The firms' CSR practices can empower women, ensure children's safety from exploitative and hazardous labor, and promote their rights.
14. *Support product innovation and improved quality*. Integrating socially responsible work environments into product innovation can enhance every stage (discovery, decision, development, and delivery).
15. *Media support*. Firms promote CSR-related initiatives using social platforms, print media, and digital media. These CSR-based activities include social and environmental (i.e., prohibition of child labor, women's empowerment, philanthropy development, promotion of waste management, carbon emissions, compliance with green environment, and renewable energy production).
16. *Social demand for ethical values, honesty, and transparency*. As part of CSR, firms are expected to take moral responsibility, demanding full transparency to enhance virtues such as honesty and ethical values.
17. *Stakeholders' pressure for CSR adoption*. The pressure of stakeholders for CSR adoption can lead to competitive advantages such as increasing the legitimacy and image of the firm, making them influential stakeholders, and becoming the leading competitor.
18. *Meeting community expectations through infrastructure development and philanthropic activities*. The

Table 1 The identified drivers of CSR adoption in Pakistan manufacturing firms

No	Drivers to CSR	References										
		A	B	C	D	E	F	G	H	I	J	K
1	Employment opportunities											
2	Alignment with corporate ethical and moral values			✓								
3	Compliance with government rules and regulations			✓					✓			
4	Long-term financial and economic benefits											
5	Competitive advantage in regional and international market											
6	Environment protection and natural resource conservation	✓				✓						
7	Promotion of waste management practices and renewable energy consumption								✓			
8	Increased customer loyalty		✓		✓	✓					✓	
9	Promotion of transparency and increased investor confidence											
10	Improve the reputation and image of the company						✓	✓	✓			✓
11	Improved working environment and concentration on employee welfare			✓	✓							
12	Attract capital investment											✓
13	Human rights protection (e.g., prohibition of child labor and women empowerment)								✓	✓		
14	Support product innovation and improved quality					✓				✓		
15	Media support											
16	Social demand for ethical values, honesty, and transparency											
17	Stakeholders' pressure for CSR adoption						✓					✓
18	Meeting community expectations through infrastructure development and philanthropic activities											
19	Promotion of green economy[d]									✓		

No	Drivers to CSR	References									
		L	M	N	O	P	Q	R	S	T	U
1	Employment opportunities		✓	✓							
2	Alignment with corporate ethical and moral values										
3	Compliance with government rules and regulations		✓								
4	Long-term financial and economic benefits		✓		✓						
5	Competitive advantage in regional and international market		✓			✓				✓	
6	Environment protection and natural resource conservation		✓					✓			
7	Promotion of waste management practices and renewable energy consumption										
8	Increased customer loyalty		✓	✓							
9	Promotion of transparency and increased investor confidence								✓		
10	Improve the reputation and image of the company	✓	✓								
11	Improved working environment and concentration on employee welfare			✓							
12	Attract capital investment										

Table 1 (continued)

No	Drivers to CSR	References L	M	N	O	P	Q	R	S	T	U
13	Human rights protection (e.g., prohibition of child labor and women empowerment)		✓								
14	Support product innovation and improved quality						✓				
15	Media support		✓								
16	Social demand for ethical values, honesty, and transparency	✓									
17	Stakeholders' pressure for CSR adoption										✓
18	Meeting community expectations through infrastructure development and philanthropic activities		✓								
19	Promotion of green economy[d]						✓				

References: A, Moon (2004); B, Sprinkle and Maines (2010); C, Arevalo and Aravind (2011); D, Santos (2011); E, Valmohammadi (2011); F, Laudal (2011); G, Hsu (2012); H, Govindan et al. (2014); I, Graafland and Zhang (2014); J, Zhu and Zhang (2015); K, Kuo et al. (2016); L, Zhang et al. (2019); M, Moktadir et al. (2018a, b); N, Barrena-Martinez et al. (2018); O, Moktadir et al. (2018a, b); P, Bello and Kamanga (2018); Q, Zhang et al. (2018); R, Ikram et al. (2019); S, Dyck et al. (2019); T, Bhattacharya et al. (2009); U, Kowalczyk and Kucharska (2020)

[d]Deleted drivers

most basic need for every nation's population growth is access to primary services, such as health, education, energy, water, and sanitation. Therefore, firms must support social, legal, and physical infrastructure to empower people, protect human rights, and ensure that people live a dignified life in their country.

19. *Promotion of green economy*. Green economies include infrastructure and assets that allow reduced carbon emissions and pollution, improved energy efficiency, preserved biodiversity and ecosystem services, and efficient energy use.

In light of previous scholarship on CSR strategy, this study focuses on the drivers of CSR to identify critical CSR drivers and their effects on the CSR adoption in the manufacturing industry of Pakistan. For this purpose, first interpretive structural modeling (ISM) is applied to the drivers of CSR to understand the relations between these measures.

According to Talib et al. (2011), ISM is a structural model that elaborates the relationship among variables in complex structures to reveal them in a specific hierarchical pattern. It is widely used to identify how system elements interact, like drivers. Orji (2019) uses the ISM framework to investigate the barriers and drivers of organizational change for sustainable performance. Raut et al. (2017) use ISM to explore the critical success factors of CSR to SSCM implementation in oil and gas firms in India. Karamat et al. (2019) investigate the drivers of knowledge management in the health sector by applying ISM Cross-Impact Matrix Multiplication Analysis Classification (MICMAC). By using ISM, Bux et al. (2020) are modeling the CSR barriers to its implementation in the Pakistan manufacturing industry. Kumar et al. (2019) assess ISM for prioritizing the enablers of CSR adoption in the Indian manufacturing sector. Using ISM-MICMAC, Sharma et al. (2019) explore the challenges associated with the circular economy for sustainability in the Indian food supply chain. Based on my knowledge, this is the first study to an extent in the literature review that applies the ISM framework to recognize the critical drivers of CSR for its adoption process, particularly for the manufacturing industry in a developing economy, Pakistan.

The FDM is a frequently used approach in business and management research that incorporates expert viewpoints into consideration to facilitate judgment on a specific subject (Cairns and Wright 2018). We used the ISM-MICMAC model in the second stage. ISM is a statistical model-based approach that systematically highlights the relationships among variables by representing them in a hierarchical design. ISM is a frequently used approach for revealing the interaction of different components (drivers) (Talib et al. 2011). Furthermore, detailed literature on ISM-MICMAC and SEM application in earlier studies is presented in Table 2.

Structural equation models (SEM) are used in the second part of the study to validate the ISM model results. It can be

used to analyze multivariate data since it illustrates the relationship between exogenous and endogenous latent variables (Aibinu and Al-Lawati 2010; Kline 2015). Several studies have applied SEM in the literature, particularly in psychology, sociology, and econometrics (Golob 2003). The studies we mention are only in fields related to our topic. Helmig et al. (2016) examine stakeholder pressure's impact on CSR adoption in Switzerland's medium-sized and large manufacturing firms. Avotra et al. (2021) explore the effects of E-government on CSR performance. Pham et al. (2022) empirically investigate the impact of barriers on CSR practices. In Chinese construction firms, Zhang et al. (2022) study the impact of mechanisms and factors on CSR adoption. To our knowledge, this first kind of study provides the integrated theoretical and empirical ISM and SEM framework to analyze the influence of CSR drivers on its adoption process for the manufacturing industry in Pakistan. We further tested the theoretical hypotheses of the study through path analysis using the maximum likelihood estimation method.

Furthermore, approaches are explained in detail ("Methodology" section), and the conceptual framework of this research is illustrated in Fig. 1.

Research hypothesis

This study consists of two objectives. The first objective is to study the interconnections among the CSR drivers and determine the most essential one. In the second objective, the influence of drivers on CSR adoption is studied. We have one leading research hypothesis, which is as follows:

> Hypothesis 1 (H1). Drivers of CSR have a positive effect on the adoption decision.

Methodology

Sampling and data collection

For the study's first objective, data were collected from organizations in Pakistan's manufacturing industries, including textiles, autos, oil and gas, steel, pharmaceuticals, and beverages. A total of 40 specialists from these industries were contacted for data gathering. However, obtaining specialists' responses proved challenging, requiring multiple emails and persistent efforts. Eventually, 15 of the 40 specialists agreed to participate and provide data. Additionally, 14 academicians were approached, and five agreed to respond. This formed a panel of 20 specialists who contributed their expertise to examine the drivers of CSR adoption.

The expert panel comprised a diverse group, including eight executives, four CSR managers, three environmental conservation managers, three management professors, a business management academic, and an environmental science professor. These specialists were carefully selected based on their educational qualifications (Ph.D.), skills, and judgment abilities. The selection criteria also included a minimum of 7–10 years of professional experience to ensure their expertise and credibility. The sample size of 20 specialists was deemed appropriate for the population under investigation.

Subsequently, the provided framework was utilized to conduct an in-depth analysis of the research topic, aiming to gain valuable insights into the drivers of CSR adoption in the manufacturing industry of Pakistan.

Identification and selection of the drivers

In the initial stage of the proposed framework methodology (Fig. 1), this study aims to identify the significant drivers of CSR adoption. A comprehensive literature review was conducted to achieve this objective, encompassing relevant studies on CSR drivers across various contexts. The literature search focused on studies on sustainability, organizational and industrial strategy, and sustainable practices, which have been published in reputable journals.

To ensure the reliability and authenticity of the literature, a thorough search was performed in well-established databases, including Scopus, Web of Science, Google Scholar, Taylor & Francis, Wiley Online, ScienceDirect, Emerald Insight, and Springer. Specific keywords were employed during the search process, such as "Corporate social responsibility adoption," "Corporate social responsibility drivers," "CSR drivers," "CSR driving forces," "CSR adoption," "CSR in the manufacturing industry," "CSR in Pakistan," and "CSR adoption in developing economies."

By systematically exploring the relevant literature using these keywords and databases, the study aimed to identify and compile a comprehensive list of CSR drivers to be further analyzed and integrated into the proposed framework.

Shortlisting CSR drivers through the FDM survey questions

FDM is a systematic, interpretative, and communicative technique primarily dependent on experts' input. The experts respond in numerous rounds. At the end of each game, a moderator compiles a summary of responses with reasons and then presents it to experts and helps them evaluate their reaction to the solutions supplied by other panel members. This procedure allows experts to reduce the number of variables impacting a system and determine the most crucial ones.

The center of gravity criteria is adopted to select CSR drivers and acquire experts' opinions. During FDM surveillance, the following processes are used: (a) collecting information using a questionnaire in which fuzzy triangular numbers (TFNs) are utilized to measure the severity

Table 2 The application areas of ISM-MICMAC and SEM

S. no	Authors	The objective of the study	Industry	Country	Methodology		
					ISM-MICMAC	SEM	Both
1	Tushar et al. (2023)	Exploring the challenges to sustainability for medical waste management adoption	Medical industry	Bangladesh	✓		
2	Yu and Choi (2016)	Examining the effect of stakeholder pressure on CSR adoption for Chinese companies	Chinese companies	China		✓	
3	Shaikh et al. (2022)	Modeling the barriers to the implementation of circular supply chain management (CSCM)	Fast-moving consumer goods sector	Pakistan	✓		
4	Khaba et al. (2021)	Exploring the key lean enablers for the coal mining industry India	Coal mining industry	India			✓
5	Pham et al. (2022)	Empirically investigate the impact of barriers on CSR practices	Construction firms	Vietnam		✓	
6	Goyal and Routroy (2023)	Modeling the enablers of environmental sustainability	Steel manufacturing	India	✓		
7	Karmaker et al. (2023)	Prioritizing challenges of I5.0 implementation for long-stand supply chain sustainability	Industry 5.0 (15.0)	Emerging economies	✓		
8	Zhang et al. (2022)	Examine the influence of mechanisms and factors on CSR implementation	Construction firms	China		✓	
9	Hussain et al. (2022)	Identifying the green, lean, and six sigma adoption for the sustainable construction industry	Construction industry	Pakistan	✓		
10	Singh and Rathi (2021)	Exploration of barriers of lean six sigma in small- and medium-sized industries	Small- and medium-sized industries	Entirely			✓
11	Orji (2019)	Investigating the barriers and drivers of organizational change for sustainability performance	Metal manufacturing	China	✓		
12	Cantele and Zardini (2020)	Analyze the impact of barriers, pressure, and benefits on sustainability performance in SMEs	Small- and medium-sized enterprises	Italy		✓	
13	Ullah and Narain (2021)	Analyzing the barriers to the adoption of mass customization	SMEs	India			✓
14	Cheffi et al. (2021)	CSR antecedents and practices as a path to enhance SME performance	Small- and medium-sized enterprises	United Arab Emirates		✓	
15	Bux et al. (2020)	Identifying the barriers to CSR adoption	Manufacturing	Pakistan	✓		

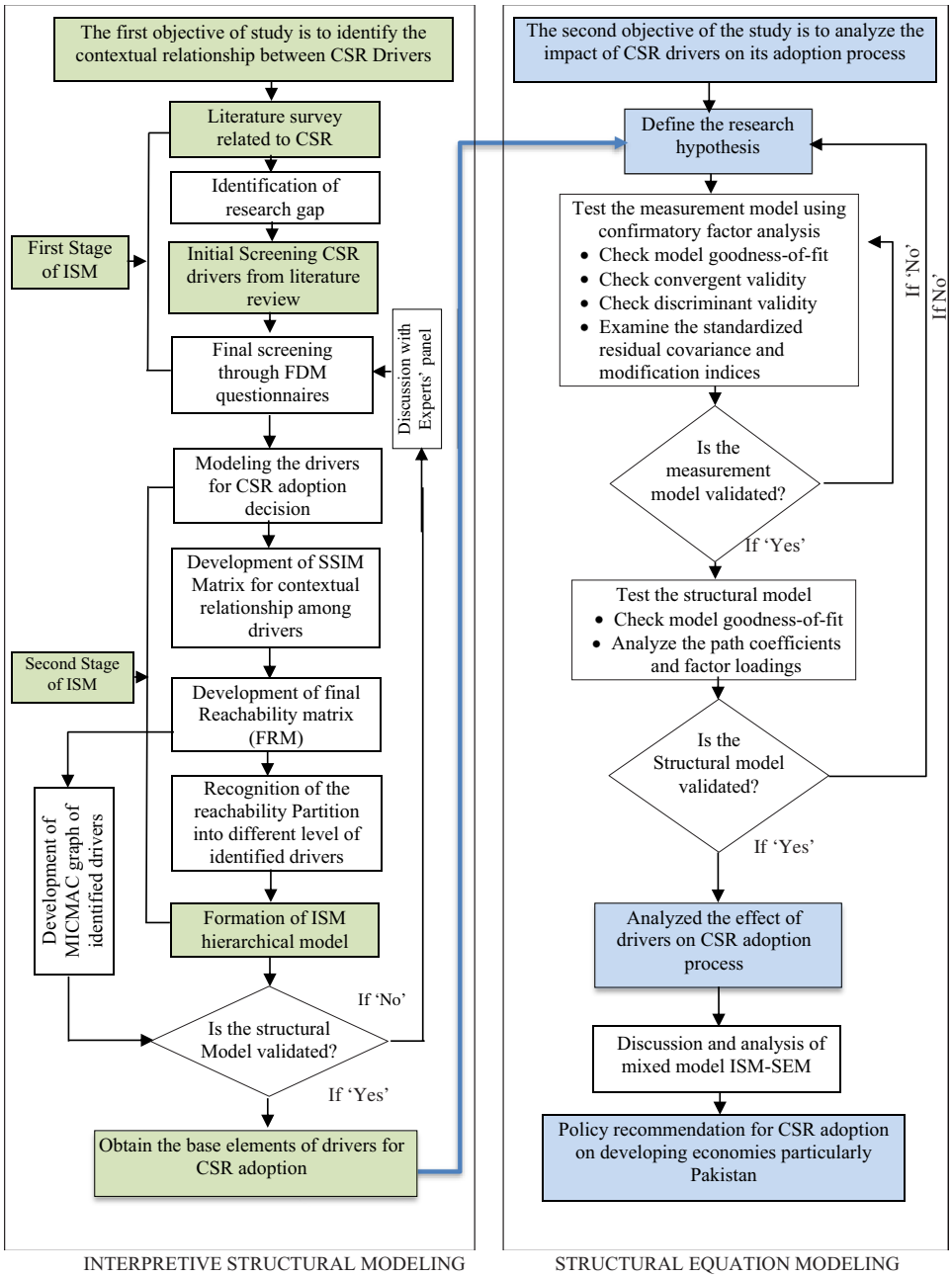

Fig. 1 Proposed research structure of analyzing the influence of drivers on the CSR adoption in Pakistan manufacturing firms

of CSR drivers, (b) converting CSR drivers' ambiguous weight Wwk into a single number Vk, and (c) Wwk directs the TFNs accumulated by integrating the three fuzzy number values (minimum, geometric mean, and maximum).

Therefore, the center of gravity rule Vk = (Minimum value, GM, maximum value)/3 can be used to calculate Vk. Here, Vk specifies the threshold value for identifying the most critical CSR drivers. After three cycles using FDM with an initial selection list of 19 CSR drivers, the experts agreed to keep 18 CSR drivers for further investigation. The identification and filtering of CSR drivers are shown in Table 1.

For the study's second objective, a two-stage field study was conducted to collect survey data from owners and top managers of manufacturing organizations. The scales of the independent and dependent variables were developed and evaluated using established instrument development procedures (Bagozzi et al. 1991). The survey items were rated on a 5-point Likert scale, ranging from 0 (strongly disagree) to 5 (strongly agree). To ensure the appropriateness of the questionnaire for Pakistani organizations, a sample questionnaire was pretested with 20 owners/managers, reducing the number of items. The final version of the survey was administered to managers responsible for formulating and implementing CSR strategies within their organizations.

To select the target population of manufacturing firms, 392 Pakistani manufacturing firms listed on the Pakistan

Stock Exchange (PSX) and actively practicing CSR were contacted. The Securities and Exchange Commission of Pakistan (SECP) regulated these publicly listed manufacturing firms under the Companies Ordinance 1984. The SECP released guidelines in 2013 to promote socially responsible business activities among publicly owned firms, facilitating stakeholder engagement and cooperation (Javaid Lone et al. 2016; Pakistan Centre for Philanthropy PCP 2016). Publicly traded firms were considered appropriate for this study due to their resources and knowledge about CSR and its industry implications (Sajjad and Eweje 2014).

After multiple reminders, 274 organizations' managers completed the questionnaires, and data from 18 organizations were excluded due to partial completion. Consequently, data from 258 manufacturing firms were included in the final analysis. Most respondents (52%) were aged between 44 and 55 years and held positions as board members or executives, with an average of 3 years of experience in their roles. Another 25% of respondents were aged between 33 and 43 years. Most respondents (85%) were male, while 10% were female. Around 59% of respondents held a master's degree in organizational management or business, and 21% had professional certifications.

Interpretive structural modeling

An interpretive structural modeling (ISM) was established and handled by Warfield (1973), and its foundations derive from graph theory. The ISM method converts a system's ambiguous, poorly articulated cognitive structures into observable, well-defined models applicable to every task (Sage 1977).

In the first objective of this study, as illustrated in Fig. 1, we use the ISM method for investigating the CSR drivers for its CSR adoption process. This framework has a clear scope and a reliable nomenclature, and it accurately illustrates the factors (drivers). Therefore, we have highlighted some recommendations based on our study framework and associated methods (Platts and Gregory 1990). The following are the significant steps in the suggested research framework:

1. The methods related to the present framework, such as literature collection, driver selection, and the application of research techniques, are all associated with this study's purpose.
2. The ISM framework has two stages (see Fig. 1): recognizing and screening the CSR drivers by literature with the support experts' opinions. The second stage filters these identified and selected drivers with specific statistics.
3. This stage examines the connection between the identified drivers and establishes hierarchical levels for the drivers to implement CSR. The ISM-MICMAC technique is utilized for this purpose.
4. This study's findings are beneficial to managers and specialists. Furthermore, this model assists managers in (a) selecting relevant drivers for CSR adoption, (b) identifying relationships between recognized drivers, and (c) developing hierarchical levels of CSR drivers.

Structural equation model

A structural equation model (SEM) is a multivariate method that allows the researcher to examine a series of dependent relationships between the measured variables and latent constructs and between the latter (Hair et al. 2006). This study uses Anderson and Gerbing's (1988) two-step approach, which estimates the measurement model before the structural model. The AMOS 22.0 application uses the maximum likelihood estimation approach to test measurement and structural models.

We performed confirmatory factor analysis (CFA) to assess the measurement model, as Hair et al. (2006) outlined. Moreover, evaluate the model χ^2 and its validity first. According to Jöreskog and Sörbom's (1993) suggestion, we investigate the χ^2 with the number of degrees of freedom, i.e., $\chi^2 = \mathrm{df}$. Furthermore, for the calculation of various goodness-of-fit metrics, we adopted standardized root mean square (SRMR), goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), normed fit index (NFI), comparative fit index (CFI), and root mean square error of approximation (RMSEA) based on Hu and Bentler's (1998) recommendations.

After evaluating the fit of the measurement model, the study proceeds to examine the convergent validity of the constructs. This validity is assessed through factor loadings, average variance extracted (AVE) for each latent variable, and construct reliability (CR). To ensure the accuracy of the measurement model, modification indices are investigated to identify any flaws that may require adjustments.

Once the measurement model is validated, the focus shifts to evaluating the structural model. The primary objective here is to examine the hypothesized correlations between the variables. Similar to the measurement model, the goodness-of-fit of the structural model is assessed using relevant metrics. The regression coefficients and loading calculations are analyzed after calculating the goodness-of-fit metrics for the structural model.

Figure 1 provides an overview of the suggested research framework and the step-by-step procedure, with the main study activities highlighted for clarity.

Data analysis and results

Recall that the first goal of this research is to identify the relationships between the CSR drivers. As mentioned in Section "Sampling and Data Collection" and Table 1, there are 18 drivers in the initial stage. In the subsequent stage, these drivers are integrated into the ISM modeling.

Interpretive structural modeling

Structural self-interaction matrix

This study sought input from the panel of experts to examine the contextual relationship between the drivers. The "leads to" type of contextual connection was adopted, indicating that one driver can lead to others. By arranging the drivers in a pairwise manner, their relationships were revealed. Subsequently, contextual relationships were developed between the drivers, following a methodology previously used by Kumar and Rahman (2016).

Furthermore, as described by Luthra et al. (2011), certain symbols were utilized to represent and analyze the contextual relationships between the drivers. These symbols likely served as a visual representation of the relationships and interactions between the drivers in the proposed research framework.

1. V—driver (i) will reach barrier (j)
2. A—driver (j) helps to reach barrier (i)
3. X—drivers (i) and (j) help one another
4. O—drivers (i) and (j) are not associated

The structural self-interaction matrix (SSIM) for CSR drivers was constructed using these symbols and experts' feedback. The result is provided in Table 6 in Appendix. Appendix contains all of the tables for the ISM approach.

Initial reachability matrix

After developing the SSIM, the next step is to create the initial reachability matrix (IRM). As a result, we reintroduced the SSIM entries using binary integers (0 and 1). The conversion followed a set of rules which are explained below:

1. For each (V) in SSIM, we put "1" in the (i, j) entry and "0" in the (j, i) entry.
2. For each (A) in SSIM, we put "0" in the (i, j) entry and "1" in the (j, i) entry.
3. For each (X) in SSIM, we put "1" in the entries (i, j) and (j, i).
4. For each (O) in SSIM, we put "0" in the entries (i, j) and (j, i).

The IRM for drivers of CSR adoption is given in Table 7 in Appendix.

Final reachability matrix

Now, we use the transitivity rule mentioned in the method step to convert the IRM (Table 7 in Appendix) to the final reachability matrix (FRM). Table 8 in Appendix displays the FRM derived for CSR adoption drivers. Formerly, driving and dependent power were obtained by calculating the row and column entries in the FRM. Furthermore, this supports developing hierarchical levels of the ISM model and clustering using Cross-Impact Matrix Multiplication Analysis Classification (MICMAC) applied to CSR drivers.

Level partitions

In addition, FRM was employed to partition drivers into various levels to understand their significance in the hierarchy. Accordingly, the reachability set and the antecedent set were constructed. Reachability sets include both the driver itself and the other drivers that affect the driver. The antecedent set of drivers consisted of the driver elements themselves and other drivers that affected the driver elements. In addition, the intersection set was developed by integrating these two sets. This procedure was applied to all drivers. When the reachability and intersection sets are the same, we assign the driver to level.

For example, increased customer loyalty (D8), improved working environment and concentration on employee welfare (D11), and attracting capital investment (D12) have been added to level 1. Then, the driver that is already assigned to a level is eliminated. Partitioning continues until at least one group has been set for all drivers. The level partitioning process for CSR drivers and the development of the ISM model are shown in Tables 10, 11, 12, 13, 14, and 15 in Appendix.

ISM model

Table 9 in Appendix illustrates the drivers retrieved at each partition level after removing all alteration levels. It indicates the number of eliminated levels and the drivers restored at each level. Based on these observations, the ISM model's hierarchical levels are formed, as illustrated in Fig. 2.

Although the drivers at the top levels are the least influential in the ISM model presented in Fig. 2, those at the lower levels are the most significant. Three drivers (D12, D11, and D8) appeared at the highest level (level 5); these drivers are the least important, and the lower levels influence their severity. The linkage drivers are the second, third, and fourth level drivers who mediate the interaction between the low- and high-level drivers. The low-level drivers (levels 5 and 6) impact CSR adoption the most.

Measurements of the variable through the MICMAC approach

The Cross-Impact Matrix Multiplication Analysis Classification (MICMAC) approach is used to identify each driver's level and evaluate the driver's driving and dependency power. FRM is used to calculate the driving power and dependencies and to understand the rows and columns. The interpretation of

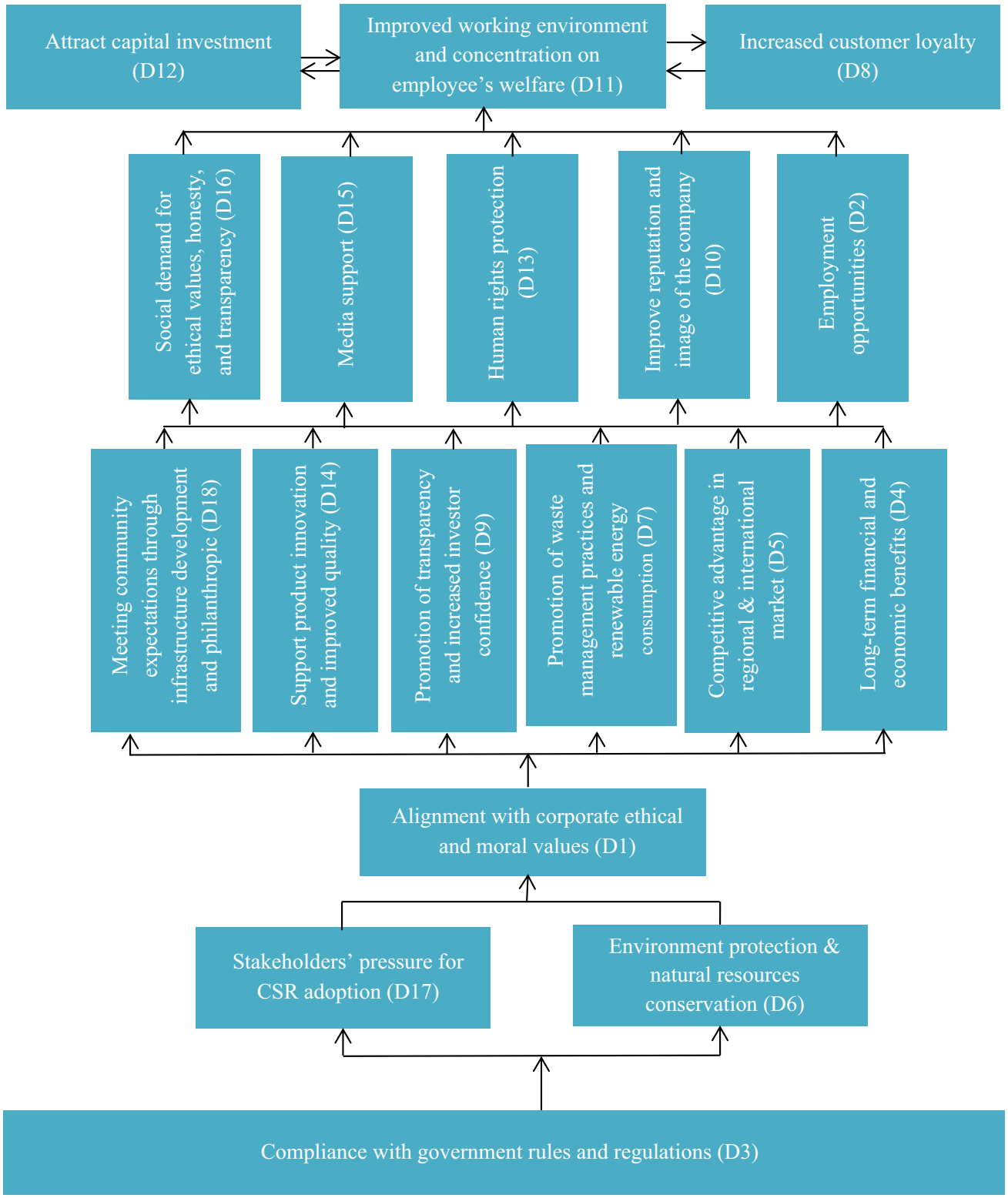

Fig. 2 ISM-based model and hierarchal level of drivers influencing CSR adoption

rows and columns for each driver reveals the driving force and dependent force (Fig. 3). Therefore, the 18 drivers are classified into four groups, and the MICMAC research chart demonstrates the drivers' driving and dependency force, as shown in Fig. 4.

Autonomous The group of drivers has less driving and dependency power and a lower attachment to the system. This group contains no drivers. As a result, all 18 identified drivers positively influence CSR adoption.

Dependent The group of drivers is at the top of the hierarchical ISM model, with a weak driving force and a strong dependence force. According to the MICMAC study chart, attracting capital investment (D12) and employment opportunities (D2) are dependent variables.

Linkage The group of drivers has high driving and dependence power. These are the 13 drivers in the middle of the ISM hierarchical model, including the promotion of transparency and increased investor confidence (9), support of product innovation and improved quality (14), environment protection and natural resource conservation (6), and long-term financial and economic benefits (4), furthermore the promotion of waste management practices and renewable energy consumption (7), improved reputation and image of the company (10), increased customer loyalty (8), media support (15), human rights protection (13), improved working environment and concentration on employee's welfare (11), meeting community expectations through infrastructure development and philanthropic (18), stakeholders' pressure for CSR adoption (17), and social demand for ethical values, honesty, and transparency (16). All of them belong to this group. As these drivers are delicate, they require detailed analysis, and practitioners should constantly monitor them at each level of adoption.

Drivers The group of drivers is at the bottom of the ISM model and has a strong driving force but a weak dependency force. Our investigation identified a driver, "compliance with government laws and regulations (3)," as the driving force. It is the main reason for all other drives. The manufacturing industry needs to focus more on this driver. It can help to enhance other drivers in the middle and top levels of the ISM model. A high driving force driver impacts several other dependent drivers. Therefore, this driver must be prioritized.

Finally, the drivers to CSR adoption were compiled according to their association with other categories; the driving drivers lead to linkage drivers, which, in turn, lead to dependent drivers. The drivers' directional effect, as determined by the MICMAC analysis, is shown in Fig. 3.

After modeling MICMAC, we create a digraph model using FRM based on vertices/nodes and edge lines. The diagram represents the model of drivers developed by leveraging FRM. Furthermore, the ISM-based hierarchical model was developed by removing transitivity links from the diagram model and placing the specified driver in the area of its node. As a result, a hierarchical ISM-based model has been designed for drivers in which CSR is driven by compliance with government regulations (3), which constructs the

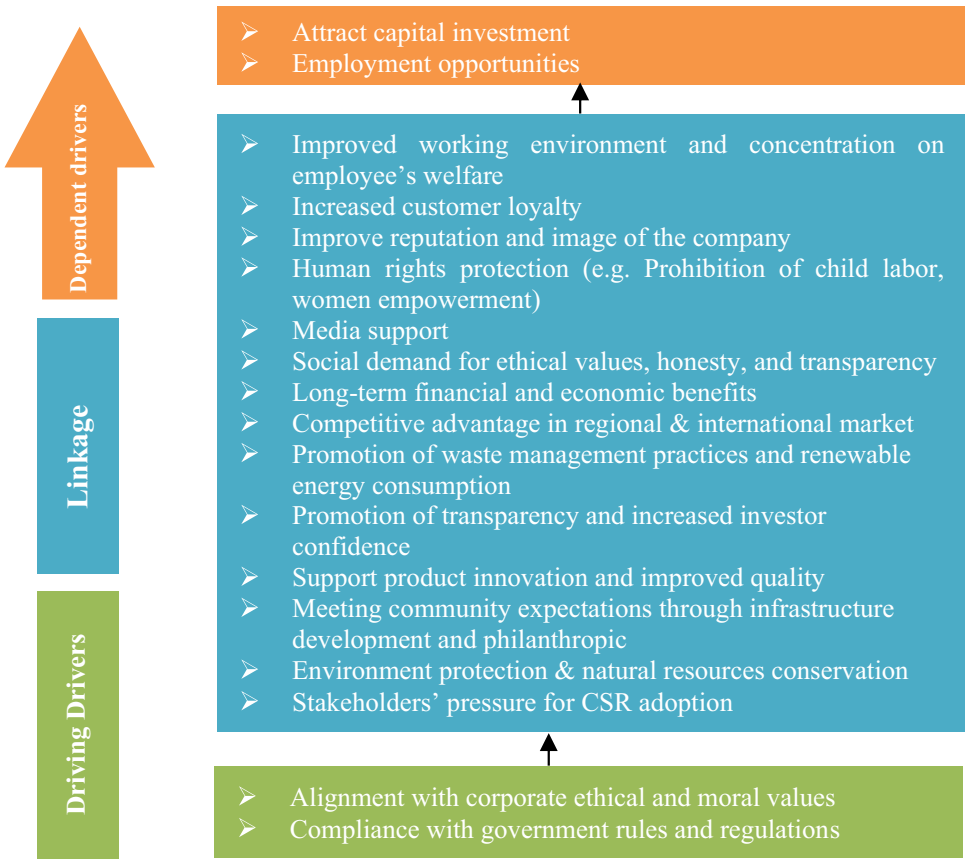

Fig. 3 Relationship among categories of CSR adoption drivers based in MICMAC

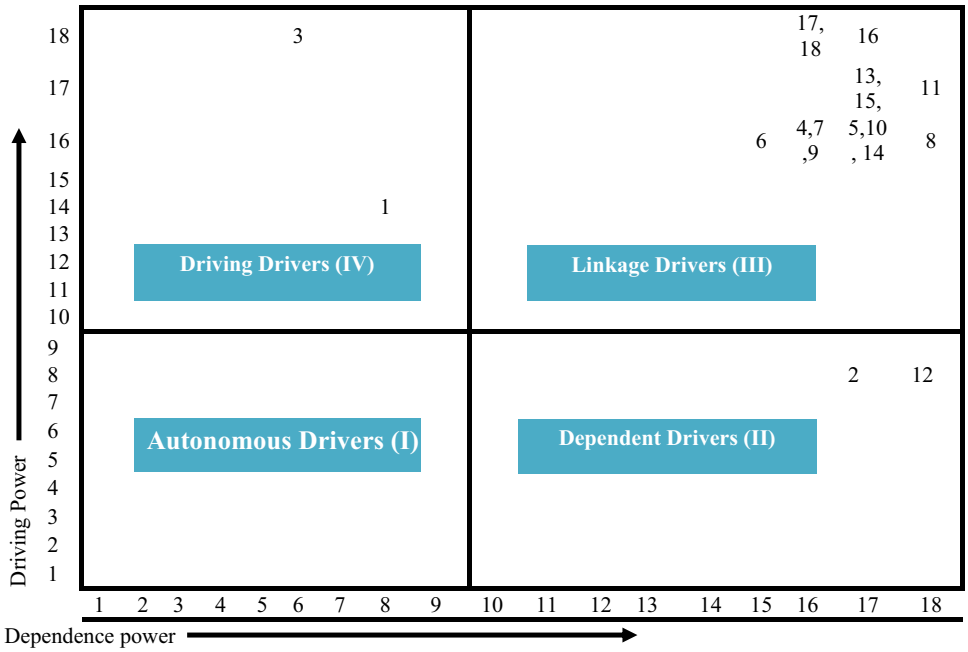

Fig. 4 MICMAC analysis of the adoption CSR drivers

foundation of the hierarchical ISM model for CSR adoption in developing economies.

Structural equation modeling

According to the outcomes of the ISM models (see Fig. 3), four drivers of CSR constitute the bottom three levels of the hierarchy, and they are found to be the root causes of the other drivers. These drivers are then documented in the SEM model and evolve indicators of the latent variables, as demonstrated in Table 3.

Measurement model assessment

We employ the Anderson and Gerbing (1988) two-step approach, in which the measurement model is evaluated before the structural model. The AMOS 22.0 application tests measurement and structural models using the maximum likelihood estimation method. Several studies in the literature (e.g., Hu et al. 1992; Olsson et al. 2000) suggest that, even if the data does not meet the normal distribution quite well (multivariate kurtosis ¼ 51.29; critical ratio ¼ 25.24), maximum likelihood estimation outperforms, alternative estimation techniques such as generalized least squares or asymptotically distribution-free approaches (Schermelleh-Engel et al. 2003).

The measurement model includes one latent construct (drivers) with four indicators. We used the confirmatory factor analysis (CFA) method to analyze the measurement model described by Hair et al. (2006). Significantly, we present the measurement model's final results. Model χ^2 was revealed to be 75.76 with 31 degrees of freedom. Schermelleh-Engel et al. (2003) recommend not to overestimate the value of the χ^2 test statistic as it has several limitations. Therefore, applying the formula $\chi^2 =$ df is an objective method for comparing the magnitude χ^2 with the number of degrees of freedom. According to Jöreskog and Sörbom (1993), our measurement model outputs $\chi^2 =$ df 2.22, just below the standard of 3.00. Moreover, other goodness-of-fit measurements are calculated. Following the suggestions of Hu and Bentler (1998), we adopted standardized root mean square (SRMR) and goodness-of-fit index (GFI) and modified them as accordingly goodness-of-fit index (AGFI), normed fit index (NFI), comparative fit index (CFI), and root mean square error of approximation (RMSEA). This measurement confirms that all values fall within the specified range, highlighting that the measurement model is appropriately reliable. Table 4 displays the measurement model results and the fit indices' proposed values.

Table 3 Latent variables

Latent variable	Indicator	Description
Drivers	D1	03. Compliance with government rules and regulations
	D2	17. Stakeholders' pressure for CSR adoption
	D3	06. Environment protection and natural resource conservation
	D4	01. Alignment with corporate ethical and moral values

In addition to analyzing the measurement model's fit, it is also necessary to evaluate convergent validity. We examine the factor loadings to determine convergent validity. All these are statistically significant over 0.70 at the 0.001 level. The loadings meet the criteria. Second, each latent construct's extracted average variance (AVE) is calculated. The measured AVE values for drivers are 0.646. Therefore, an AVE measure of 0.50 or above indicates acceptable convergent validity. Finally, we compute construct reliability (CR), which measures convergent validity. The calculated CR value for drivers is 0.879; reaching the 0.70 criteria also supports convergent validity. Table 5 contains the findings of the measuring model.

After evaluating convergent validity, modification indices are examined. Large modification indices imply that the fit may be significantly improved by providing the appropriate path for estimation. While the modification index of the measurement model is acceptable, this finding also yields substantial evidence of model validation.

Structural model assessment

After validating the measurement model, we test the structural model, concentrating on analyzing hypothesized correlations. Recall that the exogenous variable driver has four latent indicators. In contrast, the endogenous variable CSR adoption has a single measure: a question on the significance of CSR strategies for firms.

The goodness-of-fit of a structure is evaluated with the same parameters as the measurement model. The resulting model χ^2 is 71.54 with 39 degrees of freedom, and its p-value is 0.001. The normative value of χ^2 is $\chi^2 = \text{df}\ 1.92$. The goodness-of-fit measurements for the structural model are summarized in Table 4. As revealed by the findings, all tests are within acceptable limits, and the structural model corresponds adequately to the data.

Considering the structural model's goodness-of-fit metrics, we change our focus to the path coefficients and loading estimates, displayed in Fig. 5. Comparing the loading estimates of the measurement and structural models reveals that they are almost identical, with a maximum variance of 0.007. This estimate is supported by the measured indicator variables' consistency and the measurement model's reliability (Hair et al. 2006). The path coefficient estimate connection between drivers and adoption is 0.49 and significant at the 0.001 level, as demonstrated in Fig. 5. Our first hypothesis is validated; i.e., the drivers of CSR affect adoption choices positively. Thus, it would benefit firms to include CSR policies in their long-term sustainable social, economic, and environmental goals.

Table 5 Results for the measurement model

Latent variable	Indicator	Factor loading	AVE	CR
Drivers			0.646	0.879
	D1	0.806*		
	D2	0.861*		
	D3	0.754*		
	D4	0.789*		

*Significant at the 0.001 level (two-tailed)

Conclusions and discussion

The primary aim of this research is to evaluate the optimal ideal route for organizations to promote firms' sustainability through adopting CSR in their business model. The study identifies critical CSR drivers and investigates their impact on CSR adoption within Pakistan's manufacturing sector.

Thus, in the first part of the study's conceptual framework, a final list of 18 crucial CSR drivers was identified using FDM methodology and analyzed through ISM-MICMAC methodology. Subsequently, SEM was applied to examine the impact of these drivers on CSR adoption. The measurement model was validated through CFA, and the structural model was evaluated using various goodness-of-fit measures. Overall, this comprehensive methodological approach provided valuable insights into the drivers' influence on CSR adoption in the manufacturing sector of Pakistan.

Managerial implications

Boosting compliance with government rules and regulations The study underscores the significance of compliance with government rules and regulations as the most critical driver for CSR adoption in the manufacturing industry. To encourage firms' adoption of CSR, it is recommended that the government actively implements and enforces CSR

Table 4 Goodness-of-fit measures for the measurement and structural model

	Recommended value by Schermelleh-Engel et al. (2003)						
Model fits	$\chi^2/\text{df} \geq 3.00$	GFI ≥ 0.90	AGFI ≥ 0.85	CFI ≥ 0.95	NFI ≥ 0.90	SRMR ≥ 0.10	RMSEA ≥ 0.08
Measurement	2.221	0.949	0.925	0.980	0.958	0.040	0.061
Structural	1.921	0.951	0.922	0.978	0.959	0.040	0.052

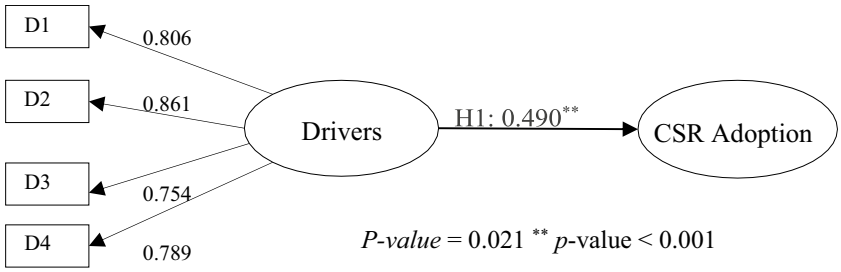

Fig. 5 Results of the path analysis

policies. Additionally, providing incentives or subsidies to firms that adopt CSR strategies can create a positive feedback loop and foster greater compliance. Public awareness campaigns on the importance and benefits of CSR can further incentivize firms to embrace sustainable practices.

Fostering stakeholders' awareness of CSR adoption and environmental protection Compliance with government rules and regulations, stakeholders' awareness of CSR adoption, and environmental protection are vital drivers. Firms should prioritize engaging stakeholders and ensuring robust climate protection regulations in their CSR strategies. Organizations can gain competitive advantages and enhance their reputation by showcasing their commitment to CSR-based practices and environmental conservation.

Aligning with corporate moral and ethical values Demonstrating a commitment to ethical values in the workplace is crucial for manufacturing organizations. By aligning business goals with moral and ethical principles, firms can foster employee engagement, create a positive corporate culture, and promote social responsibility. Embracing sustainable behaviors and ethical practices can enhance the firm's image and build trust with customers and stakeholders.

Participating in developing social welfare through philanthropy Manufacturing firms can contribute to social welfare by supporting social, legal, and physical infrastructure. Providing essential services such as healthcare, education, energy, water, and sanitation can empower people and protect human rights. Engaging in philanthropic activities for human well-being can lead to a healthier economy and an improved society.

The insights from this study can guide managers and policymakers in making informed decisions to improve business sustainability performance across social, economic, and environmental dimensions.

Limitations and future research directions

This study has some limitations that provide opportunities for future research. Firstly, the findings are confined to Pakistan's manufacturing industry, potentially impacting the generalizability of the results to other developing markets. To validate and establish the findings' universality, future studies should include samples from multiple economies to identify relatively universal boundary conditions and domains. This will allow researchers to explore the effects of CSR adoption in diverse business environments, encouraging top management of organizations and public institutions to address social well-being, environmental development, and economic prosperity.

Secondly, the data for this study was collected through surveys, which could introduce biases compared to studies using secondary or more objective data. Relying on a single informant for each business might lead to potential bias, as individuals with multiple responsibilities within the company may have varying perspectives when assessing CSR and operational effectiveness. To address this limitation, future studies are encouraged to incorporate data from various sources, such as publicly accessible or objective data, to enhance the robustness of the analysis.

Further research can explore the antecedents of CSR adoption by integrating other types of drivers not included in this study. This extension of the model will provide a deeper understanding of the factors influencing CSR adoption in the manufacturing sector of Pakistan and potentially in other developing economies. Follow-up interviews and qualitative research methods can complement the current findings, offering richer insights into the complexities of CSR adoption and its impact on organizational practices.

By addressing these limitations and pursuing the suggested directions for future studies, researchers can expand the knowledge base on CSR adoption, encompassing broader geographical contexts and more comprehensive data sources, thereby contributing to a more robust and nuanced understanding of CSR's implications for sustainable development.

Appendix. Tables for the ISM methodology

Table 6 SSIM of CSR drivers

No	Drivers	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	Employment opportunities		V	A	V	V	O	O	V	V	V	V	O	A	O	V	A	O	O
2	Alignment with corporate ethical and moral values			A	O	O	O	O	O	O	V	A	O	X	O	O	O	O	O
3	Compliance with government rules and regulations				V	V	V	V	O	V	V	V	O	V	O	O	O	A	V
4	Long-term financial and economic benefits					A	O	O	A	V	V	V	V	O	V	O	O	O	V
5	Competitive advantage in regional and international market						A	A	V	A	V	A	V	O	A	A	O	O	A
6	Environment protection and natural resource conservation							X	V	O	V	O	O	O	O	V	O	O	X
7	Promotion of waste management practices and renewable energy consumption								V	O	V	O	O	O	V	V	O	A	A
8	Increased customer loyalty									O	X	A	V	A	A	O	O	O	A
9	Promotion of transparency and increased investor confidence										V	V	V	V	O	O	O	O	O
10	Improve the reputation and image of the company											A	V	A	O	A	A	O	A
11	Improved working environment and concentration on employee welfare												O	X	O	O	X	A	V
12	Attract capital investment													O	V	A	O	V	A
13	Human rights protection (e.g., prohibition of child labor and women empowerment)														O	V	X	O	O
14	Support product innovation and improved quality															O	O	O	O
15	Media support																A	O	A
16	Social demand for ethical values, honesty, and transparency																	O	X
17	Stakeholders' pressure for CSR adoption																		A
18	Meeting community expectations through infrastructure development and philanthropic activities																		

Table 7 IRM designed for drivers for CSR

No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1	1	0	1	1	0	0	1	1	1	1	0	1	0	1	1	0	0
2	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0
3	1	1	1	1	1	1	1	0	1	1	1	0	1	0	0	0	0	1
4	0	0	0	1	0	0	0	0	1	1	1	1	0	1	0	0	0	1
5	0	0	0	1	1	0	0	1	0	1	0	1	0	0	0	0	0	0
6	0	0	0	0	1	1	1	1	0	1	0	0	0	0	1	0	0	1
7	0	0	0	0	1	1	1	1	0	1	0	0	0	1	1	0	0	0
8	0	0	0	1	0	0	0	1	0	1	0	1	0	0	0	0	0	0
9	0	0	0	0	1	0	0	0	1	1	1	1	0	0	0	0	0	0
10	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0
11	0	1	0	0	1	0	0	1	0	1	1	0	1	0	0	1	0	1
12	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0
13	1	1	0	0	0	0	0	1	0	1	1	0	1	0	1	1	0	0
14	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0
15	0	0	0	0	1	0	0	0	0	1	0	1	0	0	1	0	0	0
16	1	0	0	0	0	0	0	0	0	1	1	0	1	0	1	1	0	1
17	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	1	0
18	0	0	0	0	1	1	1	1	0	1	0	1	0	0	1	1	1	1

Table 8 FRM designed for drivers to CSR adoption

Sr. no	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Driving power
1	1	1	0	1	1	0	0	1	1	1	1	1*	1	1*	1	1	0	1*	14
2	1*	1	0	0	0	0	0	1*	0	1	1*	1*	1	0	1*	1*	0	0	9
3	1	1	1	1	1	1	1	1*	1	1	1	1*	1	1*	1*	1*	1*	1	18
4	0	1*	0	1	1*	1*	1*	1*	1	1	1	1	1*	1	1*	1*	1*	1	16
5	0	1*	0	1	1	1*	1*	1	1*	1	1*	1	1*	1*	1*	1*	1*	1*	16
6	0	1*	0	1*	1	1	1	1	1*	1	1*	1*	1*	1*	1	1*	1*	1	16
7	0	1*	0	1*	1	1	1	1	1*	1	1*	1*	1*	1	1	1*	1*	1*	16
8	0	1*	0	1	1*	1*	1*	1	1*	1	1*	1	1*	1*	1*	1*	1*	1*	16
9	0	1*	0	1*	1	1*	1*	1*	1	1	1	1	1*	1*	1*	1*	1*	1*	16
10	0	1*	0	1*	1*	1*	1*	1	1*	1	1*	1	1*	1*	1*	1*	1*	1*	16
11	1*	1	0	1*	1	1*	1*	1	1*	1	1	1*	1	1*	1*	1	1*	1	17
12	0	0	1*	0	1*	0	1*	1*	0	0	1*	1	0	1	0	0	1	0	8
13	1	1	0	1*	1*	1*	1*	1	1*	1	1	1*	1	1*	1	1	1*	1*	17
14	0	1*	0	1*	1	1*	1*	1	1*	1*	1*	1*	1*	1	1*	1*	1*	1*	16
15	0	1*	1*	1*	1	1*	1*	1*	1*	1	1*	1	1*	1*	1	1*	1*	1*	17
16	1	1*	1*	1*	1*	1*	1*	1*	1*	1	1	1*	1	1*	1	1	1*	1	18
17	1*	1*	1	1*	1*	1*	1	1*	1*	1*	1	1*	1*	1*	1*	1*	1	1*	18
18	1*	1*	1*	1*	1	1	1	1	1*	1	1*	1	1*	1*	1	1	1	1	18
DP	8	17	6	16	17	15	16	18	16	17	18	18	17	17	17	17	16	16	282

DP dependence power

*Implemented the steps outlined in the "Initial Reachability Matrix" section, following the transitivity rule method

Table 9 Hierarchal levels and CSR drivers at each level

S. no	Levels	Drivers of CSR adoption
1	1st	Increased customer loyalty (D8) Improved working environment and concentration on employee welfare (D11) Attract capital investment (D12) Employment opportunities (D2) Improve the reputation and image of the company (D10)
2	2nd	Human rights protection (e.g., prohibition of child labor and women empowerment) (D13) Media support (D15) Social demand for ethical values, honesty, and transparency (D16)
3	3rd	Long-term financial and economic benefits (D4) Competitive advantage in regional and international market (D5) Promotion of waste management practices and renewable energy consumption (D7) Promotion of transparency and increased investor confidence (D9) Support product innovation and improved quality (D14) Meeting community expectations through infrastructure development and philanthropic (D18)
4	4th	Alignment with corporate ethical and moral values (D1) Environment protection and natural resources conservation (D6)
5	5th	Stakeholders' awareness for CSR adoption (D17)
6	6th	Compliance with government rules and regulations (D3)

Level partitions for drivers of CSR adoption are presented in Tables 10, 11, 12, 13, 14, and 15

Table 10 Level partition (iteration one)

Drivers	Reachability set	Antecedent set	Intersection	Level
1	1, 2, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18	1, 2, 3, 11, 13, 16, 17, 18		
2	1, 2, 8, 10, 11, 12, 13, 15, 16	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18		
3	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18	3, 12, 15, 16, 17, 18		
4	2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18	1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18		
5	2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18	1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18		
6	2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18	3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18		
7	2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18	3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18		
8	2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18	2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18	First
9	2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18	3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18		
10	2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18		
11	1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18	1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18	First
12	3, 5, 7, 8, 11, 12, 14, 17	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18	3, 5, 7, 8, 11, 12, 14, 17	First
13	1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18		
14	2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18	1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18		
15	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18		
16	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18		
17	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18	3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18		
18	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18	1, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18		

Table 11 Level partition (iteration two)

Drivers	Reachability set	Antecedent set	Intersection	Level
1	1, 2, 4, 5, 9, 10, 13, 14, 15, 16, 18	1, 2, 3, 13, 16, 17, 18		
2	1, 2, 10, 13, 15, 16	1, 2, 3, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18	1, 2, 10, 13, 15, 16	Second
3	1, 2, 3, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18	3, 15, 16, 17, 18		
4	2, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18	1, 3, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18		
5	2, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18	1, 3, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18		
6	1, 2, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18	3, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18		
7	2, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18	3, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18		
9	2, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18	3, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18		
10	2, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18	1, 2, 3, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18	2, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18	Second
13	1, 2, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18	1, 2, 3, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18	1, 2, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18	Second
14	2, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18	1, 3, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18		
15	2, 3, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18	1, 2, 3, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18	2, 3, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18	Second
16	1, 2, 3, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18	1, 2, 3, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18	1, 2, 3, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18	Second
17	1, 2, 3, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18	3, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18		
18	1, 2, 3, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18	1, 3, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18		

Table 12 Level partition (iteration three)

Drivers	Reachability set	Antecedent set	Intersection	Level
1	1, 4, 5, 9, 14, 18	1, 3, 17, 18		
3	1, 3, 4, 5, 6, 7, 9, 14, 17, 18	3, 17, 18		
4	4, 5, 6, 7, 9, 14, 17, 18	1, 3, 4, 5, 6, 7, 9, 14, 17, 18	4, 5, 6, 7, 9, 14, 17, 18	Third
5	4, 5, 6, 7, 9, 14, 17, 18	1, 3, 4, 5, 6, 7, 9, 14, 17, 18	4, 5, 6, 7, 9, 14, 17, 18	Third
6	1, 4, 5, 6, 7, 9, 14, 17, 18	1, 3, 4, 5, 6, 7, 9, 14, 17, 18		
7	4, 5, 6, 7, 9, 14, 17, 18	3, 4, 5, 6, 7, 9, 14, 17, 18	4, 5, 6, 7, 9, 14, 17, 18	Third
9	4, 5, 6, 7, 9, 14, 17, 18	3, 4, 5, 6, 7, 9, 14, 17, 18	4, 5, 6, 7, 9, 14, 17, 18	Third
14	4, 5, 6, 7, 9, 14, 17, 18	1, 3, 4, 5, 6, 7, 9, 14, 17, 18	4, 5, 6, 7, 9, 14, 17, 18	Third
17	1, 3, 4, 5, 6, 7, 9, 14, 17, 18	3, 4, 5, 6, 7, 9, 14, 17, 18		
18	1, 3, 4, 5, 6, 7, 9, 14, 17, 18	1, 3, 4, 5, 6, 7, 9, 14, 17, 18	1, 3, 4, 5, 6, 7, 9, 14, 17, 18	Third

Table 13 Level partition (iteration four)

Drivers	Reachability set	Antecedent set	Intersection	Level
1	1	1, 3, 17	1	Fourth
3	1, 3, 6, 17	3, 17		
6	1, 6, 17	3, 6, 17		
17	1, 3, 6, 17	3, 6, 17		

Table 14 Level partition (iteration five)

Drivers	Reachability set	Antecedent set	Intersection	Level
3	3, 6, 17	3, 17		
6	6, 17	3, 6, 17	6, 17	Fifth
17	3, 6, 17	3, 6, 17	3, 6, 17	Fifth

Table 15 Level partition (iteration six)

Drivers	Reachability set	Antecedent set	Intersection	Level
3	3	3	3	Sixth

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Data availability The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval Not applicable.

Consent to participate I am free to contact any of the people involved in the research to seek further clarification and information.

Consent for publication Not applicable.

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