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The Role of Knowledge Management and Cause Related Marketing towards Sustainability to promote Societal Marketing Concept

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ABSTRACT

This study aims to categorize and validate the histories and results of environmental sustainability in green manufacturing in Pakistan, with a primary focus on small and medium-sized businesses (SMEs). This study investigates how knowledge management processes (KMPs), more especially knowledge application, dissemination, and acquisition, function as precursors to environmental sustainability. Partial least squares structural equation modeling (PLS-SEM) was used to examine data gathered from 450 SMEs via an online survey. This study investigates how, in the context of green manufacturing, CRM, knowledge management, and environmental sustainability are related. Important results show that: (1) CRM significantly affects environmental sustainability, and (2) CRM moderates the eco-friendly relationship between KM and environmental sustainability. The study's conclusions have significant ramifications for researchers, managers, and policymakers who want to comprehend the dynamics of environmental sustainability in Pakistani SMEs engaged in green manufacturing. Limitations and future research directions are also covered in this work.

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1. Introduction

In both academics and business, sustainable development has become one of the most important subjects of conversation (Akudugu & Ogwu, 2024). Partnerships with the broadest variety of stakeholders are anticipated to be necessary for the generation and dissemination of knowledge on sustainability, given the commitment to sustainable development to address the demands of all socioeconomic sectors. When given opportunities for involvement and leadership, these stakeholders are essential in bringing about organizational change (Rupčić & Babšek, 2024).An academic institution has a clear advantage when it comes to acting as a repository of information in a certain field. It accomplishes this by providing opportunities for participants to actively participate in projects that generate and share knowledge. Technology-driven businesses can maintain their sustainability and resilience in the face of the risks, hazards, and uncertainties associated with environmental change is one of the main concerns. Businesses that rely heavily on technology have to deal with challenges like changing markets, intense competition, an unstable environment, and instability if they want to survive. A company's long-term survival depends on corporate sustainability, making it more than merely a long-term consideration (Di Vaio et al., 2021). Innovation is becoming more and more important in business competitive strategy. Numerous considerations, such as a more complicated domain, a less product lifespan, more chances of new product engineering, and fluctuating consumer wants, make the work still difficult (Alzaydi, 2024).The UN's 2030 Schedule for Supportable Development, which primarily seeks to redouble efforts to accomplish sustainable development, is centered around the 17 SDGs (Liu & Harrington, 2024).Reducing the product cycle time and increasing R&D productivity are therefore essential. For this technique to be successful, the necessary internal knowledge must be developed in addition to being obtained from outside sources, shared with team members, and applied to recently developed technology.

The 17 SDGs are at the core of the 2030 Program for Supportable Development, which was created by the UN. Reviving attempts to create sustainable development is its primary objective (Lee et al., 2025).Therefore, it is crucial to reduce the product cycle time and increase R&D productivity. This strategy's efficacy depends on creating the required. It is becoming increasingly clear to businesses main goal is to boost their ability to innovate. Businesses that can effectively change their setting by producing novel knowledge, sharing it, and implementing it into their processes will become more innovative, per many studies (Amankwah-Amoah et al., 2024).Businesses are under increasing pressure to balance environmental sustainability with profits. Combining creative business concepts with knowledge management can indeed help achieve both financial success and sustainability. To promote environmental sustainability, this project will investigate how innovation and KPC—such as KA, KD, and KP—cooperate. The encouragement of knowledge-seeking, absorption, and sharing has proven crucial to the accomplishment of corporate goals. Knowledge management is seen as an essential strategic advantage for small, medium, and large businesses. It is vital to keep in mind that evidence is immaterial and, as such, hard to understand, communicate, and incorporate during the several departments of a business. This KM idea applied in this study relates to the communication of KPC in the sustainability framework. The view of global knowledge sharing being significant for the sustainability of sustainable expansion makes the case for KM because it is likely to make information sharing easier, given its capability to facilitate easy distribution of information from dissimilar locations and times (Tajpour et al., 2022). Emphasizing how concepts such as "cleaner production," "social responsibility," and "eco-innovation" donate to meeting sustainability necessities is crucial in this environment. In addition, the attainment of a more maintainable imminent is also facilitated by concerns such as "environmental awareness," "sustainable consumption of natural resources," and "sustainable use of human capital" (Manikandan et al., 2024).In this context, there are measurable benefits to good information management in enhancing environmental sustainability and innovation (Arduini, Manzo, & Beck, 2024).Innovation and information management are serious in evolving environmental sustainability in Pakistan's green manufacturing sector. In the past few years, Pakistan has greatly enhanced its adaptation of sustainable manufacturing techniques and green practices to decrease its environmental footprint.

This study advances the field of customer relationship management body of knowledge by developing new insights on how socially responsible marketing can help retain brand loyalty(Khattak et al., 2024).This is especially timely at a point in time once the body of information in CRM is expanding (Myataza et al., 2024) and the need to examine how enterprises affect society is growing. This learning's contribution is its attempt to investigate how knowledge management and cause-related marketing relate to environmental appropriateness. It has not been investigated how KPC affects the environmental sustainability of CRM. This prompted the researcher to begin investigating how KPC contributes to environmental sustainability. According to the Resource View Theory, a society can achieve lasting parsimony by determining its uncommon and valuable resources and talents. Additionally, the Relational Resource-Based View (RBV) has highlighted the significance of relational funds, while the Natural Resource-Based View (NRBV) has concentrated on how a government's funds affect the natural environment (X. Wang et al., 2024).CRM's mediating function will aid in comprehending the underlying process between KPC and the environment. The endeavor to examine the association between KM and Cause Related Marketing and environmental suitability is the study's contribution. Research on KPC's impact on environmental sustainability in CRM is lacking. This prompted the investigator to begin investigating the impact of KPC in advancing environmental sustainability. By identifying its uncommon and valuable resources and talents, a business can achieve long-term competitiveness, according to the Resource Based View Theory.

2. Literature Review

Over time, knowledge management's importance in connection to sustainability has grown. Despite its significance, this field has not received much attention, and there are numerous opportunities for academic research. The cause of sustainable development has gained more momentum because of the United Nations Program 2030 generally and the 17 Maintainable Development Goals specifically (Edwards, 2022). Sustainability is becoming important for businesses to obtain a modest edge, in addition to being more and more significant in society (Gill et al., 2024). Because knowledge management has grown in position as a tool for businesses trying to acquire and maintain a competitive edge. Knowledge management (KM) is applied to sustainability, and the government's mindset shifts, giving social responsibility, eco-friendly

sustainability, and economic viability equal weight (Bibi, Padhi, & Dash, 2021). KM might be the core for plans to sustain development. Such a tie is crucial, considering the need to comply with the environmental law. Consequently, organizations must now depend more on their resources as the basis of knowledge creation. In the pursuit of sustainability, knowledge management (KM) is being viewed as an innovative paradigm in development, wherein adherence to principles of social, environmental, and economic sustainability shall be improved (Mohsin et al., 2024). In the ever-expanding arena of KM, the issue of environmental sustainability is gaining recognition (Noor et al., 2020). Organizations globally acknowledge knowledge management as a very important skill, a source of edge over competitors, and a powerful force behind the creation of value (Al Shraah et al., 2022). However, cultural barriers prevent many businesses from successfully implementing knowledge management, even if it is essential (Shahzad et al., 2020). Scholars concur that knowledge management (KM) is an integrated, dynamic process that aids an organization in creating, capturing, organizing, accessing, and using intellectual property and creative resources to achieve long-term goals.

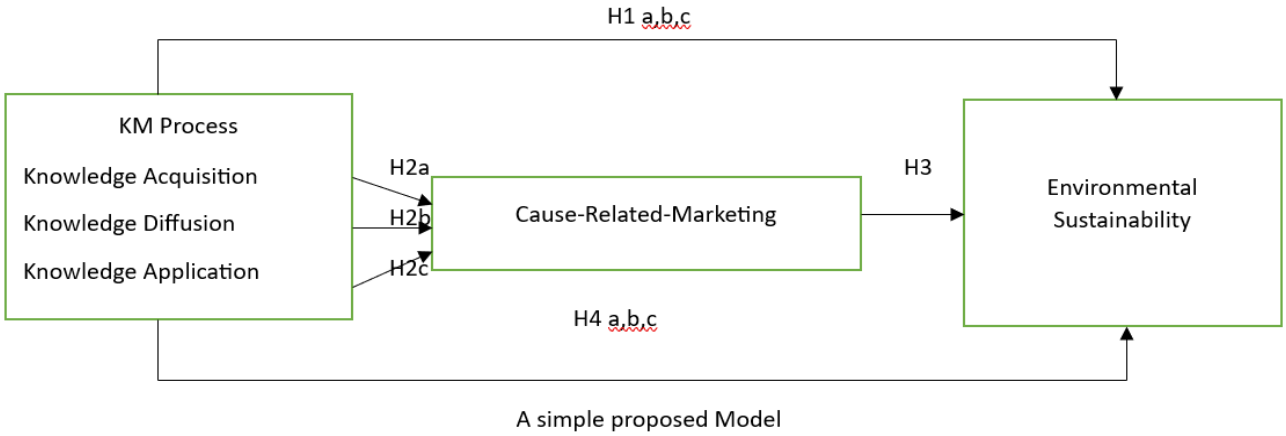
Knowledge management activities consist of three processes: an occupational agenda for knowledge misuse and value recall; an administrative information structure for flexible and strong capabilities; and a learning and information development civilization. Quarchioni and associates, 2022. The achievement of sustainable development is largely dependent on global information, according to this approach. Ayavoo and Ode, 2020a For this problem, knowledge management could be helpful because it makes it easier to share information from many places and times (Ammirato, Linzalone, & Felicetti, 2021). Growing environmental consciousness and the negative effects of environmental leadership have led to a greater focus on ecologically friendly places. In 2020, Manesh et al. With an emphasis on the mediating functions that environmental awareness and the adoption of eco-friendly technologies play, knowledge management strategies have been scrutinized in the framework of a sustainable environment. In 2020, Schneiderjans et al. The homework also examined the potential diminishing effects of a green, ground-breaking culture on the relationships between environmental sustainability and knowledge management practices (Velásquez & Lara, 2021). Knowledge must be collected, transmitted, and used to develop and sustain competitive advantages and better customer satisfaction. (Nurdin & Yusuf, 2020). Businesses can only attain a competitive advantage and can preserve and enhance their operational sustainability by applying knowledge management techniques; it eventually leads to a rise in customer and shareholder trust (Chaithanapat et al., 2022). It is well realized that knowledge management is a part of the contemporary business environment where innovation in creating new products and services as well as well-organized handling and organization of everyday affairs will have much prominence (Zhao et al., 2022).

Through long-term goals and objectives, most businesses strive for the application of innovative and real KM to ensure the economy runs smoothly and can sustain itself within the profit and loss margin (Tiwari, 2022). Modern economies construct their base using novel concepts innovated from an individual's wealth of intellect into the creation and sustainment or profitability of that economy (Oktari et al., 2020). According to Muhammed and Zaim (2020), knowledge management helps firms develop the abilities needed for CRM, which improves business performance in terms of sustainability. Knowledge management has given rise to green technologies, which have made it possible to create goods that are good for ecosystems and the environment at large. To sum it all up, knowledge management is very essential in helping organizations achieve business sustainability in results. The underlying knowledge assets and abilities form the foundation of the capacity of any company to innovate sustainably. Achieving a competitive edge requires knowledge management, which also offers a substantial financial opportunity for companies dedicated to cause-related marketing. One cannot stress the position of knowledge organizations in promoting environmental sustainability.

3. The proposed Model and Research Hypotheses

The future methodology seeks to respond to the following question: Can environmental sustainability be driven by KM in conjunction with Cause-Related Marketing? In light of this, the model will address the three facets of knowledge management (KM)—knowledge gaining, knowledge diffusion, and knowledge submission—about CRM activities inside the business that promote environmental sustainability.

Figure 1: Proposed Model



A simple proposed Model

Even though the body of literature on KM is growing, there is little analysis of KM processes and CRM connections. This study will provide targeted, relevant insights to help comprehend how KM processes link environmental sustainability to Cause-Related Marketing. Therefore, the primary premise of the research is as follows: KM can be employed as a CRM approach. The following sub-hypotheses will be investigated to test this hypothesis:

H1a: KA effects on ES.
H1b: KD effects on ES.
H1c: KP effects on SE.
H2a: KA effects on Cause-Related-Marketing
H2b: KD effects on Cause-Related-Marketing
H2c: KP effects on Cause-Related-Marketing
H3: Cause-Related-Marketing effects on environmental sustainability.
H4a: Cause-Related-Marketing mediate between KA and Environmental Sustainability.
H4b: Cause-Related-Marketing mediate between KD and Environmental Sustainability.
H4b: The mediating role of Cause-Related-Marketing between KP and Environmental Sustainability.

4. Research Methodology

4.1. Study population and sampling:

The data was collected from overall directors working in Pakistan's green engineering industry. The selection policy used in this study is proportional stratified random sampling (SRS). It "involves a process of stratification or segregation, followed by a random selection of subjects from each stratum," as stated by Qadeer and Rafi (2024). According to Sekaran and Bougie proportionate SRS is more efficient and less biased than plain random sampling when compared to other limited sampling techniques. Furthermore, SRS produces more unique and valuable data and provides more representation of every important demographic factor (Yahya et al., 2021).

4.2. Theoretical Foundation and Measurement

The Relational RBV has emphasized the importance of relational resources, whereas the Natural Resource-Based View (NRBV) has focused on how an organization's resources affect the natural environment. A business can attain long-term competitiveness by recognizing its uncommon and valuable resources and competencies, according to (Gomez-Trujillo, Gonzalez-Perez, & Baena-Rojas, 2024).

4.3. Validity and Reliability

A questionnaire designed for Pakistan's overall directors of the green engineering sector was developed by the researchers. I tested and advanced the measuring rule for the future model using investigative and assenting factor analyses after collecting the data. With the use of a structural equation model (SEM), the researcher analytically examined the anticipated connections between the study variables, KM, CRM, and ES. KM, CRM, and ES implementation levels were assessed using a five-point Likert scale, with 1 denoting "strongly disagree" and 5 denoting "strongly agree." A forced CFA model was built, discriminant validity was assessed for each potential duo of latent concepts, and an x2 alteration test was calculated between a solution that fixed the correlation between the two constructs at 1.0 and an allowed solution where both

constructs varied easily. At the 0.05 level, all of the variances among each pair are statistically significant, which strongly supports discriminant validity.

5. Results

5.1. Measurement Model Analysis

The first step of SEM is the study of the measurement model. In the dimension model, the reliability and validity of latent variables are observed. Table 1 shows the outer loadings of all observed variables. The outer loading values are above the edge value of 0.70 (Hair, Ringle, & Sarstedt, 2011). For internal consistency, Cronbach alpha and composite reliability are checked. The resultant values of Cronbach alpha and composite reliability are above the edge value i.e., 0.70 Hair, Ringle and Sarstedt (2011) which represents that all latent variables have sufficient reliability. Further, to check the convergent validity, (AVE) is measured. The AVE values are above the edge value i.e., 0.50 (Hair, Ringle, & Sarstedt, 2011).

Table 1: Measurement Model Analysis

Latent Variables	Code	Outer Loading	Cronbach Alpha	Composite Reliability	Average Variance Extracted
Knowledge Acquisition	KAQ1	0.803	0.838	0.846	0.672
	KAQ2	0.837			
	KAQ3	0.787			
	KAQ4	0.851			
Knowledge Application	KAP1	0.882	0.888	0.889	0.749
	KAP2	0.846			
	KAP3	0.858			
	KAP4	0.874			
Knowledge Diffusion	KDF1	0.898	0.764	0.812	0.681
	KDF2	0.881			
	KDF3	0.709			
Cause-Related Marketing	CMK1	0.803	0.873	0.873	0.725
	CMK2	0.869			
	CMK3	0.857			
	CMK4	0.874			
Environmental Sustainability	ESS1	0.834	0.938	0.939	0.730
	ESS2	0.852			
	ESS3	0.842			
	ESS4	0.864			
	ESS5	0.877			
	ESS6	0.863			
	ESS7	0.849			

To evaluate the discriminant validity, the Fornell-Larcker procedure is adopted at the first level (Almufti, Sellami, & Belguith, 2024). In the evaluation method of discriminant validity, the AVE square root should be larger than correlation values among other composite constructs in the measurement model (Li & Lay, 2024; Zakaria, Abd Hamid, & Ahmad Mahdzan, 2024). Table 3 demonstrates the discriminant validity score as per Fornell-Larcker method. According to the Fornell-Larcker technique, all variables have strong discriminant validity because the sloping values, which are the square root of AVE, are all bigger than their corresponding correlation scores.

Table 2: Fornell-Larcker Discriminant Validity Criterion

Variables	KAQ	KAP	KDF	CMK	ESS
Knowledge Acquisition (KAQ)	**0.820**				
Knowledge Application (KAP)	0.754	**0.865**			
Knowledge Diffusion (KDF)	0.754	0.772	**0.826**		
Cause Related Marketing (CMK)	0.789	0.801	0.801	**0.851**	
Environmental Sustainability (ESS)	0.783	0.832	0.811	0.813	**0.855**

5.2. Structural Model

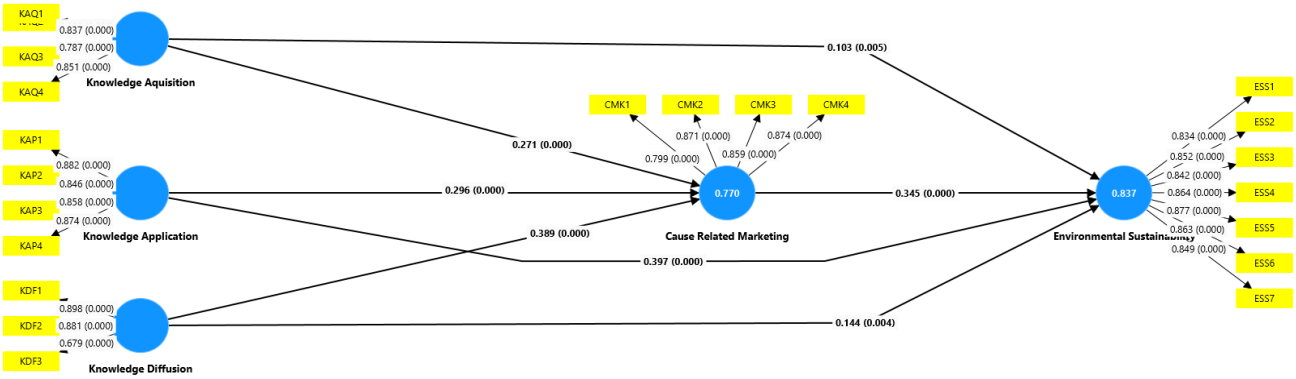
The initial step in analyzing a structural model is multicollinearity (S. Wang et al., 2024).The findings showed that there is no collinearity tricky in the data because all of the VIF standards fall below the (Roy, Barman, & Biswas, 2024) threshold of 5. Table 4 presents the findings.

Table 3: Multicollinearity Analysis of Inner Model

Constructs	Cause Related Marketing	Environmental Sustainability
Knowledge Acquisition	2.789	3.108
Knowledge Application	2.978	3.357
Knowledge Diffusion	2.977	3.635
Cause Related Marketing	-	4.343

In the second step, hypotheses are tested. Table 5 demonstrated the results which showed that knowledge acquisition has a positive effect on environmental sustainability as β= 0.103, t= 2.787, p= 0.00, H1 accepted. While, the result showed that knowledge application has a positive effect on environmental sustainability as β= 0.397, t= 9.179, p= 0.00, H2 is accepted.

Figure 2: Structural Model



Further, results showed that knowledge diffusion has a positive effect on environmental sustainability as β= 0.144, t= 2.897, p= 0.00, H3 is accepted. In the same way, results showed that knowledge acquisition has a positive effect on cause-related marketing as β= 0.271, t= 6.003, p= 0.00, H4 is accepted. As, the result showed that knowledge application has a positive effect on cause-related marketing as β= 0.296, t= 7.498, p= 0.00, H5 are accepted. Further, the result showed that knowledge diffusion has a positive effect on cause-related marketing as β= 0.389, t= 7.132, p= 0.00, H6 is accepted. In the end, the result showed that cause-related marketing has a positive effect on environmental sustainability as β= 0.345, t= 6.611, p= 0.00, H7 is accepted.

Table 4: Examination of Significance of Structural Paths

Direct Paths	B	T-ratio	p-value	Decision
KAQ→ ESS	0.103	2.787	0.00	Supported
KAP → ESS	0.397	9.179	0.00	Supported
KDF → ESS	0.144	2.897	0.00	Supported
KAQ → CMK	0.271	6.003	0.000	Supported
KAP → CMK	0.296	7.498	0.00	Supported
KDF → CMK	0.389	7.132	0.00	Supported
CMK → ESS	0.345	6.611	0.00	Supported

KAQ- Knowledge Acquisition, KAP- Knowledge Application, KDF- Knowledge Diffusion, CMK- Cause-related Marketing, ESS Environmental Sustainability

Further, the R square is measured to check the variance explained by cause-related marketing and environmental sustainability. Results are presented in Table 6. Q square is also tested to check the predictive accuracy and both variables have predictive accuracy as the resultant values of Q^2 are above the threshold value i.e., above zero (Hair, Ringle, & Sarstedt, 2011).

Table 5: Results of R^2 and Q^2

Constructs	R^2 values	Q^2
Cause-related marketing	0.833	0.831
Environmental Sustainability	0.837	0.836

6. Conclusion

There is strong evidence in this study to back up the three primary hypotheses that were put forth at the start of the investigation: Knowledge Diffusion, Knowledge Application, and Knowledge Acquisition are the three processes that directly affect CRM and Environmental

Sustainability. Also, this study has demonstrated the mediating function of CRM between Environmental Knowledge Diffusion and Acquisition, Knowledge Application, and Sustainability. The findings of this training are in mark with those of other scholarships since KA dissemination, and KP are essential to ecological sustainability and novelty (Freeman, Dmytriyev, & Phillips, 2021; Shahzad et al., 2020). Additionally, the study highlights CRM's critical function as a mediator between environmental sustainability and knowledge. This is evidence that to support ecologically friendly enterprises, creative techniques must be encouraged. The study highlights that in cutting-edge order to attain increased ecological effectiveness, companies must make investments in the creation, sharing, and use of information. The significance of advancing CRM as a way to attain increased environmental sustainability is also emphasized. The study's conclusions can help practitioners, academics, and legislators develop plans and regulations that will strengthen environmental sustainability. Organizations may find them helpful in identifying areas where they might find innovation, knowledge diffusion, and acquisition to enhance their environmental sustainability.

6.1. Limitations and Future Directions

The fact that the data was self-reported, which implies that it will be somewhat skewed, was another disadvantage of the study. Future research could overcome this constraint by employing objective metrics for environmental sustainability, CRM, and knowledge management—longitudinal research can be adopted for future studies to analyze dynamic as well as the temporal relationships involving KM and CRM about environmental sustainability. The study's cross-sectional design is another limitation that will not allow proving causality among the variables involved. Furthermore, the study only looked at one industry, therefore it is difficult to extrapolate the results to other sectors. To determine whether the results hold in other contexts, more investigation can be done to examine the relationship between information organization, invention, and ecological sustainability across various businesses. Some future directions can be taken in this area, notwithstanding the limitations of the present study. The possibilities of several knowledge management techniques for CRM and environmental sustainability may be investigated in more detail. For instance, future research could look at how knowledge creation, accumulation, and transfer affect both CRM and environmental sustainability. Lastly, future studies could look at the effects of various contextual factors on the association between environmental sustainability, CRM, and KM. For instance, more investigative studies might look at organizational size, industry structure, and national culture as the factors that determine these connections. In general, the study gives useful advice on how KM and CRM might be deployed to achieve environmental sustainability. Notwithstanding the numerous limitations of the research study, the results may offer potential avenues for further investigation into these connections. Future studies into developing effective strategies for promoting ecological sustainability and CRM may be guided by examining the results of numerous KM strategies, CRM, and ES practices under a thorough understanding based on contextual considerations.

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