THE RELEVANCE OF KNOWLEDGE MANAGEMENT IN SUSTAINABLE DEVELOPMENT AND GREEN INNOVATION: A DEVELOPING COUNTRY PERSPECTIVE

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Abstract

Green innovations are applied in various industries to promote corporate sustainability by adopting sustainable development practices. However, very little is known about how the knowledge management process influences corporate green innovation. To contribute to the development of this issue, this study explores the relationships between knowledge management, corporate sustainable development and green innovation. Data was collected from 210 respondents from private companies in a developing country context and analyzed using the structural equation modeling technique. The findings provide several conclusions. First, the components of knowledge management (application, acquisition and sharing of knowledge) significantly improve the dimensions of corporate sustainable development (environmental, economic and social dimensions). Second, sustainable environmental practices have no effect on the adoption and application of green innovations by companies, however, sustainable social practices have a positive effect on green innovations. The results of this research also show that investing in knowledge management is of great importance for achieving sustainable development, as well as investing in the application of sustainable social practices.

Keywords: *knowledge management, corporate sustainable development, economic sustainable development, social sustainable development, environmental sustainable development, green innovation*

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1. Introduction

The rapid consumption of natural resources and harmful emissions due to economic progress have led to a negative impact on the climate and environment, which is increasing constantly all over the world (Razzaq, Shrif, et al. 2021). According to the Sustainable Development Goals report, many countries have failed to maintain their environmental performance. An increasing body of scientific research highlighting the detrimental impacts of this trend has led to growing external pressure on companies and organizations to confront environmental degradation (Awan et al. 2020). This has intensified attention on green innovation (GI) and the pursuit of sustainable value, prompting debate over whether sustainable development practices can effectively address environmental issues while also enhancing competitiveness and long-term viability (Wang 2020; Yousaf 2021).

On the other hand, organizations have come to acknowledge knowledge management as a valuable mechanism for evaluating their competitive position (Ooi 2014). Knowledge obtained from different stakeholders enables management to formulate a strategic plan (Awan et al. 2020; Cui et al. 2020; Davenport et al. 2019), while knowledge management (KM) enables enterprises to adapt to evolving conditions and enhance operational sustainability, companies are able to broaden their range of green innovations (Abbas and Sagsan 2019). Corporate green innovation has received a lot of attention from researchers in the past due to the growing number of challenges within the sustainable environment, as well as the lack of resources (Jun et al. 2019; Yousaf 2021). This enables companies to produce environmentally friendly products and processes, as this is how sustainable development can be achieved (Abdul-Rashid et al. 2017; Awan et al. 2020; Razzaq et al. 2021). Further, knowledge management is a critical factor that builds on capabilities that offer the adoption of sustainable practices and that influence green innovation (Shahzad, Qu, Zafar, Ding and Rehman, 2020). In the context of developing countries, the lack of adequate knowledge management in operational processes is a limiting factor for green innovation, as it impairs the implementation of corporate sustainable development (CSD) (Shahzad et al. 2020). The implementation of corporate sustainable development is an essential and driving factor for green innovation, which can lead to better environmental performance (Song et al. 2020).

Numerous scholars have explored the determinants of green innovation. While some have focused on external influences—such as market pressures, environmental policies, and the broader push toward sustainability (Geng et al. 2021; Shah and Soomro 2021)—others have concentrated on internal organizational drivers, including environmental ethics, strategic approaches to innovation, and the role of knowledge management (Chang 2016; Ding et al. 2019; Song et al. 2020). Knowledge acquisition and transfer play a significant role in achieving green innovation (Awan et al. 2020). Environmental sustainability positively affects GI (Shahzad et al. 2020), while among many other antecedents are green capabilities and green practices (Yousaf 2021). Environmental, social and economic sustainability significantly influence investments and exploitation of green innovations, environmental, social and economic sustainability (Saunila et al. 2018). Table 1 provides an overview of the quantitative studies obtained from the Web of Science and Scopus databases that explore the relationship between corporate sustainable development and green innovation (keywords using title option: "corporate sustainable development" AND "green innovation"). The imbalance among research contexts is evident, as significant emphasis has been given to Asian companies, which results in a considerable gap in similar research in other world regions. Only one research posits that KM has a positive relationship with GI, and CSD as well, although this research also shows that green innovation is positively related to CSD (Abbas and Sağsan 2019). Two studies have offered evidence of GI antecedent role in CSD, proving that this relationship is moderated by corporate social responsibility (Liao et al. 2022) and IT capability (Li et al. 2020). As outlined in the table, other antecedents of green innovation include consumer and regulatory pressure (Zhang and Zhu 2019), total quality management (Albloushi et al. 2023), corporate social responsibility (Le et al. 2024), environmental awareness (Liu and Cao 2024), exploration and exploitation (Li et al. 2022) and tax equity (Wang 2022). Among the eight studies presented, four identified GI as having a mediating role that primarily influenced corporate social development as the main outcome, which lead to the conclusion that green innovation can behave as antecedent, outcome or mediation construct. In this sense, the first gap identified through this insight is the lack of moderator role of GI in different research models. However, most important seems its role arisen from the second gap which is studying these constructs in different settings. The presented studies are focused on exploring the relationships in the Asian context, and hence to fill this gap more studies are needed in other developed, developing and countries in transition. This is why this study offers research findings in a developing country setting. Exploring the direct links between knowledge management and corporate

Table 1. Overview of empirical studies on determinants and mediators of green innovation and corporate sustainable development

Author(s) and year	Independent construct(s)	Dependent construct(s)	Mediator Mediator	Research setting	Findings
Abbas and Sağsan (2019)	KM, GI	GI, CSD	none	Pakistan, companies	KM has a positive relationship with GI and CSD. GI is positively related to CSD.
Zhang and Zhu (2019)	CP, RP	GI	exploration, exploitation	China, companies	The positive impact on GI is more significant for CP than for RP. Both relationships exhibit partial mediation through the processes of exploration and exploitation.
Albloushi et al. (2023)	TQM, GI	CSD, GI	GI	China, companies	TQM has a positive impact on CSD and GI. GI positively impacts CSD and has a full mediation effect between TQM and CSD.
Liao et al. (2022)	GI	CSD	CSR	China, companies	GI has a positive impact on CSD. The relationship between GI and SCD is more significant when CSR is poor or when scientific research ability is weak.
Le et al. (2024)	CSR	CSD	GI	Vietnam, companies	The findings indicate a significant positive relationship between CSR and CSD, highlighting the mediation role of GI.
Liu and Cao (2024)	EA	CSD	GI; PR	China, companies	EA significantly impacts CSD through GI. PR can moderate the indirect impact of EA on CSD through GI.
Li et al. (2022)	exploration, exploitation, GI	GI, CSD	IT capability	China, companies	Exploration and exploitation have a positive impact on GI. GI positively influences CSD. IT capability moderates the relationship between GI and exploitation.
Wang (2022)	TA	CSD	GI	China, companies	TA has a significant impact on CSD, with GI positively mediating this relationship.
This study	KM, CSD	GI, CSD	none	Bosnia and Herzegovina, companies	KM has a positive relationship with CSD. Sustainable environmental practices have no effect on GI. Sustainable social practices have a positive effect on GI.

Legend of abbreviations: KM - knowledge management; GI - green innovation; CSD - corporate sustainable development; CP - consumer pressure; RP - regulatory pressure; TQM - total quality management; CSR - corporate social responsibility; EA - environmental awareness; PR - political risk; TA - tax equity.

social sustainability, and green innovation closes the following gap, which is the evidence absence of the direct relationship between them. Hence, this study tests the influence of knowledge management on corporate social development, and further offers evidence on the link between corporate social development and green innovation which has been noted in previous studies especially in a developing research context.

The following section offers a detailed literature review and hypotheses development, after which methodology section follows. Further, the result section offers descriptive statistics of the participants and hypotheses testing. The study ends with a conclusion that elaborates the research findings.

2. Literature review and hypotheses development

2.1. Knowledge Management

Organizations around the world leverage knowledge to gain insights and develop competitive strategies. Knowledge is created through communication among individuals and within social structures (Nonaka 1994). It is considered an intangible asset and serves as a source of competitive advantage for both individuals and organizations (Ooi 2014). Previous research indicates that knowledge obtained from various stakeholders, including suppliers, consumers, and research institutions, is crucial for organizations

aiming to generate green innovations (Cui et al. 2020; Tseng et al. 2018). Furthermore, innovations play a significant role in achieving sustainable competitive advantages and fostering economic growth for both companies and nations (Darroch and McNaughton 2002). Consequently, companies are continually searching for ways to enhance innovation, and research underscores the strong influence of knowledge management on the creation of innovations (Donate and Pablo 2015). Moreover, knowledge management supports corporate decision-making by collecting and utilizing information from both within the organization and the external environment (Ooi 2014). A range of studies has examined multiple dimensions of knowledge management (Abbas and Sagsan 2019; Darroch 2005; Ooi 2014; Shahzad et al. 2020). A review of these studies reveals that three dimensions of knowledge management have been defined: knowledge acquisition (KA), knowledge dissemination (KD), and knowledge application (KAPP).

Knowledge acquisition refers to the discovery and acquisition of new knowledge essential for the efficient operation of companies from various sources, encouraging individual and organizational performance (Darroch 2005). The primary purpose of acquiring knowledge is to identify customer needs and their response to products and services. The integration of the green and sustainable agenda encourages collaboration and communication with external participants, and to understand their latest technologies and knowledge (Shah and Soomro 2021). *Knowledge dissemination* implies collecting, sharing, and transferring knowledge among employees to improve the company's business processes (Shahzad et al. 2020). It can have multiple dimensions, such as sharing and gathering knowledge; sharing means proposing knowledge, while gathering refers to gathering knowledge between staff members and employees (Lee et al. 2013). *Knowledge application* is the assimilation of already acquired knowledge in designing and delivering finished products to improve the overall business and performance (Mills and Smith 2011). It is also recognized as a response to knowledge (Lee et al. 2013). An example of the application of knowledge is when an organization collects information about customer requirements and market trends and reacts quickly to this information to improve organizational processes.

While the Resource-Based View (RBV) provides a robust framework for analyzing how internal capabilities such as knowledge management contribute to competitive advantage and innovation, integrating complementary theories can offer additional insights — particularly in the context of developing economies. Institutional theory (DiMaggio and Powell 1983) emphasizes how organizational behavior is shaped by external institutional pressures — such as regulations, cultural norms, and industry expectations. In environments with evolving or weak institutions, as is often the case in developing countries, companies may adopt sustainability practices in response to coercive or normative pressures, rather than as a strategic choice aimed at innovation. This may help explain why some sustainable practices do not lead directly to green innovation in such contexts.

In addition**,** Stakeholder theory (Freeman 1984) stresses that companies must consider the interests of various stakeholders — including governments, customers, employees, and communities — in strategic decision-making. The intensity and nature of stakeholder demands may influence whether and how firms pursue green innovations. In settings where environmental awareness among stakeholders is relatively low, or where pressure from civil society and regulators is minimal, firms may engage in environmental practices for image or compliance reasons, with limited investment in actual innovation. Together, these theories complement the RBV by highlighting the interplay between internal capabilities and external pressures in shaping organizational behavior related to sustainability and innovation.

Prior studies have demonstrated a positive link between knowledge acquisition and innovation outcomes (Cui et al. 2020; Darroch 2005). While some researchers have reported a negative correlation between knowledge acquisition and overall organizational performance, they still advocate for continued investment in research and development to generate innovative ideas (Mills and Smith 2011). According to Lee et al. (2013), acquiring knowledge has a favorable impact on company performance. More recently, Abbas and Sagsan (2019) emphasized the need for organizations to integrate acquired knowledge into their operations to support sustainable development objectives. Similarly, Shahzad et al. (2019) assert that the ability to absorb knowledge significantly shapes sustainable organizational practices. Collectively, these findings underscore the critical role of knowledge acquisition in advancing sustainable development across ecological, economic, and social dimensions. Thus, we propose the following:

H1a: Knowledge management has a positive impact on sustainable environmental practices.

Knowledge dissemination is positively related to service delivery (Mills and Smith 2011). Previous research has shown that it could be the predominant

mode of social interaction and collaboration within an organization that encourages employees to solve problems by providing support and innovative solutions (Awan et al. 2020). To achieve better work results, organizations should improve the behavior of employees when sharing knowledge (Song et al. 2020). KD has a positive effect on corporate sustainability through green technology and management innovation (Abbas and Sagsan 2019). Also, it has been proven that it has a positive effect on sustainable corporate development (Further, Shahzad, Qu, Zafar, Rehman and Islam 2020). The strength of the company's knowledge increases the rate of knowledge sharing between divisions and different hierarchical levels (environmental, economic and social), and hence we propose the following hypothesis:

H1b: Knowledge management has a positive impact on sustainable economic practices.

Scholars have specified that knowledge sharing has been used to support a firm's sustainable practices to achieve better environmental performance (Abbas and Sagsan 2019; Shahzad et al. 2020). Accordingly, the practical application of knowledge can move from a potential capability to a realized and energetic capability that affects firm performance (Mills and Smith 2011). Therefore, KAPP can be linked to corporate sustainable development (ecological, economic and social). It is a fundamental component for creating a competitive advantage. The application of knowledge is an indispensable element for effectively improving technology and performance (Darroch 2005). It also transforms organizational capability and knowledge into process and product development (Mills and Smith 2011). The practical application of knowledge enables organizations to produce sustainable products through advanced, innovative and digital manufacturing technologies (Awan et al., 2020), which could lead to sustainable development. Thus, we propose the following:

H1c: Knowledge management has a positive impact on sustainable social practices.

2.2. Corporate Sustainable Development

Sustainability is the ability to meet the needs of the present without compromising the ability of future generations to meet their own needs. Sustainability is about creating a more just and prosperous world, both now and for future generations, by promoting economic, social and environmental well-being

(Elkington 2018). It employs a Triple Bottom Line (TBL) approach, which posits that companies' success and health should be evaluated based on their environmental, social, and financial performance (Norman and McDonald, 2004). *The environmental strand* of the TBL framework refers to engaging in practices that do not endanger the environmental resources of future generations. It refers to the efficient use of energy resources, reducing gas emissions and minimizing environmental waste (Goel 2010). Similar to the social aspect of TBL, environmental initiatives affect the business sustainability of organizations. Kearney's (2009) analysis was conducted on 99 companies focused on sustainability in 18 industries to examine the impact of environmental activities on organizational performance. The industries in the analysis ranged from technology, automotive and chemicals to food, media, retail and tourism. The analysis period lasted six months and the research methodology was aimed at determining whether organizations with sustainable practices were more likely to withstand an economic downturn. The analysis found that during an economic downturn, companies with practices that focused on protecting the environment and improving social well-being outperformed their industry competitors financially. The financial advantage is the result of reduced operating costs and increased revenues from the development of innovative green products (Kearney, 2009).

The social dimension of the TBL framework refers to the conduct of beneficial and fair business practices for labor, human capital, and the community (Elkington 1997). The idea is that these practices provide value to society. Examples of these practices might include fair wages and health care coverage. In addition to the moral aspect of "being good to society," failure to comply with social responsibility can affect business performance and sustainability. Recent examples in industry have revealed that there are associated economic costs to failure to comply with social responsibility. Social performance focuses on the interaction between the community and the company and addresses issues related to community involvement, employee relations, and fair working conditions (Goel 2010). Finally*, the economic strand* of the TBL framework refers to the impact of a company's business practices on the economic system (Elkington 1997). It refers to the ability of the economy, as one of the subsystems of sustainability, to survive and evolve in the future, to support future generations (Spangenberg 2005). The economic aspect links the growth of a company to the growth of the economy and how well the company contributes to supporting the economy. In other words, it refers to the economic

value that the company provides to the surrounding system in the way it prospers and in the way it promotes its ability to support future generations.

The social dimension of sustainability has emerged as a crucial factor in promoting green innovation, particularly through investments in human capital, job creation, and societal well-being (Saunila et al. 2018). Organizations that prioritize internal knowledge development and learning processes are better positioned to advance green innovation initiatives (Lim et al. 2017). Environmental training and professional development programs not only enhance employee competencies but also foster more environmentally responsible attitudes and behaviors (Awan et al. 2020). Behavioral and attitudinal changes—especially in the adoption of collaborative and sustainable technologies—play a pivotal role in realizing the full potential of green innovation (Hojnik and Ruzzier 2016). Furthermore, environmental knowledge has been shown to positively influence both organizational profitability and social support structures (Nidumolu et al. 2013). Human capital development and continuous internal learning efforts serve as critical drivers of innovation that aligns with sustainability goals. Today's consumers are increasingly inclined to support businesses that offer eco-friendly products, often expressing a willingness to pay a premium for goods that contribute to environmental preservation. This shift in consumer behavior not only enhances environmental performance but also strengthens the financial outcomes for businesses (Song and Yu 2018). Overall, literature emphasizes that social sustainability significantly encourages the pursuit and implementation of green innovations (Saunila et al. 2018). Organizational requirements, consumer demand for environmentally friendly products and services, human capital and internal knowledge capabilities were found to influence green innovation. Therefore, the following hypothesis is proposed below:

H2a: Sustainable social practice has a positive impact on green innovation.

Sustainable economic practices play a crucial role in fostering green innovation by encouraging the development of eco-friendly technologies and business models. For example, research has shown that green production is a critical factor for the survival and growth of innovative startups, as observed in the Italian context (Serio et al. 2020). Moreover, implementing green practices often results in firms increasing their innovative output across various domains, suggesting that green innovation does not necessarily crowd out other forms of innovation (Jiang and Tol 2024). Furthermore, the performance impact of environmental innovations varies based on their type and the strategic goals of firms, highlighting the complexity and diversity of "green" strategies (Biggi et al. 2023). Collectively, these findings underline the importance of sustainable economic practices not only for environmental benefits but also for enhancing competitive advantage and firm performance.

H2b: Sustainable economic practices have a positive impact on green innovation.

Sustainable environmental practices help transform production technology to reduce negative environmental impacts and minimize industrial waste (Saunila et al. 2018). Organizations should consider using innovative and environmentally friendly technology that indicates efficient use of resources to reduce consumption (Song et al. 2020). Previous research has shown that companies that have already adopted environmental strategies and sustainable policies in their processes could create environmentally friendly products (Huang and Li 2017). Proactive environmental strategies increase internal green integration for environmental performance (Shah and Soomro 2021).

Recent studies indicate that a company's level of environmental preparedness plays a significant role in boosting innovation and securing a competitive edge (Zhang et al. 2020). Environmental sustainability is increasingly recognized as a fundamental driver of green innovation and related investment decisions (Saunila et al. 2018). Organizations with a stronger environmental orientation are more inclined to adopt and implement sustainable practices (Chang 2016). Firms that operate with eco-efficiency are better positioned to meet customer expectations while minimizing environmental harm (Ardito et al. 2019). Furthermore, evidence shows that environmental sustainability has a direct, positive influence on the advancement of green innovation (Shahzad et al. 2020). To effectively foster green innovation, it is essential for businesses to cultivate environmental motivation and raise awareness of sustainable practices throughout the organization.

Therefore, the following hypothesis is proposed:

H2c: Sustainable environmental practices have a positive impact on green innovation.

Figure 1. Conceptual model
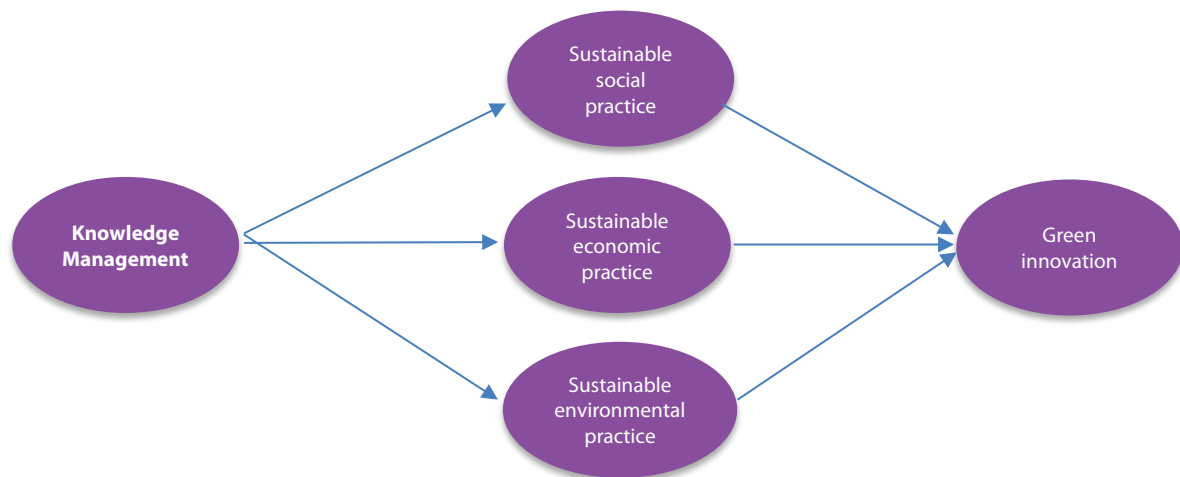
3. Methodology

Participants

The research for the purpose of this study employed a quantitative approach. It started with collecting data of companies operating in Bosnia and Herzegovina. We made a company list obtained from the Agency for Statistics of Bosnia and Herzegovina and our personal contacts comprising of 350 companies including their CEOs contact details. The first letter as an invitation to participate in our survey was sent in January 2024, and by the end of the month we collected 172 answers. In February we created a gentle reminder and sent it to those companies and their CEOs that did not fill in the survey in the first round. After this, we collected data from 210 companies that we kept for the main analysis of this study. Of the respondents, 128 CEOs were male (60.95%) and 82 were female (39.05%). In terms of age distribution, 70 respondents (33.33%) were between 20 and 29 years old, 54 respondents (25.71%) were between 30 and 39 years old, 42 respondents (20.00%) were aged 40 to 49, and 44 respondents (20.95%) were 50 years or older. Regarding educational qualifications, 80 respondents (38.10%) held a master's degree, 79 respondents (37.62%) had a bachelor's degree, 32 respondents (15.24%) had a technical diploma (equivalent to a high school diploma), 13 respondents (6.19%) held a doctoral degree, and 6 respondents (2.86%) reported having none of the above qualifications.

Measures

The study utilizes previously validated scales to ensure construct reliability and validity. The knowledge management construct is measured through three key dimensions: knowledge acquisition, knowledge dissemination, and knowledge application, based on the scale developed by Darroch (2005). Items within this scale capture how firms acquire new knowledge from both internal and external sources, how that knowledge is shared among employees, and how it is practically applied in business operations. These dimensions are directly aligned with the study's objective to assess how internal knowledge capabilities contribute to sustainability outcomes and green innovation.

The corporate sustainability construct is measured through three sub-dimensions: environmental, social, and economic practices. The items for each dimension are adapted from well-established instruments (Biasutti and Frate 2016; Dunlap et al. 2000; Michalos et al. 2012), and they assess the extent to which companies engage in practices that reduce environmental impact, support social welfare and employee wellbeing, and contribute to long-term economic stability. These dimensions reflect the triple bottom line (TBL) framework and are essential for analyzing how different aspects of sustainability relate to innovation outcomes.

Finally, green innovation is measured using a one-dimensional scale adapted from Chang (2016) and Song and Yu (2018), which includes items focused on the development and adoption of environmentally friendly products, processes, and technologies. This scale is closely aligned with the core aim of the study, which is to evaluate the extent to which knowledge and sustainability practices influence a firm's innovation behavior in the environmental domain.

Data analysis

This study utilized Partial Least Squares Structural Equation Modeling (PLS-SEM), a type of SEM commonly used for theory development by focusing on maximizing explained variance in dependent variables. SEM allows for the use of latent variables, which are not directly observable but are represented through mathematical models, making it useful for reducing the complexity of large datasets and connecting real-world data with theoretical constructs. The analysis was conducted using **SmartPLS 4.0** software, which offers a user-friendly interface and advanced reporting features. The software evaluates both measurement and structural models. The measurement model ensures the validity and reliability of the data, while the structural model tests the study's hypotheses using p-values and t-statistics. Key steps in evaluating the PLS-SEM model include assessing collinearity, examining path coefficients, and determining the predictive power of the model through the R^2 value. Additionally, effect sizes (f^2) and predictive relevance (Q^2) were calculated, with values indicating the strength of relationships between variables and the model's predictive accuracy.

4. Results

Internal consistency is evaluated using Cronbach's alpha and Composite Reliability (CR). Values above 0.70 for both indicators suggest that internal consistency is satisfactory. In Table 2, all Cronbach's alpha values exceed 0.70, indicating high internal consistency across variables. However, it is important to interpret Cronbach's alpha within the context of the research, as lower values may be acceptable depending on the study's purpose, sample size, and construct.

Similarly, all Composite Reliability values are above 0.70, confirming strong internal consistency for the variables. While CR typically provides a higher estimate of consistency, both Cronbach's alpha and CR should be considered to ensure reliability. A value of 0.70 or higher is generally acceptable, indicating that the items consistently measure the intended construct. An AVE value of 0.50 or higher is generally considered acceptable, indicating that at least 50% of the variance in the observed variables is explained by the construct they are intended to measure. In Table 3, all AVE values exceed 0.50, confirming that convergent validity is established. More specifically, the table presents the reliability of the indicators (inner loadings), or their standardized loadings on the corresponding dimension.

In Table 3, the diagonal values (square roots of AVE) are greater than the off-diagonal correlations, confirming discriminant validity per Fornell and Lacker's (1981) criterion. Besides, the Heterotrait-Monotrait Ratio (HTMT) is an alternative method for assessing discriminant validity. It compares the ratio of between-trait correlations to within-trait correlations. An HTMT value below 0.90 indicates satisfactory discriminant validity. In Table 4, all HTMT values are below 0.90, additionally confirming discriminant validity.

The first hypothesis (H1a) of this research has been confirmed. The β value is 0.427 and the p value is 0.000, which is less than 0.05. This practically means that knowledge management has a positive impact on sustainable environmental practices. The hypotheses H1b and H1c are also accepted and confirmed (β=0.390, p=0.000; β=0.304, p=0.000 respectively). This implies that companies that use knowledge management have a positive economic sustainable development, and the companies that effectively use knowledge management techniques in their operations have a positive impact on the company's socially

Table 2. Internal consistency

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	AVE
Sustainable economic practices (SECOP)	0.813	0.821	0.878	0.644
SEPSustainable environmental practices (SEP)	0.791	0.803	0.863	0.612
Sustainable social practices (SSP)	0.717	0.733	0.840	0.637
KM	0.941	0.944	0.949	0.607
GI	0.963	0.982	0.969	0.794

Table 3. Composite reliability

	SECOP	SEP	SSP	KM	GI
SECOP1	0.706				
SECOP2	0.769				
SECOP3	0.868				
SECOP4	0.857				
SE2		0.753			
SEP3		0.847			
SEP4		0.753			
SEP5		0.772			
GI1					0.805
GI2					0.893
GI3					0.909
GI4					0.920
GI5					0.893
GI6					0.934
GI7					0.914
GI8					0.855
KAF1				0.738	
KAF2				0.725	
KAF3				0.811	
KAF7				0.797	
KDF1				0.764	
KDF2				0.778	
KDF3				0.795	
KRF1				0.735	
KRF2				0.824	
KRF3				0.818	
KRF4				0.762	
KRF5				0.797	
SSP3			0.840		
SSP4			0.785		
SSP6			0.767		

Table 4. Discriminant validity results

	SECOP	SEP	SSP	KM	GI
SECOP	0.803				
SEP	0.629	0.782			
SSP	0.512	0.415	0.798		
KM	0.390	0.427	0.304	0.779	
GI	0.279	0.254	0.276	0.625	0.891

Table 5. Hypotheses testing results

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
KM -> SEP	0.427	0.439	0.055	7.805	0.000
KM -> SECOP	0.390	0.401	0.064	6.073	0.000
KM -> SSP	0.304	0.314	0.062	4.878	0.000
SSP -> GI	0.168	0.175	0.065	2.605	0.009
SECOP -> GI	0.128	0.131	0.093	1.372	0.170
SEP -> GI	0.103	0.111	0.079	1.299	0.194

sustainable development. Further, the results show that the H2b andH2c has not been accepted (β=0.128, p=0.170; β=0.103, p=0.194), while the H2a has a significant values and hence has been accepted (β= 0.168, p=0.009). The results are presented in Table 5.

5. Discussion and conclusion

The results of this research showed that knowledge management has a positive impact on the economic, environmental and social aspects of the company's sustainability. According to previous research (Awan et al. 2020; Song et al. 2020; Zhang et al. 2020), we can conclude that knowledge management has a positive effect on corporate sustainable development, i.e. on all three dimensions of company sustainability (economic, environmental and social dimension). Sustainable development is considered a key driver of green innovation, which contributes to environmental performance. This study shows that environmental practices have a negative impact on green innovation, while social practices have a positive impact. Research by Awan et al. (2020), Chang (2016), Huang and Li (2017) and Saunila et al. (2018) confirmed the positive impact of social and environmental practices on green innovations. Awan et al. (2020) suggested that corporate sustainable development will advance green innovation by integrating innovative and cleaner technologies. According to the results, social sustainable development is considered the most influential driver for green innovation. Companies should consider their operational effects on green innovation, recognizing the benefits of investing in environmental management and environmental management systems (Awan et al. 2020; Hojnik and Ruzzier 2016). Socially responsible companies provide more support in meeting consumer demands without harming the environment as the demand for environmentally friendly products increases (Tseng et al. 2018). Although

previous literature commonly identifies a positive relationship between sustainable environmental practices and green innovation (e.g., Saunila et al. 2018; Chang 2016), our findings do not support this association in the context of Bosnian companies. This divergence may be attributed to the relatively early stage of environmental strategy integration among firms in developing countries. In such contexts, environmental practices are often adopted for compliance purposes rather than innovation (Abdul-Rashid et al. 2017). Moreover, the implementation of such practices may be symbolic, fulfilling minimal standards without being deeply integrated into the firm's strategic or innovation processes. Without strong alignment between sustainability goals and core business strategies — especially those related to technology, product development, and competitive differentiation — the capacity for these practices to drive green innovation remains limited. This interpretation is in line with Institutional Theory, which suggests that under weak institutional pressures, sustainability behaviors may be more about legitimacy than substantive change (DiMaggio and Powell 1983).

Future research could further examine the depth and authenticity of sustainability implementation through qualitative case studies, while also considering regulatory dynamics and industry-specific factors that may moderate these relationships.

Additionally, limited technological capabilities, weak regulatory enforcement, and financial constraints may prevent these practices from evolving into green innovations (Hojnik and Ruzzier 2016). Similar results have been observed in studies conducted in other developing or transitional economies, where the lack of internal innovation capacity or institutional support has weakened the expected link between environmental practices and innovation outcomes (Abbas and Sağsan 2019; Razzaq, Sharif et al. 2021).

These insights suggest that, without strong innovation culture, knowledge infrastructure, and proactive strategic planning, environmental practices may not function as effective drivers of innovation. Instead, they may remain isolated operational efforts lacking integration into the broader innovation strategy. Future research should further explore these dynamics, possibly incorporating moderating variables such as environmental awareness, industry characteristics, or technological investment levels, as proposed by Zhang and Zhu (2019) and Li et al. (2022).

With the increasing awareness of environmental issues and the consequences of poor management, the demand for sustainable practices has become a critical focus (Lin and Niu 2018). This research contributes to the growing field of corporate sustainable development and green innovations by examining the relationship between knowledge management, corporate sustainability, and green innovations using the PLS-SEM methodology. The findings confirm that all dimensions of knowledge management (application, acquisition, and sharing) significantly impact corporate sustainability (environmental, economic, and social dimensions). Moreover, the social dimension of corporate sustainability significantly influences green innovations, highlighting the importance of knowledge in this area. However, the environmental dimension does not have a positive impact on green innovations. These results indicate that knowledge is a key tool in integrating sustainability into organizational processes, enabling employees to improve performance through timely and relevant knowledge sharing.

This study provides several theoretical contributions. First, it proposes a conceptual model based on the Resource-Based View (RBV) theory, addressing gaps in prior literature on green innovations. The research also expands understanding of corporate sustainability, including its environmental, economic, and social dimensions, and their role in promoting green innovations. Practically, the study emphasizes the importance of internal knowledge management as a mechanism for achieving corporate sustainability and environmental goals. Organizations should implement training programs to develop a sustainable workforce and adopt green practices that can generate greater revenue and reduce environmental impact. Additionally, management should integrate effective sustainability strategies and encourage knowledge sharing, which can drive compliance with environmental laws and enhance green innovations.

In addition to its practical relevance for businesses, this study offers important implications for policymakers in developing countries. The results suggest that governments can play a critical role in facilitating the integration of knowledge management into corporate sustainability strategies. One key area of support lies in the creation of enabling policy frameworks that promote collaboration between companies, academic institutions, and government bodies. By fostering a culture of knowledge exchange and innovation, policymakers can help overcome structural barriers that limit sustainable development in the private sector.

Moreover, the provision of financial incentives—such as grants, tax breaks, or targeted subsidies—can encourage firms to invest in green innovation and build internal knowledge capabilities. Educational and training programs designed to improve organizational capacities in both environmental management and knowledge-based innovation are also essential. These initiatives could strengthen firms' abilities to not only comply with environmental regulations but to actively use knowledge as a driver of strategic innovation.

Finally, more robust and strategically designed regulatory systems can help shift corporate sustainability efforts from mere compliance to deeper integration into business strategy. In doing so, governments can significantly enhance the impact of sustainable practices on green innovation and contribute to broader environmental and economic development goals.

Despite offering valuable insights, this study has several limitations that should be acknowledged. First, the research is geographically limited to Bosnia and Herzegovina, which, while providing a valuable localized perspective, may limit the generalizability of the findings to other contexts. Future studies should replicate the model across different developing countries to examine whether similar patterns hold in varying institutional and cultural settings. Qualitative methods may also be employed to further investigate the proposed model. Researchers are encouraged to replicate this study in different regions and include additional variables such as green knowledge-sharing behavior, absorptive capacities, and environmental awareness.

Second, the sample size of 210 companies, although sufficient for the applied PLS-SEM methodology, remains relatively modest. A larger and more diverse sample would enhance the statistical power and external validity of the results. Additionally, this study relies on self-reported survey data, which may be subject to response biases such as social desirability bias or inaccurate self-assessment by respondents. Managers may overstate the extent or effectiveness of their companies' sustainability and innovation practices, especially when such topics are viewed as socially or professionally desirable. While anonymity and

voluntary participation were emphasized to reduce this risk, the potential for bias remains. Future research could address this limitation by combining self-report data with objective performance indicators, external audits, or qualitative interviews to cross-validate findings and gain deeper insights into actual practices.

Third, the use of a cross-sectional design limits the ability to infer causal relationships between knowledge management, corporate sustainability, and green innovation. Longitudinal studies would allow for a better understanding of the temporal dynamics and causal pathways among these variables. Additionally, future research could incorporate qualitative approaches to provide deeper insights into the organizational processes that drive or hinder green innovation in sustainability-oriented firms.

In conclusion, the growing need for sustainable environments can be addressed through effective knowledge management practices, environmental awareness, and green innovations. These findings highlight the importance of considering the broader organizational and institutional context when analyzing the effects of sustainability on innovation. Further research could enrich this perspective by investigating potential moderators or industry-specific effects. This research demonstrates the impact of knowledge management on corporate sustainability and highlights the importance of the social dimension in driving green innovations, while the environmental aspect showed no significant influence.

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