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## SPECIALTY SECTION

This article was submitted to  
Environmental Economics and  
Management,  
a section of the journal  
Frontiers in Environmental Science

RECEIVED 28 February 2023

ACCEPTED 31 March 2023

PUBLISHED 11 April 2023

## CITATION

Al Shammre AS, Alshebami AS,  
Ali Seraj AH, Elshaer IA and Al Marri SH  
(2023), Unleashing environmental  
performance: The impact of green  
entrepreneurial motivation on  
small enterprises.  
*Front. Environ. Sci.* 11:1176804.  
doi: 10.3389/fenvs.2023.1176804

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# Unleashing environmental performance: The impact of green entrepreneurial motivation on small enterprises

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**Background:** Environmental degradation has been annoying, pressuring enterprises to look for innovative ways to improve their operations, methods and products.

**Aim:** This research identifies the key factors contributing to developing innovative behaviour among small enterprises in Saudi Arabia and their effect on environmental performance (EP).

**Method:** The study collected a sample of 284 from different types of small enterprises operating in Saudi Arabia. The data collected were analysed using the partial least square structural equation modelling (PLS-SEM).

**Results:** The study revealed interesting results. It was found that green entrepreneurial motivation (GEM) can positively and significantly influence green innovation (GI) as well as environmental performance. It was also found that green innovation can positively and significantly affect environmental performance. Finally, green innovation could mediate the relationship between green entrepreneurial motivation and environmental performance. Also, Knowledge sharing (KS) could moderate the relationship between green entrepreneurial motivation and green innovation.

**Conclusion:** The study concluded by providing several recommendations for the policymakers in Saudi Arabia.

## KEYWORDS

innovation, small enterprises, environment, Saudi Arabia, motivation

## Introduction

The continuous increase in environmental degradation and air and water pollution resulting from the activities of various types and sizes of businesses has recently become a source of concern. International agencies and other stakeholders continue to pressure firms to implement the necessary processes and operations to protect the environment and minimise adverse effects (Li et al., 2017; Abbas, 2020). In its sustainable development principles, the United Nations Global Compact emphasises the importance of protecting and

sustaining the environment to achieve the sustainable development goals. This constant pressure from various stakeholders to protect the climate has compelled companies to pursue eco-friendly initiatives, such as green innovation (GI), which contribute positively to environmental protection while developing a better image and competitive advantage (Hillestad et al., 2010; Novitasari et al., 2021).

Environmental degradation is caused by the activities of a range of businesses, including small and medium-sized enterprises (SMEs). Despite their positive contribution to economic development through job creation and poverty relief, SMEs account for approximately 70% of all environmental damage (Hillary, 2004; Baeshen et al., 2021). Therefore, small businesses of all types need to direct their operations and activities towards environmental protection by implementing green initiatives, services and products. The adoption of green initiatives, such as green services and products, enables small businesses to gain a strong market position, protect the environment, develop competitiveness and survive better (Miron et al., 2004; Ekins, 2010; Kamasak and Bulutlar, 2010; Ryszko, 2016; Li et al., 2022). GI principles imply the implementation of innovative processes, technologies, services, systems and products with a low environmental impact (Chen et al., 2018; Asadi et al., 2020).

However, for small businesses to adopt GI principles in their operations and among their employees, they must first understand the key factors that can improve individuals' green behaviour and assist policymakers in developing the necessary strategies to achieve it (Weng et al., 2015; Arfi et al., 2018). In most of the previous literature, innovative green behaviour has been investigated only in large enterprises, with little attention paid to small ones. It is worth noting that small businesses are not the same as large corporations, and they may find GI to be a complex problem due to a lack of funds and expertise. In addition, the countries in which small businesses operate may require different strategies (Oltra and Jean, 2009; Aghelie, 2017; Arfi et al., 2018). Furthermore, the available literature has focused primarily on theoretical explanations (Hermundsdottir and Aspelund, 2021; Padilla-Lozano and Collazzo, 2022) or on a single industry, such as manufacturing (Chang, 2011). Hence, it will be necessary to examine the various aspects of GI in relation to small businesses (Weng et al., 2015).

Despite some attempts to investigate the impact of personal characteristics on GI development, there has yet to be a clear answer in this regard (Prodanova et al., 2021; Guo, 2022). There have also been attempts to investigate the role of intangible resources in addressing the issue of environmental sustainability (El-Kassar and Singh, 2019; Singh et al., 2020), such as understanding how cognitive mechanisms are linked to green behaviour and green entrepreneurship (Chu et al., 2021). Green entrepreneurial motivation (GEM) and a culture of knowledge sharing (KS) are two antecedents that can contribute to the development of innovative behaviour in individuals (Arfi et al., 2018; Ali et al., 2020). Motivation can be classified into two types: intrinsic and extrinsic. Green intrinsic motivation refers to an individual's internal acceptance, love, passion and willingness to act in a particular way due to their inner nature (Li et al., 2020). Extrinsic motivation refers to external motives that increase an individual's willingness to perform a desired behaviour. Examples of external motivations include financial rewards, approval and

appreciation from others, and fame (Deci and Ryan, 2015; Ahmed et al., 2021).

Developing eco-friendly activities and green initiatives among people in businesses requires strong support from individuals, manifested in their willingness and love for what they do (Li et al., 2020). For green plans and strategies to be implemented successfully, individuals must be entirely motivated to accept green behaviour and activities; otherwise, they will fail (Mittal and Dhar, 2016). Enterprises must encourage employees to broaden their perspectives and knowledge of the environment, focusing on protecting it (Abbas, 2020; Ameer and Khan, 2022; Hu et al., 2022). Those with green motivation and orientation will contribute positively to environmental protection by developing innovative green initiatives, processes, services and products with a low environmental impact and using the most appropriate resources (Jiang et al., 2018; Luu, 2020). Furthermore, encouraging green entrepreneurial motivation and innovation among individuals in various contexts, including Saudi Arabia, may have numerous benefits. For instance, they encourage the adoption of renewable energy sources like solar and wind power to lower greenhouse gas emissions. Also, they can promote the use of sustainable farming methods that lessen soil erosion, preserve water supplies, and use less toxic pesticides and fertilizers. They may also result in the creation of recyclable or biodegradable eco-friendly items that cut down on trash production. Finally, we can build a more sustainable future for future generations while simultaneously benefiting economically by encouraging people and organizations to take a more responsible stance toward the environment.

In addition, successful implementation of innovative green behaviour necessitates the sharing of available knowledge among enterprises and individuals. KS is the process of individuals exchanging knowledge, information and experience to develop an innovative understanding that will ultimately result in environmental protection and competitive advantage (Wang and Noe, 2010). KS is a significant predictor of creative behaviour, and it can strengthen the link between individual motivation and innovative behaviour. Employers can boost employee motivation and creativity by cultivating a culture of collaboration and trust. This, in turn, may lead to more creative behaviour. Individuals can learn from one another by sharing their knowledge, which can boost their motivation to innovate. Furthermore, KS can give people access to new ideas and resources, enabling them to be more creative and innovative (Wang and Noe, 2010). Finally, KS can help foster a collaborative and supportive culture that encourages people to take risks and try new things. These factors can help strengthen an organisation's motivation and its relationship with innovation.

Despite its rapid economic growth, Saudi Arabia faces challenges such as fluctuating oil prices, frequently resulting in a state budget deficit. As an oil-producing country, Saudi Arabia faces environmental challenges such as air, energy, waste and water pollution (Raggad, 2018; Baeshen et al., 2021). These and other challenges have been taken into consideration and the Saudi government has developed a strategic plan known as Saudi Vision 2030, which includes many objectives, such as improving the SME sector and increasing its contribution to GDP from 20% to 35% (Al-Mamary and Alshallaqi, 2022; Aljarodi et al., 2022; Elshaer and Sobaih, 2022; Alshebami, 2023a).

Saudi Vision 2030 also focuses on developing a vibrant society, a thriving economy and an ambitious nation. It concentrates on developing innovative initiatives, such as novel services and products that serve the economy and protect the environment (Alwakid et al., 2020). Doing so requires the adoption of GI in various industries, including the small enterprise sector. What is more, it will require intrinsically and extrinsically motivated individuals working and operating small enterprises to ensure better output. Furthermore, to ensure high levels of motivation among individuals, a culture of KS must be instilled in the minds of employees and business owners because the more knowledge that is shared, the more cooperation is achieved in enterprises and the better the results. KS is considered important for innovative behaviour in Saudi Vision 2030. Accordingly, the Saudi government pressures international companies in Saudi Arabia to share knowledge among employees, particularly Saudi employees, in order to maximise the benefits for them and the country. It also offers training in knowledge transfer programmes (Kharmeh, 2020).

This article aims to investigate how GEM can influence Saudi small entrepreneurs' innovative behaviour and whether such behaviour can impact environmental performance (EP). It also intends to determine whether a KS culture can strengthen the relationship between GEM and creative behaviour. The article will provide Saudi policymakers with guidelines for developing intrinsic and extrinsic motivation among small Saudi entrepreneurs and emphasises the importance of instilling a culture of KS among individuals.

The following structure is used to organise the article. After this introduction, the literature review and development of hypotheses are discussed. The third section covers the research methodology and the fourth covers the findings. The fifth and sixth sections contain reports on the discussion and implications. The final section features the conclusion.

## Literature review and hypotheses development

### Theoretical background

GI has become an essential requirement for businesses of all sizes and types. As a result, theories to support green behaviour and innovation in this area have been developed. This study is based on the 'green theory' developed by (Eckersley, 2010). According to green theory, environmental sustainability at all levels is critical. Only by meeting the demands of various stakeholders, including society and nature, can businesses develop a competitive advantage (Edgeman and Eskildsen, 2014; Hu et al., 2022).

The study also uses the theory of conservation of resources, which holds that employees' resources, such as green motivation, help employees to engage in innovative behaviour and lead to better performance with better available resources. Finally, componential theory, which is the concept of individual creativity and invention, provides support for this study. According to componential theory, inventiveness and creativity require four elements. The three that fall under the individual domain are intrinsic task motivation, processes and skills. The fourth element is extrinsic motivation, which involves the social environment beyond the individual realm (Amabile and

Pillemer, 2012). We believe that small business owners and employees with high levels of motivation will be able to develop novel initiatives, such as environmentally friendly services and goods. One particular way to encourage green behaviour is to share information among people, which fosters a cooperative culture, increases motivation and broadens experience and skill sets (Arfi et al., 2018).

### GEM, GI and EP

In general, motivation is the desire to achieve specific goals or needs. Entrepreneurial motivation is an individual's desire to engage in entrepreneurial behaviour (Hassan et al., 2021). It is also the internal driver that directs individuals to participate in a specific goal or vision, such as green entrepreneurship, through innovative behaviour and individual demands (Wang et al., 2021). Entrepreneurial motivation acts as a guide for actual behaviour by instructing people on how to behave in specific situations (Schlepphorst et al., 2020).

There are two types of green motivation: intrinsic motivation and extrinsic motivation. Intrinsic green motivation arises from a passion or love for or an interest in green and eco-friendly behaviour, and it is driven by internal satisfaction rather than external rewards and benefits. It also drives people to perform their tasks enthusiastically in the absence of external benefits, such as rewards (Ryan and Deci, 1985). Personnel who are intrinsically motivated find their jobs intriguing, entertaining and pleasant (Amabile and Pillemer, 2012; Li et al., 2020). Extrinsic motivation is based on external motivators, such as fame, money, rewards and recognition (Li et al., 2020).

Both intrinsic and extrinsic green motivation contribute to the development of green innovative behaviour and the improvement of EP (Ahmed et al., 2021). Individuals who are highly intrinsically green motivated, for example, are more likely to engage in pro-environmental behaviour because it makes them happier with and prouder of themselves; they may also develop innovative initiatives such as green services and products. Individuals with extrinsic green motivation, on the other hand, are more likely to perform environmental protection tasks because they are motivated by external factors such as money, fame or appreciation, or because they are afraid of punishment (Li et al., 2020).

People who are intrinsically and extrinsically green motivated use less power and produce less waste, develop green initiatives, conserve the environment and go to great lengths to protect their surroundings (Ali et al., 2020). They are also thought to contribute significantly to the development of green behaviour and creativity (Bartol and Zhang, 2010; Kong et al., 2017; Hur et al., 2018). Individuals who lack enthusiasm, love, passion and interest in performing pro-environmental tasks, on the other hand, are less likely to pursue green tasks. Green motivation in general enables people to identify information about environmental challenges and problems as well as understand the underlying causes of these challenges, putting them in a better position to develop innovative products and make the best use of available resources (Luu, 2020; Ahmed et al., 2021). That said, in spite of the belief that motivation and its role are positive in their effects, empirical confirmation is still required (Li et al., 2020).

Extrinsic motivation is thought to reduce intrinsic motivation among people, despite the fact that green motivation in general has been shown to positively contribute to the growth of green behaviour among individuals (Hammond et al., 2011; Amabile and Pillemer, 2012). Therefore, management and human resources need to identify, assess and work to encourage the required motivation in individuals to act in a green manner in an enterprise (Saeed et al., 2019; Ali et al., 2020). Management can implement necessary strategies, such as green compensation and green reward systems, to help individuals improve their motivation and direct them towards ecological sustainability and the development of innovative behaviour (Al-Ghazali and Afsar, 2020; Hu et al., 2022). Finally, we argue that small entrepreneurs with GEM can develop better innovative initiatives, such as green processes, methods, services and products, resulting in environmental protection and the reduction of factors that have a negative impact on the environment. Thus, the following hypotheses emerge:

H1: GEM is positively related to GI.

H2: GEM is positively related to EP.

### Mediation effect

GI can be defined as new advancements and technologies that are used to reduce pollution, waste and energy use while also protecting the environment. GI can also reduce operational costs, improve an enterprise's market position and build a good brand for the enterprise through the introduction of innovative initiatives, such as novel services and products (Chandy and Tellis, 2000; Soomro et al., 2023) resulting in better performance (Zailani et al., 2015).

Good innovation means that businesses have strong operational performance and economic success (Roca and Searcy, 2012; Asadi et al., 2020). GI can be developed in businesses by identifying the key factors that contribute to its growth. Various factors, such as personal characteristics, have been identified as being responsible for the development of GI, but no definitive mechanism has been identified (Prodanova et al., 2021; Guo, 2022). GEM is thought to act as a precursor for developing green behaviour in individuals, ultimately benefiting the environment and its surroundings.

Individuals with higher levels of intrinsic or extrinsic green motivation have a stronger love, passion and respect for nature and, as a result, develop necessary pro-environmental green processes, methods, services and products that reduce waste, energy use and pollution (Amabile and Pillemer, 2012; Ali et al., 2020; Li et al., 2020; Ahmed et al., 2021; Hu et al., 2022). GEM, in other words, enables people to think creatively, love nature, protect the environment and reduce waste and pollution by directing their internal values towards pro-environmental behaviour. This environmentally conscious behaviour and love of nature improves the overall performance of society, the economy and the environment (Bartol and Zhang, 2010; Deci and Ryan, 2015; Jones, 2019). Therefore, we believe that if small businesses can generate any type of green motivation, they will be able to develop green behaviour and thus positively contribute to saving and protecting the environment. Consequently, the following hypothesis is proposed:

H3: GI mediates the relationship between GEM and EP.

### GI and EP

Environmental degradation and other natural issues have recently dominated the global debate. Enterprises' activities are thought to have a negative impact on the environment and pollution. Various stakeholders have consistently put pressure on businesses to implement environmental measures, such as green initiatives (Qu et al., 2021). These pressures have also increased public awareness of EP and the need to address it (Asadi et al., 2020). Green initiatives or innovation can be of two types: green process innovation and green product innovation (Awan et al., 2019) and both should result in reduced energy consumption and waste generation.

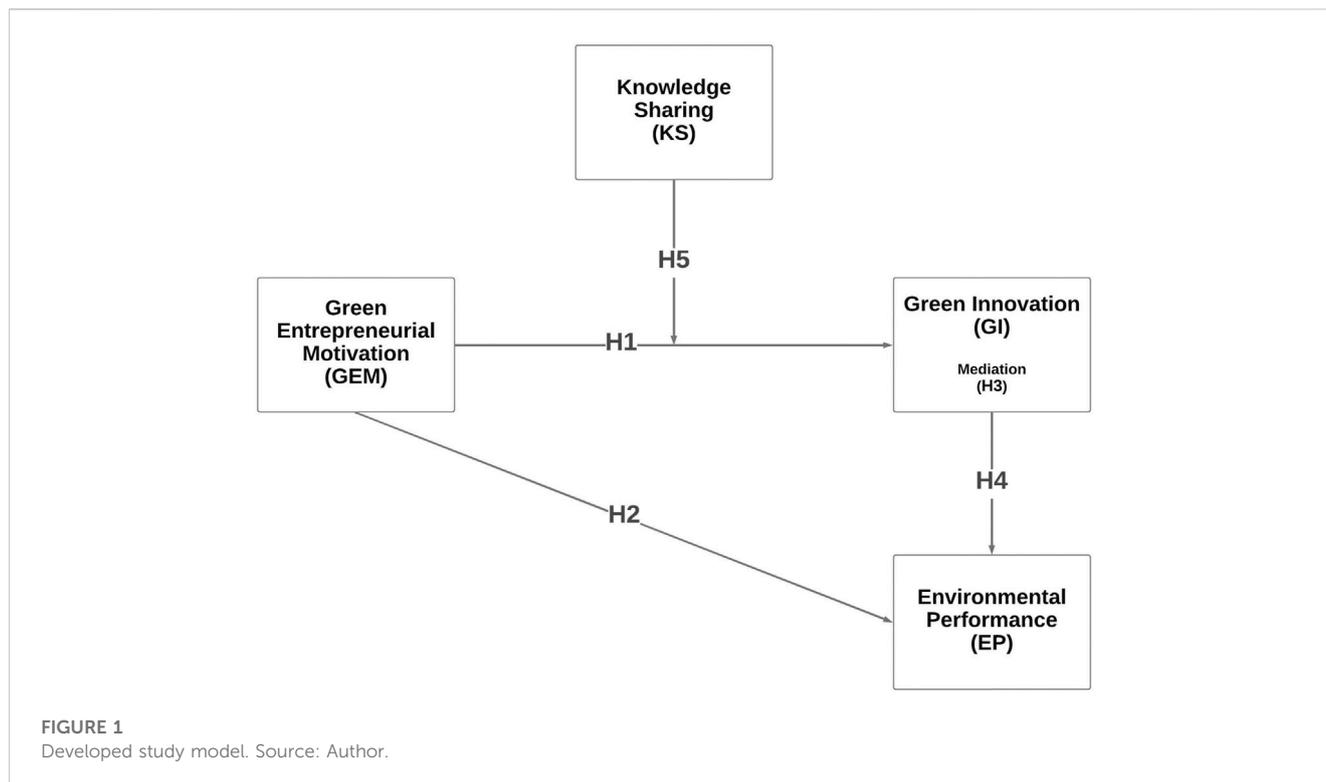
Enterprises strive to achieve so-called EP, which refers to the use of specific measures by businesses to protect the environment and reduce negative effects on it, such as the use of poisonous substances (Zhu et al., 2008; Asadi et al., 2020). EP is also defined as the impact on the environment of implementing GI (Baeshen et al., 2021). GI employs green behaviour, eco-friendly technologies, modern technologies and green ideas, processes and methods to create services and products that protect the environment and lead to long-term development (Awan et al., 2019; Asadi et al., 2020; Kumari et al., 2021).

GI entails reducing waste, using less paper, using less electricity and making the best use of available resources (Ahmed et al., 2021). Employees or individuals in general who exhibit GI behaviour indicate that they are willing to reduce pollution in the environment by developing novel ideas that have a positive impact on the environment (Ali et al., 2020; Hu et al., 2022). Businesses that focus on meeting EP standards reap numerous benefits, including the development of a competitive advantage that allows them to outperform their competitors (Yang et al., 2011; Kim and Lyon, 2015). Enterprises that implement pro-environmental programmes help to reduce greenhouse gas emissions and other wastes (Daily et al., 2012). They can also contribute to EP by lowering operational costs and adhering to imposed rules, which improve their image (Singh et al., 2016; Xue et al., 2019; Asadi et al., 2020; Baeshen et al., 2021). Designing green services, products and processes has numerous advantages, including reduced health risks, energy conservation and the elimination of toxic substances and other negative effects generated during manufacturing processes (Awan et al., 2019). As a result, it is argued here, small businesses that contribute to environmental pollution can reduce their negative impact on the environment if they practice pro-environmental behaviour, such as GI, and thus we develop the following hypothesis:

H4: GI is positively related to EP.

### Moderation effect

Understanding, information and expertise are shared reciprocally within an enterprise with the goal of developing new innovative and creative knowledge that contributes to the firm's improvement by developing a competitive advantage (Wang and Noe, 2010; Arfi et al., 2018). Unless knowledge is shared, it will have



little impact on enterprise performance (Inkpen, 2000). Internal and external knowledge both contribute to the development of GI (Noailly and Ryfisc, 2015). KS in businesses strengthens the link between individual motivation and innovative behaviour by fostering a culture of cooperation and trust, which leads to increased employee motivation and creativity. It also allows people to take risks and experiment with new ideas, which leads to increased motivation. Individuals can learn from each other's knowledge, which increases their motivation to innovate.

Furthermore, KS provides individuals with access to new ideas and resources that can help them become more creative and innovative, as well as revealing the level of innovation efficiency in an enterprise (Peng, 2013). KS and motivation are inextricably linked and mutually beneficial. Employees may want to share their knowledge with other employees in an organisation in order to impress their managers (Wang and Noe, 2010). Furthermore, individuals who are highly green motivated tend to share their knowledge with others (Aljanabi and Kumar, 2012), ultimately leading to the development of green initiatives that are beneficial to the environment. As a KS culture is regarded as an essential component for innovative behaviour, management can assist in directing shared knowledge towards developing green motivation among individuals by encouraging them to adhere to desired values through the use of rewards or punishments (Aljanabi and Kumar, 2012).

If necessary incentive systems are provided to support it in an enterprise, a KS culture can succeed and play a pivotal role in supporting innovative behaviour (Hung et al., 2011). Enterprises that have a KS environment or support the sharing and transfer of knowledge increase motivation and strengthen employee retention (Arfi et al., 2018). We argue that KS will enable greater individual

motivation and innovative behaviour in the context of small businesses, especially given that the relationship between KS and individual motivation remains relatively untapped and incompletely understood (Lam and Ford, 2010). Therefore, the following hypothesis is developed:

**H5:** KS moderates the relationship between GEM and GI.

## Study model

We developed our model for this study after conducting a thorough review of the previous literature. The model depicted in Figure 1 has GEM as an independent variable, GI as a mediator variable and EP as a dependent variable. KS is also included as a moderating variable in the model. This model seeks to investigate how KS can help moderate the relationship between GEM and GI. Furthermore, we plan to examine whether GI can act as a link between GEM and EP. An examination of the direct relationships between GEM, GI and EP is also included.

## Methodology

### Data collection and study respondents

Our research method is quantitative while using a deductive approach. It makes use of convenience sampling, a type of non-probability sampling that is commonly used in both qualitative and quantitative research due to its numerous advantages, such as ease of use (Sedgwick, 2013; Etikan et al., 2015). The sample for the study

was drawn from 284 male Saudi entrepreneurs engaged in various small business activities. An online survey was used to collect the responses of these small business owners to ensure that no data were missing and that all questions were answered. The survey measures were originally written in English, but we translated them into Arabic because the respondents were unable to answer English questions. A qualified professional assisted in completing the translation. We then sent the link to a sample of 15 respondents to see if there were any issues with the questionnaire's quality. We distributed it to respondents because there were no problems with its content or quality, and it remained online for about a month in 2022.

## Study measures

The measures used in this study were derived from previous empirical studies on comparable topics. The study looked at major constructs, such as GEM, GI, EP, and KS. The first, GEM, was adopted from (Wang et al., 2021). Statements relating to GEM were along the line of this example: "I would like to start a green enterprise in order to contribute to the development of the ecological environment." The GI and EP constructs statements were adopted from (Muangmee et al., 2021). Statements relating to these constructs were along the lines of these examples: "Our organisation uses eco-labelling" and "Our organisation has improved on environmental compliance." The section on KS included statements from (Wong, 2012) including this example: "I enjoy helping colleagues by sharing my knowledge."

## Results

### Demographic profile of respondents

This study included 284 Saudi Arabian respondents who ran various small businesses. The majority of them (91.5%) were male, with the remainder being female. The majority (37.3%) of the respondents were between the ages of 31 and 40, with a further 35.6% being between the ages of 21 and 30, 15.5% between the ages of 41 and 50, 8.5% under 20% and 2.8% over 50. With regards to highest educational qualification obtained, the majority of respondents (43%) held a diploma certificate, 28.2% held a bachelor's degree, 22.2% had a secondary school certificate, 6% had attended higher education, less than 1% had only primary education or less than that. With regard to sector, 40.49% were in the service sector, 19.4% in the wholesale and retail sale sector, 18.66% in small production and industrial products, and 21.5% in other, unspecified sectors.

### Assessment of PLS-SEM results

In this study, the data were analysed and hypotheses were tested. For this, we used partial least squares structural equation modelling (PLS-SEM). PLS-SEM has been identified as one of the most effective techniques for dealing with small sample sizes and predicting estimated models. It also aids in predicting the relationships between various structures (Hair et al., 2019). Those employing PLS-SEM need to

conduct two steps, namely, testing the measurement model and then testing the structural model (Hair et al., 2011; Alharasi et al., 2021; Alshebami, 2023b) to complete the required analysis.

## Measurement model analysis

When dealing with the measurement model, various tests must be performed, such as examining the construct indicator loadings; assessing construct internal reliability, as represented by composite reliability (CR) and Cronbach's alpha (CA); and examining the average variance extracted (AVE) and variance inflation factor (VIF). Loadings of 0.70 and above are recommended for indicators to demonstrate the ability to explain the variance of the indicator above 0.50, indicating better reliability (Sarstedt et al., 2017). Our findings in Table 1 indicate that the indicators' loading is more reliable. To ensure better internal reliability and consistency, values for the CR and CA should be between 0.70 and 0.95 (Hair et al., 2017). Our findings indicate that the desired thresholds for both CR and CA are met.

Concerning the AVE used for examining convergent validity, it is recommended that a study's constructs have an AVE of 0.50 or higher (Sarstedt et al., 2017). According to Table 1, the reported AVE is acceptable, indicating good convergent validity. The VIF is then used to perform an important test for multicollinearity. The VIF test determines whether there is a strong correlation between the independent variables. According to the results, all of the VIF values discovered were less than 3, indicating that there was no collinearity among the variables of the study (Hair et al., 2011; 2019; Alshebami and Alamri, 2020).

Once all the above tests shown in Table 1 were completed, we then checked the distinctiveness of variables. Accordingly, we used the (Fornell and Larcker, 1981) test. The results for this study, shown in Table 2, indicate sufficient discriminant validity.

## Structural model analysis

When the measurement model was finished, the structural model was tested. Table 3 shows the findings for the relationships and hypotheses tested, as well as other important tests.

In relation to H1, it was found that there was a positive and significant positive relationship between GEM and GI among Saudi small entrepreneurs ( $\beta = 0.465$ ,  $p < 0.05$ ). The coefficient of determination ( $R^2$ ) showed the ability to explain about 58% of the GI variance, which is considered strongly predictive for the endogenous construct (Cohen, 1988). The table also discloses the effect size ( $F^2$ ) of the exogenous variables on the endogenous variables. The  $F^2$  for H1 is reported to be 0.194, indicating a medium effect (Cohen, 1988). The t-value indicated that 7.257 of the variance in GI can be explained by GEM. Finally, the result of the  $Q^2$  indicates the predictive relevance of the model. The results of the  $Q^2$  showed values above zero, revealing that the model has a sufficient level of predictive significance (Hair et al., 2019).

In relation to H2, it was found that there was a positive and significant positive relationship between GEM and EP among Saudi

**TABLE 1 Reliability, convergent validity and multicollinearity.**

Constructs and items	Loadings	Cronbach's alpha	Composite reliability	Average variance extracted	Variance inflation factor
Green Entrepreneurial Motivation (GEM)		0.880	0.909	0.626	2.155
GEM1	0.774				1.828
GEM2	0.784				2.000
GEM3	0.832				2.305
GEM4	0.799				1.931
GEM5	0.784				1.955
GEM6	0.771				1.917
Green Innovation (GI)		0.795	0.867	0.619	2.155
GI1	0.750				1.454
GI2	0.820				1.743
GI3	0.789				1.650
GI4	0.788				1.717
Knowledge Sharing (KS)		0.841	0.888	0.613	2.646
KS1	0.792				1.829
KS2	0.788				1.794
KS3	0.808				1.967
KS4	0.824				1.997
KS5	0.695				1.440
Environmental Performance (EP)	0.750	0.832	0.882	0.598	-
EP1	0.808				1.637
EP2	0.758				1.859
EP3	0.790				1.657
EP4	0.761				1.834
EP5	0.750				1.595

Source: Primary data.

**TABLE 2 Fornell-Larcker criterion.**

	EP	GEM	GI	KS
EP	0.774			
GEM	0.788	0.791		
GI	0.730	0.732	0.787	
KS	0.708	0.787	0.695	0.783

Source: Primary data.

small entrepreneurs ( $\beta = 0.548, p < 0.05$ ). The coefficient of determination ( $R^2$ ) for this relationship showed the ability of GEM and GI to explain about 67% of the EP variance, which is considered strongly predictive for the endogenous construct (Cohen, 1988). The table also discloses the effect size ( $F^2$ ) of the exogenous variables on the endogenous variables. The  $F^2$  for

H2 is reported to be 0.424, indicating a large effect (Cohen, 1988). The t-value indicated that 11.548 of the variance in EP can be explained by the GEM. Finally, the result of the  $Q^2$  indicates the predictive relevance of the model. The results of the  $Q^2$  for this relationship showed values above zero, revealing that the model has a sufficient level of predictive significance (Hair et al., 2019).

In relation to H4, the aim was to test the relationship between GI and EP. A positive and significant positive relationship was found between GI and EP among Saudi small entrepreneurs ( $\beta = 0.329, p < 0.05$ ). The coefficient of determination ( $R^2$ ) for this relationship showed the ability of GEM and GI to explain about 67% of the EP variance, which is considered strongly predictive for the endogenous construct (Cohen, 1988). The table also shows the effect size ( $F^2$ ) of the exogenous variables on the endogenous variables. The  $F^2$  for H4 was 0.153, indicating a medium effect (Cohen, 1988). The t-value indicated that 6.983 of the variance in EP can be explained by the GI.

TABLE 3 Hypothesis testing.

Hypotheses	Association	Coefficient $\beta$	t-value	p-value	Decision	R <sup>2</sup>	F <sup>2</sup>	Q <sup>2</sup>
H1	GEM - > GI	0.465	7.257	0.000	Accepted	0.583	0.194	0.348
H2	GEM - > EP	0.548	11.548	0.000	Accepted	0.672	0.424	0.396
H4	GI - > EP	0.329	6.983	0.000	Accepted		0.153	
Mediation Analysis								
H3	GEM - > GI - > EP	0.153	5.402	0.000	Partial Mediation			
Moderation Analysis								
H5	GEM - GI * KS	0.120	2.379	0.018	Moderation			

Source: Primary data.

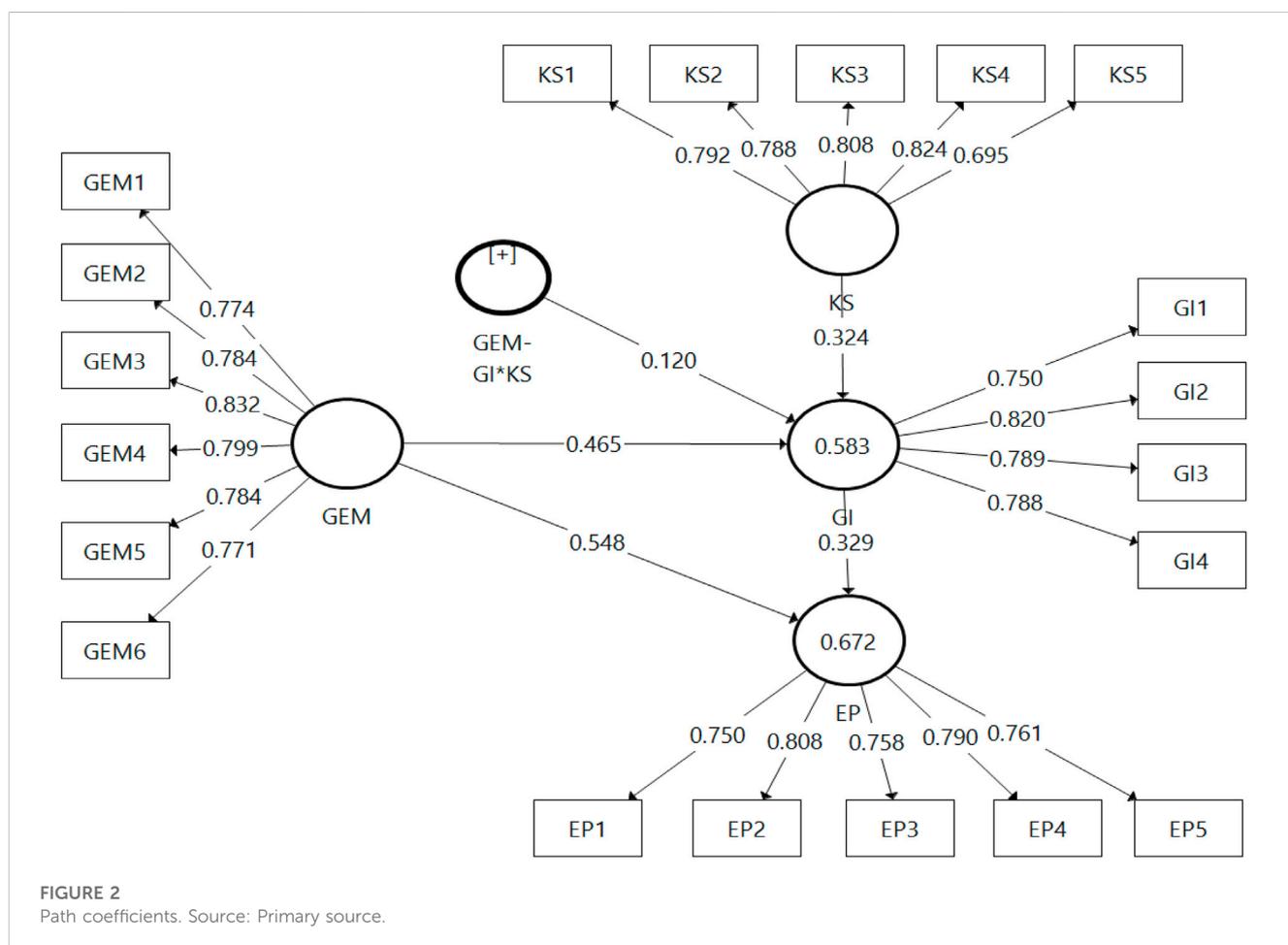


FIGURE 2 Path coefficients. Source: Primary source.

Finally, the result of the Q<sup>2</sup> indicates the predictive relevance of the model. The results of the Q<sup>2</sup> for this relationship showed values above zero, revealing that the model has a sufficient level of predictive significance (Hair et al., 2019).

With regards to H3, which aimed to examine whether the GI can mediate the relationship between GEM and EP, it was found that GI could successfully and partially mediate the relationship between GEM and EP ( $\beta = 0.153, p < 0.05$ ). Finally, the results in relation to H5 revealed that KS can positively moderate the connection between GEM and GI ( $\beta = 0.120, p < 0.05$ ).

### Representation of Path Coefficients

Figure 2 shows the path coefficient representation of the study variables.

### Discussion

This is one of the few studies on the role of GEM in GI and EP. The study also checked whether KS can moderate the relationship

between GEM and GI, and whether GI can mediate the relationship between GEM and EP. The study generated five hypotheses, all of which yielded intriguing results. H1 was developed with the goal of determining whether GEM has a positive impact on GI among Saudi small businesses. H2 was also created in order to test the effect of GEM on EP. The results revealed a significant and positive relationship between GEM and GI ( $\beta = 0.465$ ,  $p < 0.05$ ). Furthermore, there was a positive and significant relationship between GEM and EP ( $\beta = 0.548$ ,  $p < 0.05$ ). The findings relating to H1 and H2 are logical and intriguing since GEM motivation is required for developing innovative behaviour. GEM, whether intrinsic or extrinsic, directs or guides individuals' behaviour towards certain actions that lead to the development of novel methods and products and, as a result, contributes to environmental protection. Employees or individuals in general can be encouraged to engage in green behaviour and performance both internally, by increasing their love and passion for the environment, and externally, by providing financial assistance or implementing specific punishments or measures. Individuals who are highly motivated can create innovative and green services or products that have a lower environmental impact, are less toxic, emit less green pollution, waste less, and consume less energy. The overall performance of these environmentally conscious individuals will result in improved EP. The findings for H1 and H2 are supported by previous literature (Kong et al., 2017; Hur et al., 2018; Asadi et al., 2020; Li et al., 2020; Ahmed et al., 2021; Wang et al., 2021; Hu et al., 2022).

H4 was designed to investigate how GI influences EP. The results were exciting because they revealed the ability of GI to influence EP positively and significantly ( $\beta = 0.329$ ,  $p < 0.05$ ). This is also reasonable, given that the new green advancements, technologies, methods, products and initiatives are all intended to be pro-environment. As a result, they can positively contribute to environmental protection by reducing pollution, minimising energy use, reducing poisonous substances, reducing waste generated and improving air quality. GI can also help businesses to reduce the pressures imposed by various stakeholders, such as suppliers, funders, consumers, the government and environmental agencies by adhering to the rules and regulations imposed for GI. This ultimately contributes to improving EP. This finding is in line with the previous literature (Zhu et al., 2008; DiPietro et al., 2013; Xue et al., 2019; Asadi et al., 2020; Baeshen et al., 2021).

H3 was developed with the intention of investigating the possibility of GI mediating the relationship between GEM and EP. The H3 result is intriguing because it reveals GI's ability to mediate the connection between GEM and EP ( $\beta = 0.153$ ,  $p < 0.05$ ). The results indicate that the more people are motivated by green motivation, whether internally or externally, the more they will direct their behaviour and attitude towards implementing and developing novel and innovative initiatives that reduce pollution and waste and save energy, ultimately saving and protecting the environment. This finding confirms the critical role of GI in mediating the relationship between GEM and EP. The discovery also confirms that GI can only partially bridge the gap between GEM and EP. This finding is supported by prior research (Awan et al., 2019; Ali et al., 2020; Asadi et al., 2020; Li et al., 2020; Ahmed et al., 2021; Kumari et al., 2021; Hu et al., 2022).

Finally, in relation to H5, the study tested whether KS can positively moderate the relationship between GI and GEM. The

findings were positive and significant, showing the ability of KS to moderate the relationship between GI and GEM ( $\beta = 0.120$ ,  $p < 0.05$ ). This result is intriguing and logical since small businesses with a high level of KS enable individuals to learn from one another, increasing their motivation to innovate. Enterprises with a KS culture give employees access to new ideas and resources that can help them be more creative and innovative. KS can foster a collaborative and supportive culture that encourages individuals to take risks and experiment with new ideas. All of these factors can help to strengthen an organisation's relationship between motivation and innovation (Wang and Noe, 2010; Hung et al., 2011; Aljanabi and Kumar, 2012; Peng, 2013; Arfi et al., 2018). However, this study is not in line with one piece of previous research (Guo, 2022), which reported the non-existence of a moderation effect of KS on GI entrepreneurial self-efficacy.

## Theoretical and practical implications

This study is one of the few that focuses on the role of GEM in GI and EP, as well as the impact of GI and KS as mediating and moderating concepts. It thus adds to the limited literature on GI and SMEs worldwide, particularly in Saudi Arabia. It provides a platform for other researchers interested in small businesses and GI to continue researching other aspects of GI and small businesses. The study also provides empirical evidence of the role of GEM in positively influencing both GI and EP and confirms the significance of KS in fostering a cooperative culture among employees in their businesses. It also indicates that if GI is available, it can mediate the connection between GEM and EP. The study also provides empirical evidence to Saudi policymakers on the applicability of the developed model in the context of Saudi Arabia. This confirms that policymakers, small business owners and research institutions must focus on increasing environmental awareness among people in general and small business employees in particular. The message about the need to protect the environment can be spread by holding various seminars and workshops on the subject.

Research institutions, universities and colleges can help protect the environment by funding green research, including environmental lessons in their curricula and instilling a culture of green entrepreneurship in the small businesses they incubate. The Saudi government can continue to assist small businesses in developing green initiatives by providing the necessary incentives and financial resources to those who successfully develop green strategies. It can also assist them in conducting the necessary research to investigate available green business opportunities. In addition, the Saudi government can encourage green businesses by lowering taxes and providing more assistance to small businesses. GI principles can benefit society, the environment and small businesses by reducing pollution, reducing pressures from various stakeholders and increasing profits.

The study's findings also support the theories employed in the study. For example, the green theory states that enterprises can achieve benefits such as competitive advantages and environmental protection if they only meet the demands and requirements of

society, nature, and stakeholders. Accordingly, meeting these demands and requirements requires us to have motivated employees with a green orientation who can act towards developing innovative initiatives that protect the environment and satisfy the demands and requirements of various stakeholders. Attaining the green initiatives can also be achieved by providing a sharing knowledge culture that supports the sharing of available useful knowledge and experience in the enterprises. The same principles apply to conservation of resource theory, which holds that employees' resources, such as green motivation, help employees engage in innovative behaviour and lead to better performance with better available resources. This ultimately results in better protection of the environment. Finally, component theory, which is the concept of individual creativity and invention, provides support for this study. The componential theory confirms that available resources, such as green motivation among individuals, are important sources that must be directed toward developing creativity and green innovative ideas that benefit the environment, nature, and society.

## Conclusion

Small businesses are thought to contribute to pollution through their various operations and carelessness in relation to environmental protection. This study is a response to the previous literature's repeated calls to identify the factors that lead to the development of green initiatives among small businesses and the impact of these green initiatives on EP. A model was developed on the basis of the previous literature, and hypotheses were generated. A sample was chosen comprising 284 Saudis working in various small businesses. Surprisingly, all the proposed hypotheses were confirmed. This study provides policymakers and stakeholders in Saudi Arabia with a set of theoretical and practical implications regarding GI practices and EP. Despite its importance and intriguing findings, the study had some limitations, including a small sample size and a limited scope of investigation and analysis. Future research could focus on broadening the scope of the study, increasing the number of concepts used in the model and incorporating new concepts, such as green training and support. The sample size could also be increased.

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## Data availability statement

The raw data supporting the conclusion of this article will be made available by the authors, without undue reservation.

## Ethics statement

This study was reviewed and approved by the King Faisal University, Deanship of Scientific Research, Ethics Committee. Informed consent was obtained from all individual participants in the study.

## Author contributions

ASA has developed the model AHA has written the literature. ASAS has analysed the data. SA has reviewed the article.

## Funding

This work was supported by the Deanship of Scientific Research, Vice Presidency for Graduate Studies and Scientific Research, King Faisal University, Saudi Arabia (Grant No. 3195).

## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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