

Green Entrepreneurial Orientation, and Environmental Performance in Family SMES Examining the Moderating Role of Perceived CSR and GI



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ABSTRACT: This study aims to investigate the effects of green entrepreneurial orientation (GEO) on the environmental performance of small and medium-sized enterprises (SMEs). Building on Social Capital Theory (SCT), emphasizing corporate social responsibility and green innovation as mediating variables to improve this relationship, to achieve this, a study was conducted with 120 industrial SMEs distributed according to different sectors of activity. Activity and data were collected from a survey, and the validity and reliability of the measurement model were well reported. The results provided empirical evidence supporting the hypotheses of the study and they showed that the orientation of green entrepreneurship has an effect on environmental performance and that social responsibility and green innovation can play a mediating role in influencing the relationship between GEO and the EP of SMEs in Tunisia.

KEYWORDS: Corporate Social Responsibility (CSR), Green innovation, Environmental performance, green entrepreneurial orientation, SMES

INTRODUCTION

Researchers have paid great attention to environmental orientation activities in developed economies and for large organizations, in contrast, the literature shows that a limited number of researchers and studies that focus on environmental performance in the context small and medium-sized enterprises (SMEs) which are considered the backbone of developing countries (Ghazilla et al., 2015; Yoshino et al., 2016), however, SMEs have a significant influence on the environment in terms of climate change and energy consumption (Fawcett & Hampton, 2020), therefore, environmental issues represent some of the greatest concerns of companies, especially SMEs, which are generally characterized by limited financial resources, therefore, Amankwah-Amoah et al. (2019) confirmed that researchers pay a lot of attention to environmental sustainability orientation (ESO) which helps improve organizational performance. thus, researchers and practitioners are paying increasing attention to environmental problems – which arise from a range of business activities – and the identification of potential solutions (Qi, Zou, & Xie, 2020). for example according to industrial practitioners, researchers, academics and environmental policy makers, environmental degradation is explained by several reasons such as atmospheric emissions, resource depletion, hazardous materials, increased pollution air and water, climate change and energy consumption (Kraus et al., 2020)

In this context, recent research (Jiang, Chai, Shao, & Feng, 2018; Leonidou, Christodoulides, Kyrgidou, & Palihawadana, 2017) assume that the green entrepreneurial orientation (GEO) of companies represents an important factor that helps them to mitigate the harmful effects of their activities on the environment. So, GEO is defined as “a predisposition to seek out potential opportunities that produce both economic and ecological benefits by initiating green activities (Jiang et al., 2018). In this way, the notion of GEO focuses on the ability of companies to adopt green practices for innovation, market proactivity and risk taking in the execution of business activities.

Also, the existing literature provides accumulating evidence that green entrepreneurial activities are essential for improving the business environment, economic growth and social values (see Orazalin and Baydauletov, 2020), and therefore justify the motivation of companies to invest more in resources and develop skills that companies towards green entrepreneurship. Additionally, environmental sustainability involves acts and processes to reduce pollution, renew resources, avoid using harmful materials, and eradicate all processes that influence the environment. Researchers have confirmed that when environmental policies are properly designed, business competitiveness improves (Bresciani et al., 2021).

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On the same aspect, according to (Zhai et al., 2018), environmental orientation significantly improves the innovation performance of Chinese SMEs. Furthermore, market orientation and entrepreneurial orientation play a crucial role in determining commitment to sustainability (Jansson et al., 2017).

However, in other studies, Aykol and Leonidou (2015) stated that environmental sustainability is poorly understood in SMEs as the majority of researchers work on the environmental sustainability of large organizations in developed economies or (Bos Brouwers, 2010) indicates that there is a successful environmental sustainability practice in large organizations and it doesn't have to work in SMEs

In the Tunisian context, the notion of CSR takes on particular importance today. With the development of the societal movement after the January 2011 revolution, Tunisian SMEs, which represent more than 80% of active companies, are called upon to adopt new pro- societal behaviors within an environment that becomes hostile after the January revolution. 2011. Thus, public incentive environmental policies are oriented towards SMEs because of their weight and importance for the international opening of the country, but also their fragility in a globalized world.

Pour expliquer la relation entre EO et CSR, Iqbal & Malik (2019) analyzed the effect of entrepreneurial orientations through the engagement of SMEs in CSR practices, and they highlight from the results that entrepreneurial orientations are positively associated with the commitment to sustainable practices, in particularly with regard to the environment, human resource management and community and local development.

In the same context, (Shahzad et al. 2020) assume that CSR commitment is the effort that a company makes to play its role in preserving the natural environment. And therefore, CSR engagement plays a greater role in pursuing GEO results to improve PE

Therefore, the present research aims to study the role of GEO in SMEs in relation to their environmental performance in the first place and secondly, to explain the moderating effect of CSR on this relationship.

1. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Green entrepreneurship orientation and environmental performance

(Yunis and Michalisin 2016) pointed out that the world population has continued to increase over time and increased customer needs and global market demands have resulted in rapid degradation of natural resources which has raised unexpected ecological and socio-economic concerns. Therefore, many studies have indicated the importance of GEO in reducing environmental problems and improving SME performance. Indeed, GEO can contribute to a higher PE through several mechanisms, first, by providing environmentally friendly products and services (chen and chang, 2013), second, GEO aims to reduce hazardous emissions (Jiang et al, 2018). Third, the commitment to consumer safety and health (Chuang and Yang, 2013).

Also, (Guo et al, 2020; Pratono et al, 2019) have recently suggested that GEO plays a crucial role in achieving better financial performance and minimizing environmental impacts, thus, Teece (2014) sees that dynamic capacities emphasize the construction and restructuring of internal and external resources, therefore, this inclination facilitates the monitoring of ecological opportunities to generate green added value and it strives promote new product processes (woldesenbet et al, 2012)

Moreover, GEO can contribute to improving the sustainability and environmental performance of SMEs in several ways. Firstly, GEO captures the potential opportunities that are used to reduce environmental degradation and reduce market failures by improving market efficiency and similarly, it provides SMEs with special capabilities that enable them to explore, identify and assess the elements that are closely associated with environmentally related market failures (Teece, 2012).

Moreover, according to Teece (2012) GEO can contribute to improving the sustainability and environmental performance of SMEs in several ways. Firstly, GEO captures the potential opportunities that are used to reduce environmental degradation and reduce market failures by improving market efficiency and similarly, it provides SMEs with special capabilities that enable them to explore, identify and assess the elements that are closely associated with environmentally related market failures.

In addition, market failures notably lead to environmental degradation (Jiang et al., 2018) .For example, electricity companies are generally criticized for insufficiently adopting environmentally friendly technologies, thus leading to underutilization of other sustainable energy sources, such as wind power (Sine & Lee, 2009). and to address this market failure, which is closely linked to environmental degradation, GEO offers businesses the opportunity to identify technologies and methods that mitigate the harmful effects of existing business practices. In this way, (Demirel, Li, Rentocchini, & Tamvada, 2019) point out that GEO enables companies to discover/develop green practices, methods and technologies, and thus increase production efficiency with minimal impact on natural resources . Take the case of Toyota, which offers hybrid technology in cars, and telecommunications companies use radio waves, which saves natural resources and causes less damage to the environment. Second, GEO benefits employees – in terms of their occupational health and safety – by discouraging the use of toxic materials,

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thereby reducing hazardous emissions in the workplace (Chuang & Yang, 2014).

On the other hand, (Chuang & Yang, 2014) assume GEO benefits employees - in terms of their occupational health and safety - by discouraging the use of toxic materials, thereby reducing hazardous emissions in the workplace. In the same context, Ge et al. (2016) find that green proactivity has a significant positive impact on green performance through reduced pollution, waste and energy consumption. Similarly, Jiang et al (2018) find a significant positive relationship between GEO and environmental performance. Thus, GEO can contribute to better environmental performance by creating green products and services, reducing waste and materials, energy and water consumption, and ensuring the safety of employees and customers. Hence the hypothesis that:

H1: GEO has a positive influence on the environmental performance of SMEs.

1.2. CSR, GEO and environmental performance

Corporate social responsibility (CSR) is defined as a social approach that encompasses economic, social and environmental considerations According to (Huang, 2010), which can be an important issue to consider to improve environmental effects. And this means that it is easier to describe the environmental impacts of particular corporate social responsibility activities. Indeed, CSR practices and environmental consequences have been studied in previous research, with a variety of studies covering topics such as the relationship between CSR and green supply chain management, behavior individual green and employee environmental commitment. In this context, we find that research examining the link between CSR and organizational performance is sparse, but the limited research available shows that CSR drives performance.,

Recently, Researchers have studied CSR and economic performance in micro, small and medium enterprises (Hernández et al., 2020) found that CSR significantly improves economic performance (Sila and Cek, 2017; Marakova et al., 2021). As a result, scholars have mainly strayed into his research on the environmental performance assessment of such companies without paying much attention to corporate social responsibility (CSR). For example, Chuang, S.P.; Huang, S.J. (2017), pointed out that corporate social responsibility must incorporate the characteristics of revealed authority, reliability and environmental performance.

Additionally, Corporate Social Responsibility provides environmental data on waste disposal, including vital environmental statistics on sewage and pollution, Meng, X.; Zeng, S.; Xie, X.; Zou, H. Also Ahmad, N.; Ullah, Z.; Arshad, M.Z.; Kamran, H.W.; Scholz, M.; Han,

H. (2019) pointed out that the correlation between corporate social responsibility and environmental performance has recently received a lot of attention. For example, studies in the manufacturing and service sectors in Pakistan and in the Nigerian manufacturing sector, Shabbir, M.S.; Wisdom, O. (2020) reported that corporate social responsibility significantly influences the environmental performance of organizations, similarly, Bux, H.; Zhang, Z.; Ahmad, N. (2020) also suggested that implementing corporate social responsibility in manufacturing can increase the competitive advantage of that firm On the other hand, Suganthi (2020) found that the incorporation of CSR-related activities boosts organizational performance. He collected data from employees of different organizations and indicated that the CSR of organizations leads to better environmental performance.

Also, (Broccardo et al. 2022) indicates that CSR is also considered as a strategic tool to improve environmental performance, in addition, the CSR of organizations also facilitates their progress on different aspects, such as environment, economy and ethics (Malik et al. 2020). Additionally, Anser et al. (2020) pointed out that commitment to organizational CSR results in increased environmental performance, Kraus et al. (2020) also described a significant positive link involving GEO and PE under the influence of CSR.

In addition, and from the perspective of dynamic capability theory, researchers, in particular Adomako and Nguyen (2020), hypothesize that higher levels of the entrepreneurial dimensions provide the company with available resources and the possibility of entrepreneurship CSR activities. In this way, the entrepreneurial strategy facilitates the implementation of social commitment practices, making its skills available to the company, so that it uses its internal resources and applies them in the CSR strategy. In the same context, a company's GEOs play an important role in advancing corporate social responsibility (CSR) performance. And this means that a company's innovation, proactivity and risk-taking would lead it to adopt more socially responsible practices and generate benefits for society.

In conclusion, the researchers agree with the postulate that activities related to social responsibility can reduce the environmental effect of manufacturing companies by strengthening the entrepreneurial orientations of the company, therefore, we propose the following two hypotheses

H2: GEO has a positive influence on the CSR

H3: CSR has a positive relationship with corporate environmental performance.

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1.3. GEO and EP: Moderating role of CSR

The notion of CSR refers to the obligations of companies towards economic, social and environmental well-being (Jin et al., 2013; Sharma, 2019). Also, CSR is characterized by the practice of values that recognize social responsibilities, contribute to ethical social values and integrate these values into their practices in order to develop their goods and services in order to obtain a competitive advantage and to develop their business (Getele, Li, & Arrive, 2020). According to stakeholder theory, CSR implies that business development must include stakeholders, including employees, consumers, suppliers and communities (Turker, 2009). By adhering to CSR principles, companies can foster trust and excellent relationships with internal and external stakeholders and effectively drive innovation (Lins et al., 2016).

In this context, (Pucheta-Martínez and Gallego-Álvarez, 2019) assume that anything related to CSR can have a favorable effect on shareholder profitability. Thus, CSR provides shareholders with economic benefits, management and operational knowledge and motivation to work on CSR. Additionally, shareholder-related CSR can increase shareholder confidence in innovative investment opportunities.

Indeed, employee-focused CSR can make it easier for employees to identify with the organization. When employees recognize a company's commitment to environmental sustainability, they encourage the organization to view environmental preservation as an opportunity to improve competitive advantage (Ernst & Jensen Schleiter, 2021) furthermore, companies stimulate social and environmental performance through pro-environment behavior and stimulate green behaviors of employees, which has a favorable effect on employees' innovative technological exploration (Xu et al., 2022). Therefore, green human resource management can promote corporate sustainability as an essential technique to influence the green behavior of employees (Amjad et al., 2021; Zhu et al., 2021). Similarly, employee green creativity is seen as the driver of company green innovation, and employee green behavior is a crucial indicator for measuring employee green creativity (Jiang et al., 2020). In the same framework of analysis, Gaudencio et al. (2017) found that CSR increases employee job satisfaction and organizational commitment and has a beneficial effect on building a stable innovation team (Ho, 2017).

Finally, according to (Kim, Li, & Li, 2014), CSR provides access to multiple stakeholders, thus creating an "environmental munificence", which allows companies to take advantage of abundant resources – in particular ethical values – which offer many opportunities for innovation and growth. These values have a greater effect in predicting GEO

Overall, studies have shown that CSR can help stakeholders increase their profitability and further promote green investments and pro-environmental behaviors. Therefore, we suggest the following hypothesis:

H4: CSR moderates the relationship between GEO of SMEs and environmental performance

1.4. GEO, GI and environmental performance

The concept of Green Entrepreneurial Orientation (GEO) is based on the foundations of Green Entrepreneurship Theory and Entrepreneurial Orientation Theory (Guo et al. 2020), it can facilitate the production of innovative green products that will help improve sustainable business performance (Teece 2016). As such, the main objective of GEO is to promote sustainable production processes and to introduce green products and services or so-called GI (Bos-Brouwers 2009). Green innovation is achieved through the applicability of new technological advances that will help reduce the cost of production and pollution and increase a company's market share. It also develops innovative products and services, builds well-known brands, and gains competitive advantage [Baeshen, Y.; Soomro, Y.A.; Bhutto, M.Y.(2021)]. Likewise, green innovation enables companies to develop and produce products that have a favorable impact on the environment (Huang and Li 2017). Thus, most studies have targeted factors promoting IG, such as limited perceptions of customers, business owners, supplier capabilities, government regulations, and technological, environmental, and organizational determinants [Weng, H.-H.; Chen, J.-S.; Chen, P.-C.(2015)].

Moreover, GEO play an important role in encouraging individuals to act green and direct their behavior towards the development of innovative products and services. Once individuals develop skills, beliefs, readiness, confidence and the ability to act in a greener way, they can develop innovative ideas. They will implement them in their businesses in innovative and creative ways, developing a better competitive advantage and better economic return, Elshaer, I.A.; Azazz, A.M.S.; Ameen, F.A.(2023). A trend towards green innovation means people have more self-confidence. Hence, they will reduce operational costs, save available resources, overcome potential challenges, and ultimately protect the environment and improve overall business performance.

Additionally, individuals with higher GEO can make better use of available resources, reduce negative environmental impact, and develop innovative ideas [Kuckertz, A.; Wagner, M.(2010)] that will lead to sustainable business performance, Empirically, researchers have confirmed the positive relationship between GEO and GI, as [Soomro, B.A.; Shah, N.(2021)] Regarding the relationship between green innovation and environmental performance, (Asadi et al. 2020; Gault 2018; Gavurová

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et al. 2020) pointed out that companies that reduce waste generation and carbon dioxide emissions, as well as the reduction of toxic substances, are involved in environmental performance. However, organizations around the world are adopting environmental strategies that help accelerate environmental performance and gain competitive advantage (Pakurár et al. 2020; Rodríguez-Antón et al. 2012). In this regard, environmental laws also put pressure on managers to respect environmental performance (B. DiPietro et al. 2013). However, (Dangelico and Pujari 2010) assume that environmental performance is an important component of organizational strategy as it encompasses green innovation and business strategies that create competitive advantage in the marketplace. Consequently, organizations that have adopted environmental performance as part of organizational strategies have a competitive advantage (Yang et al. 2011).

In general, current literature reveals that improved operational activities as well as higher productivity lead to better environmental performance of companies (Asadi et al. 2020; Kozubíková et al. 2017; Montabon et al. 2007). Based on evidence from previous studies, the following hypothesis is proposed:

H5: GEO has a positive effect on GEO.

H6: Green innovation significantly influences environmental performance
H7: GI mediates the relationship between GEO and EP.

2. RESEARCH METHODOLOGY

2.1. Questionnaire and data collection

In this study, the collection of raw data was carried out through interviews with managers of industrial SMEs in Tunisia to develop an official questionnaire. The questionnaire consists of 3 parts. The first part of the information concerns the characteristics of the company, part 2 the information relating to the respondents, part 3 deals with questions relating to the factors affecting the environmental performance of industrial SMEs, in particular GEO and CSR. Data collection is done through practical sampling methods to collect feedback data from business leaders on the impact of GEO and CSR on the environmental performance of family SMEs in Tunisia. The questionnaire uses the Rennis Likert scale (also known as the Likert scale), the Likert scale has 5 levels ranging from low scores to high scores, ranging from 1 to 5 as follows: 1. strongly in disagreement; 2. Disagree; 3. normal; 4. OK; 5. totally agree. The total number of questionnaires issued is 200, collecting 130 returns; the number of returns valid for data processing is 120

2.2. Data Analysis

Raw data will be processed in SPSS 28.0 software after being collected. The study tested the reliability of a scale using Cronbach's Alpha coefficient, which is a statistical test of the degree of stringency with which the scale items correlate. Next, perform a principal component analysis which identifies the main factors and reduces the number of items with maximum information. Finally, the study uses multivariate regression methods to test the impact of the dimensions of social responsibility and corporate GEO to improve the environmental performance of industrial SMEs in Tunisia.

2.3. Research Model and Development of Assumptions

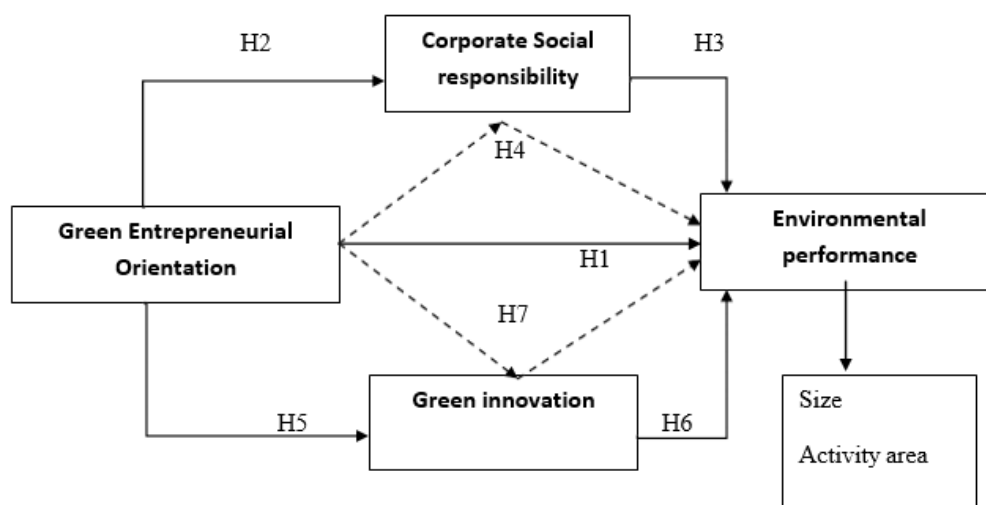


Figure 1. Estimated conceptual framework.

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H1: GEO has a positive influence on the environmental performance of SMEs.H2: GEO has a positive influence on the CSR

H3: CSR has a positive relationship with corporate environmental performance.

H4: CSR moderates the relationship between GEO of SMEs and environmentalperformance

H5: GEO has a positive effect on GEO

H6: Green innovation significantly influences environmental performance.H7: GI mediates the relationship between GEO and EP.

Table 1. Measurement of variables

Variables	Items	Auteurs
Social responsibility	Promote employee training	McWilliams et al, (2016)
	Has higher salaries than the sector	
	Has flexible work policies	
	Trying to improve the worker's quality of life	
	Participate in social projects with the community	
	Purchases from local suppliers are encouraged	
	They maintain relationships with responsible suppliers	
	The prices of their products are reasonable	
	There are guarantees on the products offered to the customer)	
	Its processes have little environmental impact	
	They value the adoption and use of renewable energy	
They are favorable to the reduction of gases and pollutants		
Green entrepreneurial Orientation	GEO1: Our organization uses less or non-polluting/toxic materials.	Y. Li, Wei, and Liu (2010)
	GEO2: Our organization has a strong tendency for high-risk green product development.	
	GEO3: Our firm/organization has a strong emphasis on green R&D, technological leadership, and innovation.	
	GEO4: Our firm/organization has a tendency to initiate green actions for competitors to respond to.	
	GEO5:Our organization has a tendency to be a market leader, always first in introducing green products, services, or technologies.	
Environmental performance	EP1: Our company has reduced the use of hazardous/toxic materials in construction projects.	Vanalle R.M., Ganga G.M.D., FilhoM.G., Lucato W.C (2017)
	EP2: Our company has reduced environmental accidents and health hazards in construction projects.	
	EP3: Our company has reduced the waste water and solid wastes in construction projects.	
	EP4: Our company has reduced the consumption of electricity and water in construction projects.	
	EP5: Our company has used low-pollution and eco-friendly materials in construction projects.	
	EP6: Our company has reduced material waste.	
Green innovation	GI1: Our organization uses less or non-polluting/toxic materials.	Asadi et al. (2020), Chen(2008)
	GI2: Our organization improves environmentally friendly packaging for existing and new products.	
	GI3: Our organization recovers end-of-life products and recycling.	
	GI4: Our organization uses eco-labeling	

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2.4. Results and discussion

2.4.1 Reliability test of variables

Table 2. Descriptive statistics on the scale of the GEO

Item	Mean	Standard deviation	Alpha without item
GEO1	3.24	0.780	0.787
GEO2	3.13	0.798	0.781
GEO3	3.15	0.741	0.785
GEO4	3.10	0.844	0.781
GEO5	2.99	0.755	0.840
Alpha Score	0.860		

We looked for the Cronbach's alpha coefficient to measure the internal consistency of these eight items. This coefficient has a value of 0.860 which must be considered high since it is higher than the recommended minimum value of this coefficient which is 60%.

2.4.2. PCA analysis

Before applying the PCA, we verify that the necessary conditions are provided. In our case, we have KMO index ≥ 0.5 and Bartlett specificity test equal 285.298 with a significance level that tends towards 0 as well as there are internal correlations. The three conditions are met so the PCA is feasible. The KMO "Kaiser-Meyer-Olkin" index is satisfactory since it is equal to 0.830. Bartlett's sphericity test is significant ($p = 0.000 < 0.05$). So the data can be factored. Two factors have eigen values greater than 1 and 78.6 of the information is retained. All the items have factorial contributions greater than 0.7, they are all to be retained.

Table 3. KMO index

KMO and Bartlett test		
Sampling precision measurement kaiser Meyer Olkin		0,830
uare sphericitytest	Chi-square approximated	291,298
	Ddl	31
	Bartlett's sig	,000

As a rule, we accept variables that have commonality greater than or equal to 0.4. We notice that all the items have acceptable values ≥ 0.5 According to the rule of variance greater than or equal to 1 and following an initial exploration of the table of total variance explained, we have retained a single axis which expresses 67.953% of the rate of total information which is relatively acceptable. On the other hand, the other components were not retained if the Kaiser criterion is applied.

Table 4. Communalities and factorial contributions to GEO

	Component	Communalities
	1	
GEO1	0.716	0.621
GEO2	0.749	0.651
GEO3	0.720	0.620
GEO4	0.721	0.623
GEO5	0.728	0.632
Own value	3,784	
Cumulative % of variance explained	67,953 %	

2.4.3. Descriptive statistics on the CSR variable scale

The table below shows that the alpha coefficient has a relatively strong and acceptable value $0.724 \geq 0.5$ and all the items are strongly correlated with each other. Internal consistency between items improves the value of Alpha.

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Table 5. Descriptive statistics on the CSR variable scale

Total item statistics			
	Mean	Standard deviation	Alpha without item
RSE1	4.16	0.502	0.683
RSE2	4.29	0.525	0,725
RSE3	3.79	0.849	0,687
RSE4	4.40	0.492	0,722
RSE5	4.23	0.614	0,678
RSE6	4.12	0.568	0,685
RSE7	4.09	0.608	0,717
RSE8	4.34	0.476	0,693
RSE9	4.18	0.449	0,722
RSE10	4.12	0.597	0,724
RSE11	4.21	0.607	0,716
RSE12	4.05	0.516	0,709
Alpha Scor	0.724		

PCA analysis applied to the CSR variable.

According to the table below KMO index ≥ 0.5 with a significance level which tends towards

In our case, the KMO index $=0.740 \geq 0.5$ and the specificity and Bartlett test has a value of 267.709 and significant. it tends towards 0 by more, there is a correlation between the items. Therefore PCA is feasible.

Table 6. KMO index and Bartlett test

KMO and Bartlett test		
Sampling precision measurement Kaiser Meyer Olkin		0,740
Bartlett Chi-square sphericitytest	Chi-square approximated	267,709
	Ddl	66
	Bartlett sig	,000

According to the table of total variance explained, we retained the first three axis which contributed to the rate of total information with 54.785 %.

Table 7. Communalities and factorial contributions

	Component			Communalities
	1	2	3	
RSE1	0.579	0.365	0.225	0.519
RSE2	0.668	0.329	0.043	0.557
RSE3	0.674	0.342	0.006	0.513
RSE4	0.087	0.110	0.712	0.526
RSE5	0.664	0.149	0.294	0.549
RSE6	0.327	0.561	0.316	0.522
RSE7	0.285	0.219	0.659	0.563
RSE8	0.294	0.611	0.258	0.526
RSE10	0.012	0.791	0.107	0.637
RSE11	0.044	0.293	0.692	0.567
RSE12	0.665	0.218	0.238	0.547
Own value	3,140	1,611	1,275	
Cumulative % Variance Explained	21,848	38,487	54,785	

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The table shows that all the items have coefficients greater than 0.5 except item 9 which represents a low value so it was the disturbing element in the model, so we eliminated this item from our PCA analysis. The other items represent communalities that are generally above 0.5. Axis 1 is correlated with the items RSE1, RSE2, RSE3, RSE5 and RSE12 which represent high contributions and communalities greater than 0.5. Axis 2 is correlated with the items RSE6, RSE8 and RSE10 which have strong contributions and communalities greater than 0.5. The items RSE4, RSE7 and RSE11 are correlated with axis 3. They represent high contributions as well as communalities greater than 0.5.

2.4.4. Descriptive statistics of green innovation

Table 8. Descriptive statistics on the scale of the green innovation variable

Statistiques totales des items			
	Mean	Standard deviation	Alpha without item
GI1	12,03	1,596	,667
GI2	11,79	1,427	,610
GI3	12,11	1,106	,547
GI4	11,87	1,562	,671
Alpha Score	0,684		

Variable ACP analysis Green innovation

According to the table below KMO index ≥ 0.5 with a significance level which tends towards

In our case, the KMO index $= 0.658 \geq 0.5$ and the specificity and Bartlett test has a value of 95.940 and significant. it tends towards 0 by more, there is a correlation between the items. So PCA is feasible.

Table 9. KMO et Bartlett test

Sampling precision measurement kaiser MeyerOlkin			0,658
Bartlett sphericity test	Chi-square	Chi-square approximated	95,940
		Ddl	6
		Bartlett's sig	,000

According to the table of total variance explained, we retained the first axis which contributed to the rate of total information with 62.267%.

Table 10. Communalities and factorial contributions

GI4		0.639	0,594
Own value		3,092	
Cumulative Explained	% Variance	62,28	

	Component	Communalities
	1	
GI1	0.630	0,617
GI2	0.848	0,720
GI3	0.791	0,625

2.4.5. Descriptive statistics on the environmental performance

Table 11. Descriptive statistics

Item	Mean	Standard deviation	Alpha without item
EP1	3.34	0,754	0.787
EP2	3.13	0.780	0.784

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EP3	3.18	0.741	0.789
EP4	3.25	0.844	0.781
EP5	2.99	0.664	0.840
EP6	3.43	0.730	0.789
Alpha Score	0.824		

We looked for the Cronbach's alpha coefficient to measure the internal consistency of these eight items. This coefficient has a value of 0.824 which must be considered high since it is higher than the recommended minimum value of this coefficient which is 60%.

PCA analysis

Before applying the PCA, we verify that the necessary conditions are provided. In our case, we have KMO index ≥ 0.5 and Bartlett specificity test equal 289.893 with a significance level that tends towards 0 as well as there are internal correlations. The three conditions are met so the PCA is feasible. The KMO "Kaiser-Meyer-Olkin" index is satisfactory since it is equal to 0.828. Bartlett's sphericity test is significant ($p = 0.000 < 0.05$). So the data can be factored. Two factors have eigen values greater than 1 and 67.54% of the information is retained. All the items have factorial contributions greater than 0.7, they are all to be retained.

Table 12. KMO index

KMO and Bartlett test		
Sampling precision measurement kaiser Meyer Olkin		0,828
quare sphericitytest	Chi-square approximated	289,893
	Ddl	29
	Bartlett's sig	,000

As a rule,, we accept variables that have commonality greater than or equal to 0.4. We notice that all the items have acceptable values ≥ 0.5 except the EP5 variable which has a low value, so we excluded this variable from our PCA analysis According to the rule of variance greater than or equal to 1 and following an initial exploration of the table of total variance explained, we have retained a single axis which expresses 67.539% of the rate of total information which is relatively acceptable. On the other hand, the other components were not retained if the Kaiser criterion is applied.

Table 13. Communalities and factorial contributions to Environmental performance

	Component	Communalities
	1	
EP1	0.716	0.612
EP2	0.749	0.742
EP3	0.720	0.618
EP4	0.721	0.620
EP6	0.728	0.630
Own value	3,597	
Cumulative % of variance explained	67,539 %	

The table shows that all items have coefficients greater than 0.5. The other items represent communalities that are generally above 0.5. Axis 1 is correlated with items EP1, EP2, EP3, EP4 which represent high contributions as well as commonality above 0.5.

2.5. Analysis of regressions between variables

The regression analysis value of $R = 0.587$ and adjusted R^2 is 0.415, this means that the relationship between the independent variables explains 41.5% of the dependent variable "Environmental performance and medium industry in Tunisia". According to the results of the ANOVA analysis, the value of $F = 18.241$ with statistical significance $Sig = 0.000 < 0.05$. We can confirm the existence of relationships between the independent variables and the dependent variables. Thus, showing that the research model ensures reliability. Based on the beta coefficient from the table below, it can be seen that the factors of the research model, the

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green entrepreneurial orientation (GEO) factor, has the largest beta normalization factor = 0.460. The CSR factor (ecological dimension) has the smallest coefficient Beta = 0.198. Furthermore, the Values sig. of all variables < 0.05. Thus, the hypotheses H1, H3, H4, H5, H6, H7 proposed in the research model are all accepted.

The results of the non-standardized regression model of the factors influencing the environmental performance of family SMES in Tunisia are shown in the table below

Hypotheses Testing

TABLE 14. Hypotheses Results

Path	Beta	SE	p-value	Result
GEO → EP	0,460	0,079	0,000<0.001	Accepted
GEO → CSR	0,198	0,087	0,217	Rejected
CSR → EP	0,212	0,053	0,001	Accepted
GEO, CSR → EP	0,365	0,049	0,000	Accepted
GEO → GI	0,420	0,042	0,000	Accepted
GI → EP	0,247	0,064	0,000	Accepted
GEO, GI → EP	0,295	0,047	0,000	Accepted

*** : significatif 1% $p \leq 0.01$; ** significatif 5% ou $p < 0.05$; * significatif ou $p < 10\%$

a. variable dépendant : Environmental performance

The goal of this research was to study the relationships between GEO and environmental performance. We also tried to examine whether or not CSR and Green innovation play a moderating role in influencing the relationship between GEO and the environmental performance of SMEs in Tunisia, and, by. According to the results and for hypothesis 1 which tests the relationship between GEOs and the environmental performance of SMEs, the results revealed that GEOs have a significant positive relationship with the environmental performance of SMEs (H1). These results explain that companies with more GEO deal with natural environmental problems more proactively because GEO contributes to minimizing environmental degradation and improving ecology, the H2 hypothesis which tests the relationship between GEO and CSR is not justified with $p=0.217$ is not significant, therefore we accept H1, on the other hand for H3 which studies the relationship between CSR and PE, we underline a positive and significant link ($\beta = 0.212$, $p > 0.000$), so we accept H0 and reject H1, which corroborates with the studies of (Broccardo et al. 2022) which indicates that CSR represents a strategic tool for improving environmental performance and it also facilitates their progress on different aspects, such as environment, economy and ethics, in H4, we study CSR as a mediating factor that influences the relationship between GEO and PE, this hypothesis is justified too, it means that companies by their demonstration of CSR through their business activities, and inclined to the well-being of stakeholders are more likely to incentivize GEO and achieve environmental performance, Kraus et al. (2020) also described a significant positive link involving GEO and PE under the effect of CSR. In addition, H5 who studied the link between GEO and GI, also revealed an exciting discovery. The hypothesis result ($\beta = 0.420$, $p > 0.000$) reported a significant relationship between GEO and GI, This result is also logical, because individuals with a tendency or orientation towards green innovation or towards the development of innovative products and services tend to act greener. Indeed, Soomro, B.A.; Ghumro, I.A.; Shah, N (2019) speculate that for those with a sustainability orientation can develop more emotions and constituents towards green entrepreneurial behavior. H6 which tests the relationship between GI and EP is validated, as suggested by previous researchers that firm performance does not only depend on economic success, but also on social performance and environmental factors (Asadi et al. 2020; Chin et al 2015, moreover, (Montabon et al 2007) argued that better environmental practices lead to environmental performance. For H7 which highlights the positive and significant mediating effect of GI on the relationship between GEO and environmental performance is verified ($\beta = 0 < 0.295$, $p = 0.000 < 1\%$). These results are rational, because individuals with higher GEOs can develop innovative products and services with the help of their abilities, strength and confidence. As a result, these newly developed green ideas can improve a company's environmental performance.

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CONCLUSION

Although SMEs are the engine of growth of the international economy thus playing a vital role in developing economies, creating new employment opportunities, alleviating poverty and empowering people, their operations still contribute to environmental problems, and therefore it should be essential to inculcate the culture and attitude of small business owners to develop innovative products and services capable of creating competitive advantage, protecting the environment and increasing returns. In addition, current literature shows that very limited studies have been conducted on the influence of green entrepreneurial orientation on green innovation and CSR, which play a role as mediating variables in our model and which in turn influence environmental performance. Therefore, this study built a conceptual model based on Resource Based Theory (RBV) and assessed the impact of Green Entrepreneurial Orientation (GEO) on Green Innovation (GI) and the CSR that ultimately led to corporate environmental performance. The results confirmed the importance of CSR in the development of GEO which will improve the PE of entrepreneurs' businesses. The study also revealed GI's ability to mediate the relationship between GEO and EP. The study also provides guidelines for policy makers and other Tunisian stakeholders to strengthen and improve the GEO of small entrepreneurs in order to develop innovative and green products and services which help reduce production costs, increase enterprises' revenue and protect the environment.

RECOMMENDATIONS

In the light of the research results, the authors propose a number of solutions and recommendations for the strategy of green entrepreneurial orientations of companies to strengthen the environmental performance of family SMEs in Tunisia, in particular as follows put in place systems for the continuous improvement of the organization's environmental performance, which makes it possible to verify its compliance with regulatory requirements, to prevent pollution and to respond to emergency situations. - create a work environment that ensures safety and meets the requirements of employees. - offering training courses, self confidence building programs and entrepreneurial orientation programs. Also, there could be knowledge enrichment programs on green innovation and environmental protection for small entrepreneurs. Small entrepreneurs need to understand the negative impact their business could generate and how to minimize it. They should also know how they benefit from the development of innovative products and services and their thoughts on economic performance.

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