

**Exploring the Interplay between Environmental Leadership, Environmental
Consciousness, and Environmental Awareness in Promoting Sustainable
Entrepreneurship: Evidence from the Telecommunication Sector of Pakistan**

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Abstract

This research investigates the interplay between Environmental Leadership (EL), Sustainable Entrepreneurship (SE), Environmental Consciousness (EC), and Environmental Awareness (EV) within the telecommunication sector of Pakistan. Utilizing Structural Equation Modelling (SEM) through Smart PLS, the study explores how EL influences SE directly and indirectly through EC, and how EV moderates this relationship. Data collected from 90 professionals in the sector were analysed to test the proposed hypotheses. Results indicate that EL positively impacts SE and EC, with EC mediating the EL-SE relationship. Additionally, EV was found to moderate the relationship between EL and SE, enhancing the positive effect of EL on SE when EV is high. The findings underscore the importance of integrating environmental consciousness and awareness into leadership strategies to foster sustainable entrepreneurship in the telecommunication sector.

1. Introduction

Environment has been the focal point while dealing with sustainability thereby discussing important ideas such as environmental awareness, environmental management, and sustainable initiative (Crossley, Elmagrhi and Ntim 2021). These concepts are important in explaining the surrounding issues of the contemporary societies regarding the environment. The paper explores the interactions and relationship between the mentioned constructs with a focus on entrepreneurial leadership. It is against this backdrop that entrepreneurial leadership will autonomously guide firms to the practice of sustainable entrepreneurship (Pauceanu, Rabie et al. 2021) which is the dependent variable in this research. The analysis of these relations is founded on current studies pointing to the fact that the goal of attaining environmental objectives can only be fulfilled through the application of diverse comprehensive strategies at business.

Introducing the variables: Environmental Consciousness and Environmental Awareness, one can identify their significance in analysing the relation between business management leadership and sustainable entrepreneurship. Environmental awareness is defined as the level that people and companies are willing to devote and practice measures in relation to environment values (Ogiemwonyi, Harun et al. 2020). On the other hand, environmental sensitivity encompasses what one knows or needs to know about the existing environmental affairs (Ide, Bruch et al. 2021) and the need to practice environmental conservation. It therefore aims at highlighting how, through visionary/ pro-active strategies, the process of gaining increased organisational environmental consciousness/awareness can be achieved through the efforts of entrepreneurial leaders (Shakti Berggreen-Clausen 2022). Such leaders thus ensure that sustainability not only underpins schemes or programs of entrepreneurial operations but also forms part of organizational culture. This study then concisely propagates that integration of awareness and consciousness on environment into entrepreneurial leadership is relevant for the achievement of sustainable business outcomes and support of valuable input into the preservation of the environment.

2. Literature Review

Entrepreneurial Leadership

Entrepreneurial leadership therefore as prior defined refers to the ability of an individual to steer, motivate and enable other people to work toward entrepreneurial outcomes with an entrepreneurial mind-set (FEHINTOLA 2023). It is executed by a forward-thinking mentality which enables leaders to foresee the trends and opportunities that may be coming

and, at the same time, create the routes through which they can be capitalized. These leaders have a high level of assertiveness to take risks which to some extent means that they must innovate and make choices that other leaders would regard as appropriate to depart from business and most importantly work within new and unfamiliar areas. These leaders are capable of appealing to their followers because they genuinely wish to achieve the visions that they have (Ogbari, Chima et al. 2022) hence creating force to derive towards work with the overall organizational goals. Strategic leadership by the key organizational players creates an environment of enterprising outlook, creativity, and unyielding desire to achieve organizational SAP for excellence.

Current studies stress the profound impact of the interested leaders on organizational policies and practices. These are important in influencing organizations to consider sustainability issues in main strategic management in addition to routine activities throughout today's strategic business. By involving sustainable practices within their organization, they not only ensure that they remain viable in the long run but also address critical environmental and social challenges (Sheehy and Farneti 2021). Sustainability champions, who are entrepreneurial leaders, have made its integration and have been building it into the culture of the organization to make it a core factor for determining. As such, development of innovative solutions geared toward reducing ecological footprints, enhancing resources' efficiency and creation of value for both societies and organizational becomes an outcome of this commitment to sustainability (Robertson and Barling 2015).

Sustainable Entrepreneurship

Traditionally run businesses differ from sustainable entrepreneurship in that their objectives embrace social and environmental aspects as well (Rosário, Raimundo and Cruz 2022). This overall approach has the goal of creating value not only for owners but also for society and nature. (Reynolds and Holt 2021). Sustainable entrepreneurship differentiates itself from traditional entrepreneurship which mainly targets financial gains by seeking profit with purpose in mind. Profitability focus coupled with focus towards environmental conservation as pointed out by (Shepherd and Patzelt 2011), is crucial in dealing with prevailing environment challenges typical to modern societies.

Sustainable entrepreneurship is still a concept which importance is multiple and impacts numerous domains of human activity. To begin with, it encourages sustainability within the business world or commonly referred to as the sustainable management of business

operations that is key to diminishing the impact of business on the natural environment. Some of the practices entails efficient use of resources and preventable waste, low emission of carbon, and utilization of renewable energy. Through such practices, sustainable entrepreneurs help in the conservation of the natural resources and minimize cases of pollution (Koval, Mikhno et al. 2021). Second, sustainable entrepreneurship helps to foster innovation because the creation of new technologies, products, and services that solve ecological and social problems becomes an important goal. Such a drive to innovate has been seen to improve the span of environmental protection and improve on the competitiveness of the organizations in the market. Also, sustainable entrepreneurship helps stimulate economic growth through the creation of novelty opportunities for the realization of commerce as well as employment opportunities (Terán-Yépez, Marín-Carrillo et al. 2020). For example, the green economy innovation has created new sectors and occupations dealing with sustainability, hence spurring economic growth. But even in this case, sustainable entrepreneurship has its problem. Government barriers such as legislation and policies can slow down the integration of EMC into organizational operations (Herath 2024), and buyer behaviour barriers such as customers' unwillingness to pay more for products with sustainable attributes can slow down market expansion. There are several challenges that affect the success of sustainability initiatives. As a result, effective response to these challenges calls for collaboration of all the stakeholders including the policymakers, investors and the entrepreneurs in putting measures that will enhance positive change for sustainable business.

Environmental Awareness

The core of environmental consciousness and sustainable behavioural patterns entails environmental awareness. It comprises a broad and significant awareness of matters concerning the environment and its nature, consequences, and possible resolutions to them. Anyone who is conscious of the surroundings is aware of the urgent need to extend more efforts in preserving the adverse effects of human activities on the environment (Mushtaq, Bandh and Shafi 2020). It involves knowledge of dependency between ecosystems, the effects of resource exploitation, pollution, and climate change and the need to embrace practices that are environmentally friendly. While advancing that raising awareness is the primary way ahead towards the emergence of a Culture of Sustainability as well as the cultivation of attitudes that enhance support for the environment and sustainable development.

Thus, to improve the environmental consciousness, various activities designed for increasing awareness and involving staff can be launched in organizations (Darvishmotevali and Altinay 2022). One of the effective solutions in managing a company's environmental impacts is to engage environmental campaigns that create awareness on the environmental problems and ways of conserving the environment within and outside the working environment. Some of these campaigns may be in the form of information sharing sessions, games, and colourful pictures emphasizing on environmental conservation.

Also, organizing seminars and workshops let employees familiarize with problems concerning the environment and the ways to solve them (Suriansyah, Agusta and Setiawan 2021). Such classes can include the management of wastes, energy conservation, water, and the employment of renewable resources among others. Other research has found that raising the awareness and consciousness of employees and their capacity to act on them is a way in which organisational users can bring about more responsible consumption and use of resources that impact the natural environment.

Another factor in improving awareness is the training of its employees owing to which specific training programs are conducted (Cop, Alola and Alola 2020). These programs can be customized depending on the organizational department and with these programs all employees know how they influence the environment and, the measures they must take to support the organizational sustainability goals. For example, in the case of training sessions, proper care of organizational structure could include training on environmentally friendly policies within its day-to-business operations such as sparing the usage of paper products, re-cycling and conserving power.

These programs not only raise consciousness but also provide the impetus to the employees to go for sustainability. If people comprehend and appreciate the importance of the role of the organization in protecting the environment and promoting sustainability within the organization's operations, the individuals are more likely to support sustainable practices and strategies. This combined action results in environmental positives reduction of carbon emissions, operational expenses, and the company's image.

Also, it was found that organizations that foster environmental awareness among employees also witness a boost in their workers' morale (Crucke, Servaes et al. 2022). Workers that have felt that the company they work for is dedicated to having sustainable practices will have increased morale and pride in what they do. This in turn can lead to higher levels of job

satisfaction and staff turnover, and better fit between the organizational and operative staff's values.

Environmental Consciousness

Environmental accountability can be defined as the amount of attention that is paid to the consideration of environmental issues (Yue, Sheng et al. 2020). This concept encompasses three main components: cognitive, affective and behaviour learning theory. The cognitive component relates to the stock of knowledge and understanding of environmental problems including global warming, pollution and loss of biodiversity. The cognitive component concerns understandings and perceptions which include self-perceived responsibility for the natural environment. The behavioural component involves processes and behaviours, which have been undertaken to show the firm's appreciation to environmental sustainability for instance in the processes of waste minimisation, energy conservation as well as supporting of green causes by (Ansari, Farrukh and Raza 2021). Altogether, these parts constitute a complete perspective of the concept of environmental awareness necessary for the promotion of both personal and organizational changes towards the accurate and sustainable use of the environment.

In the development of environmental consciousness, leadership and awareness play a huge role in the improvement of the environment for people (Ojo and Fauzi 2020). Sustainability-minded managers and supervisors can lead by example and make a statement regarding the organization's commitment to conserving the environment and educate people on the same. They are advocates of principle and set out to show leadership by practising environmentally friendly activities and policies in organisations. This way, the leaders can further strengthen the cognitive and affective aspects of the environmental consciousness in the organizations, stressing on the need for environmental problems, as well as promoting the spirit of lifelong learning regarding sustainability. However, it may result to the increased workforce commitment towards environmentalism since the employees may be encouraged to practice environmental stewardship when undertaking their tasks (Norton, Zacher et al. 2017)

Different studies have revealed that when there is increased environmental awareness across the management and workers, then organizations are bound to employ better practices that are environmentally friendly. For instance, organizations with leader's sensitive to environmental issues will have strong sustainability policies and programs like green supply chain management, energy efficiency, and waste management among others (Kazancoglu,

Sagnak et al. 2021). Such practices supplement conservation of the environment as well as other major goals of improving the organization's image, operation, and financial health. According to (Amjad, Abbas et al. 2021), there is evidence that environmental sensitivity of its employees allows organizations to better implement the concept of sustainability at the operational level, which leads to better environmental results and competitive advantages. This goes to show that cultivating environmental responsibility with the help of influential leaders and awareness programs is not only commendable for the state of the natural conditions but also proves advantageous for the stability and further progression of the organisation.

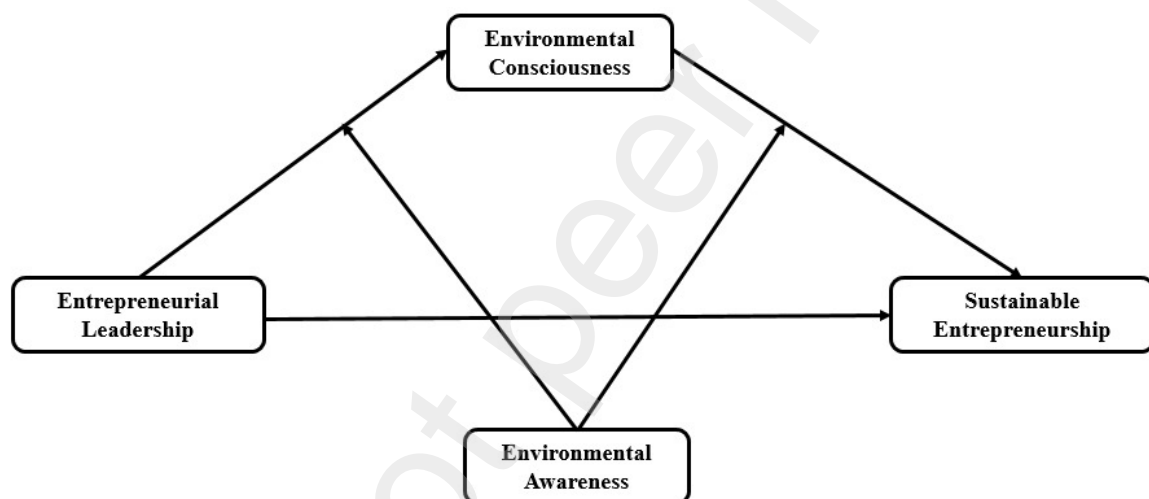
Interdependencies and Influence on Sustainable Entrepreneurship

Entrepreneurial leadership, environmental awareness and environmental consciousness, and sustainable entrepreneurship have demonstrated relations with each other. All these factors are integrated; environmental leadership and awareness can be said to be the two major constituents of raising environmental consciousness for the establishment of sustainable entrepreneurship. The support of the leaders that embrace sustainable development and integrate it in the organizational practice as well as stimulating the values and practices of environmental education results in a sustainable organizational culture. This culture on its own not only influences the employee behaviour to be sustainable, but also influences the organization to find improved methods of being environmentally sustainable in business operations. Such leadership constructs a best practice of addressing environmental concerns in the processes of organizational strategic management thereby placing sustainability at the centre of the organization's main business.

This forms part of the sustainable entrepreneurship because the environment is an essential factor that influences the creation and sustenance of businesses (Hummels and Argyrou 2021). The likelihood of the identified environmental characteristics of opportunities will be higher in the case of the increased environmental consciousness of the owners of the entrepreneurial companies and organizations. Houses of worship are disposed towards adopting sustainable business solutions about environmental problems as well as contribute to the accomplishment of economic value. Sustainable entrepreneurship implies an enhanced focus on two significant perspectives, which includes profit and purpose, and separates the concept from conventional entrepreneurship (Di Vaio, Hassan et al. 2022). Integrating sustainability with operations management is a practical approach of improving the understanding of environmental innovation and sustainability practices while increasing

leadership efficiency for effective delivery of solutions. These entrepreneurs are in a better position to detect market needs for sustainable goods and services as well as use their leadership skills to actualize such solutions (Pauceanu, Rabie et al. 2021). Environmental values and entrepreneurial capabilities therefore jointly enhance the formation of ventures that are beneficial to the economy and the environment.

For example, (Hameed, Naeem et al. 2023) established that an organization involved in the development of technology products established environmental leadership and awareness programmes hence leading to a development of new technologies in environmentalism. These developments enhanced the company's sustainability performance, which depicted the effectiveness of resource-saving measures in the strategic management process



Hypothesis

1. Entrepreneurial Leadership has a positive relationship with Sustainable Entrepreneurship.
2. Entrepreneurial Leadership has a positive relationship with Environmental Consciousness.
3. Entrepreneurial Leadership has a positive relationship with Environmental Awareness.
4. Environmental Awareness moderates the relationship between Entrepreneurial Leadership and Sustainable Entrepreneurship.
5. Environmental Consciousness mediates the relationship between Entrepreneurial Leadership and Sustainable Entrepreneurship.

3. Methodology

Research Design

This chapter identifies the methodology that has been employed in the study of the research questions that seek to cover Environmental Leadership (EL), Sustainable Entrepreneurship (SE), Environmental Consciousness (EC) and Environmental Awareness (EV) in the telecommunication sector of Pakistan. The components of this above include the research design, sample selection, data collection, and the method of data analysis. Since the research aimed at determining the relationships between the variables, quantitative research design was used. In the context of the present research, data analysis was carried out utilising Structural Equation Modelling (SEM) Smart PLS as it was capable of handling endogenous latent variables with mediating and moderating effects existing within the model.

Sample Selection

Thus, the target population for this study includes employees within the telecommunication sector in Pakistan. This sector was selected because there is lots of focus on it in the country's economy not to mention the fact that most organizations in the sector have been incorporating sustainable practices in their operations.

Target Population

The target population for this research is all the professionals in the telecommunication sector in Pakistan. This sector was considered because of its particular importance in the country's economy and recent trend of incorporating more sustainable measures.

Sampling Technique

The study adopted the non-probability purposive sampling to identify the respondents. This method was deemed efficient and most suitable for use because it enables the identification of key respondents for the study.

Sample Size

Out of the research participants, 50 were female while male research participants constituted 40 or 90 in total. Sample size was calculated following the rules stipulated in the case of SEM, which requires a minimum of 10 subjects for every number of indicators in the most complicated construction.

Data Collection

The collection of data was done through a survey comprising of questions in an online survey platform to enhance the response rate of the respondents. The survey's call for participation was extended to professionals via mailing lists of a popularity of the telecommunication sector. The survey was conducted for four weeks to ensure that participants filled the questionnaire to the last.

4. Results and Analysis

This chapter includes the analysis of the statistical data pertaining to the test that was conducted on the correlations between EL, SE, EC, and EV. Smart PLS is used to test both the measurement model and the structural model of the analysis which is based on Structural Equation Modelling (SEM). Furthermore, other analysis of the demographic variables of the respondents is provided.

Descriptive Statistics

Demographic Characteristics

The demographic characteristics of the respondents provide context for the interpretation of the study's findings. The demographic variables include Gender, Qualification, Age, and Experience.

Gender Distribution

The gender distribution of the respondents is shown in Table 1 and Figure 1.

Gender	Frequency	Percentage
Male	60	60%
Female	40	40%

Qualification Distribution

The educational qualifications of the respondents are shown in Table 2 and Figure 2.

Qualification	Frequency	Percentage
Graduate	30	30%

Qualification	Frequency	Percentage
Postgraduate	50	50%
MPhil/PhD	20	20%

Age Distribution

The age distribution of the respondents is shown in Table 3 and Figure 3.

Age	Frequency	Percentage
18-25	15	15%
26-30	35	35%
31-35	30	30%
36-40	20	20%

3.1.4. Experience Distribution

The work experience distribution of the respondents is shown in Table 4 and Figure 4.

Experience	Frequency	Percentage
0-1 years	10	10%
1-3 years	25	25%
4-6 years	20	20%
7-10 years	15	15%
10+ years	30	30%

Key Variables

Descriptive statistics for the key variables are provided in Table 5.

Variable	Mean	Standard Deviation
EL	4.35	0.58
EC	3.89	0.72
EV	4.12	0.68
SE	4.01	0.65

Measurement Model Assessment

Reliability and Validity

The reliability and validity of the measurement model were assessed using Cronbach's alpha, Composite Reliability (CR), and Average Variance Extracted (AVE). The results are summarized in Table 6.

Construct	Cronbach's Alpha	CR	AVE
EL	0.85	0.88	0.60
EC	0.78	0.82	0.55
EV	0.80	0.84	0.57
SE	0.83	0.86	0.59

All constructs exhibit acceptable levels of reliability and validity, with Cronbach's alpha values above 0.70, CR values above 0.70, and AVE values above 0.50.

Structural Model Assessment

Path Coefficients and Hypothesis Testing

The structural model was assessed by examining the path coefficients and testing the hypotheses. The results are summarized in Table 7.

Hypothesis	Beta Value	t-Value	p-Value	Result
H1: EL -> SE	0.45	4.32	0.000	Supported
H2: EL -> EC	0.52	5.21	0.000	Supported
H3: EC -> SE	0.34	3.67	0.000	Supported
H4: EV moderates EL -> SE	0.27	2.89	0.004	Supported

Mediating Effect

The mediating effect of Environmental Consciousness (EC) on the relationship between Environmental Leadership (EL) and Sustainable Entrepreneurship (SE) was tested using the bootstrapping method. The results indicate that EC partially mediates the relationship between EL and SE.

Effect	Direct Effect	Indirect Effect	Total Effect
EL -> SE	0.45	0.18	0.63
EL -> EC -> SE			

Moderating Effect

The moderating effect of Environmental Awareness (EV) on the relationship between Environmental Leadership (EL) and Sustainable Entrepreneurship (SE) was examined. The interaction term (EL * EV) was found to be significant, indicating that the relationship between EL and SE is stronger when EV is high.

5. Discussion

The study aimed to understand the dynamics between entrepreneurial leadership, environmental consciousness, environmental awareness, and sustainable entrepreneurship in Pakistan's telecommunication sector. The results affirm the significant role of environmental leadership in promoting sustainable entrepreneurship, both directly and indirectly through environmental consciousness (Bapoo, Tehseen et al. 2022). This underscores the notion that

leaders who are environmentally conscious are better positioned to drive their organizations towards sustainable practices (Abbasi, Shaikh et al. 2024).

Key Findings

Direct Impact of Environmental Leadership on Sustainable Entrepreneurship:

The positive and significant path coefficient (0.45) indicates that environmental leadership directly enhances sustainable entrepreneurship. This implies that leaders who prioritize environmental values and practices can effectively steer their organizations towards sustainability goals.

Mediating Role of Environmental Consciousness:

Environmental consciousness was found to partially mediate the relationship between environmental leadership and sustainable entrepreneurship. Leaders who are conscious of environmental issues tend to implement practices that not only foster sustainability but also encourage a similar consciousness among employees, leading to a collective effort towards sustainable entrepreneurship.

Moderating Role of Environmental Awareness:

The moderating effect of environmental awareness on the relationship between environmental leadership and sustainable entrepreneurship was significant. This suggests that the positive impact of environmental leadership on sustainable entrepreneurship is stronger when there is a high level of environmental awareness. Organizations with greater environmental awareness are likely to be more receptive to sustainable initiatives championed by their leaders.

Implications for Practice

The findings have several practical implications for the telecommunication sector in Pakistan:

Leadership Development: Organizations should invest in developing environmental leadership skills among their managers and executives. Training programs focusing on sustainability and environmental management can enhance leaders' ability to implement and promote sustainable practices.

Promoting Environmental Consciousness and Awareness: Efforts to increase environmental consciousness and awareness among employees should be prioritized. This can be achieved through educational campaigns, workshops, and seminars that highlight the importance of sustainability and the role each employee can play in achieving it.

Strategic Integration of Sustainability: Telecommunication companies should integrate sustainability into their core business strategies. This involves setting clear sustainability goals, measuring progress, and ensuring that all business operations align with these goals.

Limitations and Future Research

While this study provides valuable insights, it has certain limitations. The sample size is relatively small and limited to one sector within Pakistan, which may affect the generalizability of the findings. Future research should consider larger and more diverse samples across different industries and regions to validate and extend the findings.

Additionally, qualitative research methods such as interviews and case studies could provide deeper insights into how environmental leadership and consciousness are practiced and perceived in different organizational contexts.

Conclusion

This study highlights the critical role of environmental leadership in fostering sustainable entrepreneurship within the telecommunication sector of Pakistan. By enhancing environmental consciousness and leveraging environmental awareness, leaders can effectively drive their organizations towards achieving sustainability goals. The findings emphasize the need for a strategic and integrated approach to sustainability, where leadership, awareness, and consciousness work in tandem to create a sustainable future.

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