

**IMPACT OF GREEN ENTREPRENEURIAL ORIENTATION
ON SUSTAINABLE FIRM PERFORMANCE: A STUDY IN
THE INDIAN MANUFACTURING SECTOR**

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INDIAN INSTITUTE OF TECHNOLOGY DELHI**

JULY 2025

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**Impact of Green Entrepreneurial Orientation On Sustainable
Firm Performance: A Study In The Indian Manufacturing Sector**

by

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DEPARTMENT OF MANAGEMENT STUDIES

submitted

In fulfilment of the requirements of the degree of

DOCTOR OF PHILOSOPHY

to the



INDIAN INSTITUTE OF TECHNOLOGY DELHI

JULY 2025

CERTIFICATE

This is to certify that the thesis entitled "**Impact of Green Entrepreneurial Orientation on Sustainable Firm Performance: A Study in the Indian Manufacturing Sector**" being submitted by **Ms. Shivani** to the Indian Institute of Technology Delhi for the award of the degree of **Doctor of Philosophy**, in the Department of Management Studies is a record of bonafide research work carried out by her. She has worked under our supervision and has fulfilled the requirements for the submission of this thesis, which is in accordance with the standards required for a Ph.D. degree from the institute. The results presented in this thesis have not been submitted in part or full to any other university or institute for the award of any degree or diploma.

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ACKNOWLEDGEMENTS

I express my heartfelt gratitude to my supervisors, Prof. Seema Sharma and Prof. Shveta Singh, Department of Management Studies (DMS), Indian Institute of Technology Delhi, for their profound insight, relentless support, and invaluable guidance in completion of this thesis. It would not have been possible for me to accomplish this work without their valuable guidance and constant encouragement. Prof. Seema Sharma and Prof. Shveta Singh have been pivotal in my overall development as an academician by putting me in multiple tasks and activities. They have always supported me in understanding and achieving my supreme potential.

I would also like to extend my sincere gratitude to Prof. Amlendu Kumar Dubey, Prof. Smita Kashiramka, and Prof. Ankush Agrawal for providing constructive feedback and suggestions as part of the Student Research Committee (SRC). I am greatly indebted to my family members, who believed in me and were a constant source of support during both happy and dismal moments.

I am grateful to the Head of Department, Department of Management Studies, other faculty members, support staff, and other research scholars for their support and cooperation. I am thankful to the Department of Management Studies, Indian Institute of Technology Delhi, for extending all possible support. Finally, I bow my head before the almighty God, the Creator, as well as the Preserver, with humility and reverence.

(Shivani)

ABSTRACT

In recent decades, the global business landscape has embraced green transformation, driven by mounting environmental awareness and tightening regulatory framework. This transformation is particularly crucial for manufacturing firms in emerging economies such as India, where these firms have a pivotal role in supporting the economic system through substantial contributions to employment and economic growth. Previous research has highlighted the importance of green orientations, such as green entrepreneurial orientation (GEO), in promoting sustainable practices and boosting organizational performance. GEO is a strategic framework that organizations adopt to embed environmental sustainability into their economic activities. This approach fosters an innovative and proactive mindset, enabling firms to identify and capitalize on opportunities that align with environmental objectives.

This thesis examines the key drivers of GEO and their relationship with sustainable firm performance within the landscape of India's manufacturing domain. The present investigation aims to evaluate how these drivers contribute to enhancing GEO and sustainable firm performance against four specific objectives. First, through meta-analysis, this study identifies seven strategic drivers of GEO: green absorptive capacity, environmental collaboration, managerial environmental concern, institutional pressure, organizational ambidexterity, corporate social responsibility, and big data analytical capability. Moreover, sustainable firm performance as a performance outcome of GEO is also validated through meta-analysis.

Second, the significance of the identified drivers of GEO has been tested using PLS-SEM with 380 participants. The findings reveal that green absorptive capacity, environmental collaboration, managerial environmental concern, institutional pressure, corporate social responsibility, and big data analytical capability exhibit a strong positive association with GEO.

Further, the thesis also seeks to explore the connection between key drivers and sustainable firm performance. The analysis finds a significant and positive relationship of green absorptive capacity, environmental collaboration, managerial environmental concern, institutional pressure, corporate social responsibility, and big data analytical capability with sustainable firm performance. Third, the thesis investigates the role of GEO and competitive strategies as a sequential mediator between drivers and sustainable firm performance. The analysis confirm that GEO and differentiation strategy sequentially mediate the connection between drivers and sustainable firm performance except for organizational ambidexterity and sustainable firm performance relationship. The sequential mediating path from drivers to sustainable firm performance through GEO and cost leadership strategy is not supported in this thesis.

Additionally, the impact of access to finance as a moderating variable has been studied. A significant moderating impact of access to finance is established for GEO and sustainable firm performance relationship. The results of the PLS-SEM have been supported with Importance Performance Map Analysis (IPMA). Further, this thesis focuses on identifying and analysing variations in GEO and sustainable firm performance between firms groups differentiated by demographical variables through the application of a Multi-Group Analysis (MGA) technique. Fourth, a Total Interpretive Structural Model (TISM) is developed based on data gathered from expert opinions and subsequently validated through empirical analysis using survey data to establish a hierarchical relationship between drivers, GEO, competitive strategies and sustainable firm performance. Finally, the case triangulation validates the impact of all significant variables within the model. Triangulation allows establishing the creditability and validity of the findings by providing a detailed explanation of significant variables in different case context.

This thesis adds to the body of existing research on GEO, confirming the significance of identified drivers of GEO and their relationship with sustainable firm performance. The present thesis responds to the call by researchers for further research on entrepreneurial orientation, business strategy, and firm performance, as these relationships have received limited attention in the literature. Additionally, it provides implications for practitioners, policymakers, and academics to facilitate the successful adoption of GEO.

सारांश

पिछले कुछ दशकों में, वैश्विक व्यापार परिदृश्य ने हरित परिवर्तन को अपनाया है, जो बढ़ती पर्यावरणीय जागरूकता और कड़ी होती नियामक मांगों द्वारा प्रेरित है। यह परिवर्तन विशेष रूप से उभरती अर्थव्यवस्थाओं, जैसे कि भारत में, महत्वपूर्ण है, जहां विनिर्माण कंपनियां अर्थव्यवस्था को समर्थन देने में एक महत्वपूर्ण भूमिका निभाती हैं, जैसे कि रोजगार और आर्थिक विकास में महत्वपूर्ण योगदान। पिछले शोधों ने हरित उद्यमिता उन्मुखता जैसे हरित उन्मुखताओं के महत्व को रेखांकित किया है, जो सतत प्रथाओं को बढ़ावा देने और संगठनात्मक प्रदर्शन को बढ़ाने में सहायक हैं। हरित उद्यमिता उन्मुखता एक रणनीतिक ढांचा है, जिसे संगठन अपने आर्थिक गतिविधियों में पर्यावरणीय स्थिरता को शामिल करने के लिए अपनाते हैं। यह दृष्टिकोण एक नवोन्मेषी और सक्रिय मानसिकता को बढ़ावा देता है, जो कंपनियों को पर्यावरणीय लक्ष्यों के साथ मेल खाने वाले अवसरों की पहचान और लाभ उठाने में सक्षम बनाता है।

यह शोध हरित उद्यमिता उन्मुखता के प्रमुख चालक और भारतीय विनिर्माण उद्योग के संदर्भ में सतत कंपनी प्रदर्शन के साथ उनके संबंधों की जांच करता है। अध्ययन का उद्देश्य इन चालकों के योगदान का मूल्यांकन करना है जो हरित उद्यमिता उन्मुखता और सतत कंपनी प्रदर्शन को बढ़ाने में सहायक हैं, जिन्हें चार विशिष्ट उद्देश्यों के खिलाफ परीक्षण किया गया है। पहले, मेटा-विश्लेषण के माध्यम से, यह अध्ययन हरित उद्यमिता उन्मुखता के सात रणनीतिक चालकों की पहचान करता है: ग्रीन एब्जॉर्टिव क्षमता, पर्यावरणीय सहयोग, प्रबंधकीय पर्यावरणीय चिंता, संस्थागत दबाव, संगठनात्मक दोलनशीलता, कॉर्पोरेट सामाजिक जिम्मेदारी और बिग डेटा विश्लेषणात्मक क्षमता। इसके अतिरिक्त, हरित उद्यमिता उन्मुखता के एक प्रदर्शन परिणाम के रूप में सतत कंपनी प्रदर्शन को भी मेटा-विश्लेषण के माध्यम से सत्यापित किया गया है।

दूसरे, हरित उद्यमिता उन्मुखता के पहचाने गए चालकों के महत्व का परीक्षण PLS-SEM के माध्यम से 380 प्रतिभागियों के साथ किया गया। परिणाम बताते हैं कि ग्रीन एब्जॉर्टिव क्षमता, पर्यावरणीय सहयोग,

प्रबंधकीय पर्यावरणीय चिंता, संस्थागत दबाव, कॉर्पोरेट सामाजिक जिम्मेदारी और बिग डेटा विश्लेषणात्मक क्षमता का हरित उद्यमिता उन्मुखता के साथ महत्वपूर्ण सकारात्मक संबंध है। आगे, यह शोध हरित उद्यमिता उन्मुखता और सतत कंपनी प्रदर्शन के बीच चालक और संबंधों को समझने का उद्देश्य रखता है। विश्लेषण से यह पता चलता है कि ग्रीन एब्जॉर्प्टिव क्षमता, पर्यावरणीय सहयोग, प्रबंधकीय पर्यावरणीय चिंता, संस्थागत दबाव, कॉर्पोरेट सामाजिक जिम्मेदारी और बिग डेटा विश्लेषणात्मक क्षमता का सतत कंपनी प्रदर्शन के साथ सकारात्मक और महत्वपूर्ण संबंध है। तीसरे, यह अध्ययन हरित उद्यमिता उन्मुखता और प्रतिस्पर्धी रणनीति की भूमिका की जांच करता है, जो चालकों और सतत कंपनी प्रदर्शन के बीच एक अनुक्रमिक मध्यस्थ के रूप में कार्य करता है। परिणामों से पुष्टि होती है कि हरित उद्यमिता उन्मुखता और विभेदन रणनीति चालकों और सतत कंपनी प्रदर्शन के बीच एक अनुक्रमिक मध्यस्थ के रूप में कार्य करती है, सिवाय संगठनात्मक दोलनशीलता और सतत कंपनी प्रदर्शन के संबंध के लिए। चालकों से सतत कंपनी प्रदर्शन तक के अनुक्रमिक मध्यस्थ मार्ग को हरित उद्यमिता उन्मुखता और लागत नेतृत्व रणनीति के माध्यम से इस शोध में समर्थन नहीं मिला।

इसके अतिरिक्त, वित्तीय पहुंच के प्रभाव को एक मध्यस्थ चर के रूप में हरित उद्यमिता उन्मुखता और सतत कंपनी प्रदर्शन के बीच अध्ययन किया गया है। हरित उद्यमिता उन्मुखता और सतत कंपनी प्रदर्शन के संबंध में वित्तीय पहुंच के महत्वपूर्ण मध्यस्थ प्रभाव की स्थापना की गई है। आंशिक न्यूनतम वर्ग संरचनात्मक समीकरण मॉडलिंग के परिणामों को एक महत्व-प्रदर्शन मानचित्र विश्लेषण के माध्यम से पूरा किया गया है। इसके अलावा, यह शोध समूहों के बीच हरित उद्यमिता उन्मुखता और सतत कंपनी प्रदर्शन में भिन्नताओं की पहचान करने और विश्लेषण करने पर केंद्रित है, जो समूहों को डेमोग्राफिक चर के द्वारा अलग किया गया है, जिसके लिए मल्टी-ग्रुप विश्लेषण तकनीक का उपयोग किया गया है। चौथे, एक कुल व्याख्यात्मक संरचनात्मक मॉडल विकसित किया गया है, जो विशेषज्ञों की राय से डेटा एकत्रित करके और उसके बाद सर्वेक्षण डेटा का उपयोग करके अनुभवजन्य विश्लेषण के माध्यम से परीक्षण

किया गया है, ताकि चालकों, हरित उद्यमिता उन्मुखता, प्रतिस्पर्धी रणनीति और सतत कंपनी प्रदर्शन के बीच एक श्रेणीबद्ध संबंध स्थापित किया जा सके। अंत में, केस ट्रायंगुलेशन के माध्यम से मॉडल में सभी महत्वपूर्ण चर के प्रभाव को सत्यापित किया गया है। ट्रायंगुलेशन से यह सुनिश्चित करने में मदद मिलती है कि निष्कर्षों की विश्वसनीयता और वैधता को विभिन्न केस संदर्भों में महत्वपूर्ण चर की विस्तृत व्याख्या के माध्यम से स्थापित किया गया है।

यह शोध हरित उद्यमिता उन्मुखता के क्षेत्र में मौजूदा साहित्य में योगदान करता है, हरित उद्यमिता उन्मुखता के पहचाने गए चालकों के महत्व और उनके सतत कंपनी प्रदर्शन के साथ संबंधों की पुष्टि करता है। यह शोध उन शोधकर्ताओं की पुकार का उत्तर देता है जो उद्यमिता उन्मुखता, व्यापार रणनीति और कंपनी प्रदर्शन के बीच परस्पर क्रिया पर और अधिक शोध की मांग करते हैं, क्योंकि इन रिश्तों पर साहित्य में सीमित ध्यान दिया गया है। इसके अतिरिक्त, यह शोध प्रैक्टिशनरों, नीति निर्माताओं और विद्वानों के लिए हरित उद्यमिता उन्मुखता को सफलतापूर्वक अपनाने के लिए प्रभावी उपायों की सिफारिश करता है।

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LIST OF ABBREVIATIONS

Acronyms	Expanded Form
GEO	Green Entrepreneurial Orientation
GDP	Gross Domestic Product
EO	Entrepreneurial Orientation
PLS-SEM	Partial Least Square Structural Equation Modelling
CB-SEM	Covariance Based Structural Equation Modelling
IPMA	Importance Performance Map Analysis
MGA	Multi Group Analysis
TISM	Total Interpretative Structural Modelling
TCCM	Theories, Context, Characteristics, Methods
WoS	Web of Science
TP	Total Production
RBV	Resource Based View
NRBV	Natural Resource-Based View
SMEs	Small and Medium Enterprises
fsQCA	Fuzzy-set Qualitative Comparative Analysis
MCDM	Multi-Criteria Decision Making
ISM	Interpretive Structural Modeling
ANN	Artificial Neural Network
DID	Difference-in-Differences
RQ	Research Questions
RO	Research Objectives
SEM	Structural Equation Modelling
CPCB	Central Pollution Control Board
VIF	Variance Inflation Factor
MICMAC	Matrice d'Impacts Croisés Multiplication Appliquée à un Classement
GAC	Green Absorptive Capacity
SD	Standard Deviation
EC	Environmental Collaboration
MEC	Managerial Environmental Concern

IP	Institutional Pressure
OA	Organizational Ambidexterity
CSR	Corporate Social Responsibility
BDAC	Big Data Analytical Capability
CLS	Cost Leadership Strategy
DS	Differentiation Strategy
AF	Access to Finance
FP	Financial Performance
EP	Environmental Performance
SP	Social Performance
CMV	Common Method Variance
EFA	Exploratory Factor Analysis
AVE	Average Variance Extracted
HTMT	Heterotrait-Monotrait Ratio
HOC	Higher Order Construct
LOC	Lower Order Component
SRMR	Standardized Root Mean Square Residual
SPCB	State Pollution Control Board
FTIR	Fourier Transform Infrared Spectroscopy
HPLC	High-Performance Liquid Chromatography
MRSL	Manufacturing restricted substances list
RSL	Restricted Substances List
ZDHC	Zero Discharge of Hazardous Chemicals
TCCT	Thermal-Cured Coating Technology
DI	Ductile Iron
TMT	Thermo-Mechanically Treated Bars
BAPL	Bright Autoplast Private Limited
EBITDA	Earnings Before Interest, Taxes, Depreciation, and Amortization