

SUSTAINABLE INVESTING

NAVIGATING

ENVIRONMENTAL, SOCIAL,

AND GOVERNANCE (ESG)

CHALLENGES AND

OPPORTUNITIES



Editors:

Rishikaysh Kaakandikar

Keshav Kaushik

Supriya Pathak

Bentham Books

Sustainable Investing: Navigating Environmental, Social, and Governance (ESG) Challenges and Opportunities

Edited by

Rishikaysh Kaakandikar

*SaiBalaji International
Institute of Management Sciences
Pune, Maharashtra, India*

Keshav Kaushik

*Sharda School of Computer Science
& Engineering Sharda University
Greater Noida, Uttar Pradesh, India*

&

Supriya Pathak

*Faculty of Management
Oriental University
Indore, Madhya Pradesh, India*

Sustainable Investing: Navigating Environmental, Social, and Governance (ESG) Challenges and Opportunities

Editors: Rishikaysh Kaakandikar, Keshav Kaushik & Supriya Pathak

ISBN (Online): 979-8-89881-135-8

ISBN (Print): 979-8-89881-136-5

ISBN (Paperback): 979-8-89881-137-2

© 2025, Bentham Books imprint.

Published by Bentham Science Publishers Pte. Ltd. Singapore, in collaboration with Eureka Conferences, USA. All Rights Reserved.

First published in 2025.

BENTHAM SCIENCE PUBLISHERS LTD.

End User License Agreement (for non-institutional, personal use)

This is an agreement between you and Bentham Science Publishers Ltd. Please read this License Agreement carefully before using the ebook/echapter/ejournal (“**Work**”). Your use of the Work constitutes your agreement to the terms and conditions set forth in this License Agreement. If you do not agree to these terms and conditions then you should not use the Work.

Bentham Science Publishers agrees to grant you a non-exclusive, non-transferable limited license to use the Work subject to and in accordance with the following terms and conditions. This License Agreement is for non-library, personal use only. For a library / institutional / multi user license in respect of the Work, please contact: permission@benthamscience.org.

Usage Rules:

1. All rights reserved: The Work is the subject of copyright and Bentham Science Publishers either owns the Work (and the copyright in it) or is licensed to distribute the Work. You shall not copy, reproduce, modify, remove, delete, augment, add to, publish, transmit, sell, resell, create derivative works from, or in any way exploit the Work or make the Work available for others to do any of the same, in any form or by any means, in whole or in part, in each case without the prior written permission of Bentham Science Publishers, unless stated otherwise in this License Agreement.
2. You may download a copy of the Work on one occasion to one personal computer (including tablet, laptop, desktop, or other such devices). You may make one back-up copy of the Work to avoid losing it.
3. The unauthorised use or distribution of copyrighted or other proprietary content is illegal and could subject you to liability for substantial money damages. You will be liable for any damage resulting from your misuse of the Work or any violation of this License Agreement, including any infringement by you of copyrights or proprietary rights.

Disclaimer:

Bentham Science Publishers does not guarantee that the information in the Work is error-free, or warrant that it will meet your requirements or that access to the Work will be uninterrupted or error-free. The Work is provided "as is" without warranty of any kind, either express or implied or statutory, including, without limitation, implied warranties of merchantability and fitness for a particular purpose. The entire risk as to the results and performance of the Work is assumed by you. No responsibility is assumed by Bentham Science Publishers, its staff, editors and/or authors for any injury and/or damage to persons or property as a matter of products liability, negligence or otherwise, or from any use or operation of any methods, products instruction, advertisements or ideas contained in the Work.

Limitation of Liability:

In no event will Bentham Science Publishers, its staff, editors and/or authors, be liable for any damages, including, without limitation, special, incidental and/or consequential damages and/or damages for lost data and/or profits arising out of (whether directly or indirectly) the use or inability to use the Work. The entire liability of Bentham Science Publishers shall be limited to the amount actually paid by you for the Work.

General:

1. Any dispute or claim arising out of or in connection with this License Agreement or the Work (including non-contractual disputes or claims) will be governed by and construed in accordance with the laws of Singapore. Each party agrees that the courts of the state of Singapore shall have exclusive jurisdiction to settle any dispute or claim arising out of or in connection with this License Agreement or the Work (including non-contractual disputes or claims).
2. Your rights under this License Agreement will automatically terminate without notice and without the

need for a court order if at any point you breach any terms of this License Agreement. In no event will any delay or failure by Bentham Science Publishers in enforcing your compliance with this License Agreement constitute a waiver of any of its rights.

3. You acknowledge that you have read this License Agreement, and agree to be bound by its terms and conditions. To the extent that any other terms and conditions presented on any website of Bentham Science Publishers conflict with, or are inconsistent with, the terms and conditions set out in this License Agreement, you acknowledge that the terms and conditions set out in this License Agreement shall prevail.

Bentham Science Publishers Pte. Ltd.

No. 9 Raffles Place

Office No. 26-01

Singapore 048619

Singapore

Email: subscriptions@benthamscience.net



CONTENTS

PREFACE	i
LIST OF CONTRIBUTORS	ii
CHAPTER 1 EMERGING TRENDS AND INNOVATIONS IN ESG PRACTICES	1
<i>Vikrant V. Nangare, Sayli Wankhade and Sachin Ayarekar</i>	
INTRODUCTION	2
1. Integration of Advanced Technologies	3
<i>a) Artificial Intelligence (AI) and Machine Learning (ML)</i>	3
<i>Case Studies and Examples</i>	5
<i>Summary</i>	6
<i>b) Blockchain Technology</i>	6
<i>Case Studies and Examples:</i>	7
<i>Summary</i>	7
<i>c) Internet of Things (IoT)</i>	7
<i>Case Studies and Examples:</i>	9
<i>Summary</i>	9
2. Enhanced Esg Reporting and Standards	9
<i>a) Standardization of ESG Reporting</i>	10
<i>Case Studies and Examples:</i>	12
<i>Summary</i>	12
<i>b) Integrated Reporting</i>	12
<i>Case Studies and Examples:</i>	14
<i>Summary</i>	14
3. Focus on Climate Risk and Resilience	14
<i>a) Climate Risk Disclosure</i>	15
<i>Case Studies and Examples:</i>	17
<i>Summary</i>	17
<i>b) Climate Adaptation and Resilience</i>	17
<i>Case Studies and Examples:</i>	19
<i>Summary</i>	19
4. Social Impact and Human Capital Management	19
<i>a) Diversity, Equity, and Inclusion (DEI):</i>	20
<i>Case Studies and Examples:</i>	22
<i>Summary</i>	22
<i>b) Employee Well-being and Mental Health:</i>	22
<i>Summary</i>	24
5. Impact Investing and Green Financing:	24
<i>a) Growth of Green Bonds and Sustainability-linked Loans:</i>	25
<i>Case Studies and Examples:</i>	27
<i>Summary</i>	27
<i>b) Impact Investing:</i>	27
<i>Case Studies and Examples:</i>	29
<i>Summary</i>	29
CONCLUSION	29
REFERENCES	29
CHAPTER 2 SOCIAL IMPLICATIONS OF E-GOVERNANCE IN SUSTAINABLE DEVELOPMENT: A CASE STUDY OF THE E-PANCHAYAT MISSION MODE PROJECT	31
<i>M. Shankar Lingam, Kadari Rajeshwar and G. Anuradha Reddy</i>	
INTRODUCTION	31

National e-Governance Plan (NeGP) and e -Panchayat	33
Potential Benefits of e-Panchayats	34
TRANSFORMATION OF PES TO E-GRAMSWARAJ	36
Panchayat Enterprise Suite (PES)	36
e-GramSwaraj	37
Mandatory usage of e-GramSwaraj	38
USE OF E-GRAMSWARAJ IN PREPARATION AND IMPLEMENTA- TION OF GDPD	39
REPORTS	41
E-GOVERNANCE AND ITS SOCIAL IMPACT: CHALLENGES AND OPPORTUNITIES	41
Social Impact	42
Challenges	43
Opportunities	44
CONCLUSION	45
REFERENCES	45
CHAPTER 3 CORPORATE RESPONSIBILITY AND SUSTAINABLE REPORTING:	
DRIVING POSITIVE CHANGE IN MODERN BUSINESS PRACTICES	47
<i>P.R. Jeyalakshmi</i>	
INTRODUCTION	47
Corporate Responsibility Overview	47
Sustainability Reporting Overview	49
IMPORTANCE OF CRSR IN MODERN BUSINESS PRACTICES	50
OBJECTIVE AND METHODOLOGY	51
EVOLUTION OVER TIME OF CORPORATE RESPONSIBILITY AND	
SUSTAINABILITY REPORTING: TRACING THE DEVELOPMENT OF REPORTING	
FRAMEWORKS AND STANDARDS	51
Development of Reporting Frameworks and Standards Over Time	52
ESSENTIAL COMPONENTS OF SUSTAINABILITY REPORTING	53
HOW COMPANIES IMPLEMENT CORPORATE RESPONSIBILITY AND	
SUSTAINABLE REPORTING	54
KEY ASPECTS OF SUSTAINABLE REPORTING	56
FRAMEWORK COMPARISON	57
IMPLEMENTATION CHALLENGES, BEST PRACTICES AND EXAMPLES	58
CASE ANALYSIS, FINDING AND DISCUSSION	59
Thematic Analysis	59
Content Analysis	59
Analysis Results and Discussion	59
<i>Environmental Initiatives</i>	60
<i>Social Initiatives</i>	60
<i>Governance Initiatives</i>	61
DISCUSSION	62
CONCLUSION	62
REFERENCES	63
CHAPTER 4 DOES ESG INVESTMENT MAKE A DIFFERENCE? A RISK-RETURN	
ANALYSIS	66
<i>Jasvinder Kaur, Kamaljit Singh and Krishan Kumar</i>	
INTRODUCTION	66
Motivation and Relevance of the Study	68
LITERATURE REVIEW	69
RESEARCH METHODOLOGY	72
Data	72

Methodology	72
EMPIRICAL ANALYSIS	76
Risk -return Profile	76
<i>Performance Analysis of ESG Indexes Based on Risk-adjusted Measures</i>	77
CONCLUSION AND POLICY RECOMMENDATIONS	81
REFERENCES	82
CHAPTER 5 MEASURING IMPACT INVESTMENT: METRICS AND EVALUATION OF THE IMPACT INVESTING FOR INFORMED DECISION-MAKING	83
<i>Priya Tiwari and Shrirang Madhukar Choudhari</i>	
INTRODUCTION	83
GROWING IMPORTANCE OF ESG DISCLOSURES	88
FACETS OF ESG INVESTING	89
ESG IS AN INTEGRAL ASPECT OF BUSINESS	91
ESG REGULATIONS IN THE INDIAN CONTEXT	92
ESG FRAMEWORK RELATIONS WITH INVESTING	96
SOCIAL IMPACT INVESTING	97
CONCLUDING REMARKS	100
REFERENCE	102
CHAPTER 6 IMPACT INVESTING AND COMMUNITY ENGAGEMENT: ALIGNING FINANCIAL RETURNS WITH SOCIAL AND ENVIRONMENTAL GOALS WITHIN ESG FRAMEWORKS	104
<i>Dipti Malpani, Supriya Pathak and Dheeraj Nim</i>	
INTRODUCTION	105
ESG OVERVIEW	106
The History of ESG	106
Why ESG is Important?	107
ESG Investing vs. Other Investment Strategies	108
IMPACT INVESTING	108
Understanding Impact Investing and ESG	108
Evolution of Impact Investing	109
Unique Characteristics of Impact Investing	110
ESG and Impact Investing	110
The Role and Impact of Impact Investors in Social Enterprises in the Indian Context	111
COMMUNITY ENGAGEMENT	113
Case Studies	114
Case Study 1: Affordable Housing in the United States	114
<i>Community Engagement Strategies</i>	114
<i>Results and Impact</i>	115
<i>Lessons Learned</i>	115
Case Study 2: Renewable Energy in Sub-Saharan Africa	116
<i>Community Engagement Strategies</i>	116
<i>Challenges and Responses</i>	117
<i>Results and Impact</i>	117
<i>Lessons Learned</i>	118
SUMMARY	118
Case Study 3: Sustainable Agriculture in Latin America	118
<i>Community Engagement Strategies</i>	119
<i>Challenges and Responses</i>	120
<i>Results and Impact</i>	120
<i>Lessons Learned</i>	121

SUMMARY	121
Why Impact Investing for a Community Foundation?	122
MECHANISMS OF COLLABORATION IN COMMUNITY ENGAGEMENT AND IMPACT INVESTING	122
TOOLS AND METRICS FOR ASSESSING IMPACT	124
CHALLENGES IN IMPACT INVESTING	125
CASE STUDIES: COMBINING IMPACT INVESTING WITH COMMUNITY ENGAGEMENT AND ESG PRINCIPLES IN INDIA	126
Case Study 1: SELCO India	126
<i>Key Aspects of SELCO's Model</i>	126
<i>Impact on Communities and Social Investing</i>	127
SUMMARY	127
Case Study 2: Swachh Bharat Abhiyan (Clean India Mission)	128
<i>Key Elements of the Swachh Bharat Abhiyan</i>	128
<i>Role of Impact Investing in Swachh Bharat Abhiyan</i>	129
<i>Community Engagement in Swachh Bharat Abhiyan</i>	129
<i>Impact and Results</i>	130
<i>Lessons Learned</i>	131
SUMMARY	131
Case Study 3: Agri-tech Startups in India	131
<i>Key Agri-tech Startups in India</i>	131
<i>Role of Impact Investment in Agri-tech Startups</i>	132
<i>Community Engagement Strategies of Agri-tech Startups</i>	133
<i>Impact of Agri-tech Startups on Communities</i>	134
<i>Challenges and Lessons Learned</i>	134
CONCLUSION	135
REFERENCES	135
CHAPTER 7 EXPLORING ESG INTEGRATION: STRATEGIES FOR SUSTAINABLE AND RESPONSIBLE INVESTING	137
<i>Priya Sachdeva and Archan Mitra</i>	
INTRODUCTION	138
Definition of “ESG” (Environmental, Social, and Governance) Factors	138
Importance of Integrating ESG Factors into Investment Decision-making	139
Overview of the Chapter Structure	140
THEORETICAL FRAMEWORK	141
The Concept of Sustainable Investing	141
Theories Supporting the Integration of ESG in Investment Practices	141
<i>Stakeholder Theory</i>	142
<i>The Triple Bottom Line</i>	142
Practical Implications of ESG Integration	143
LITERATURE REVIEW	144
Introduction to Sustainable Investing	144
Historical Development of Sustainable Investing	144
Theoretical Foundations of ESG Integration	144
ESG Integration Strategies	145
Performance of Sustainable Investments	146
Challenges in ESG Integration	146
Future Directions in Sustainable Investing	146
METHODOLOGY	147
Comparative Analysis Approach	147

Selection Criteria for Comparing Different Investment Strategies Incorporating ESG	148
Factors	148
DATA SOURCES AND COLLECTION METHODS	149
FINDINGS	151
INTERPRETATION OF RESULTS	153
Financial Performance	153
ESG Performance	153
Risk Management	153
Impact Measurement	153
Stakeholder Engagement	154
Regulatory Compliance	154
Financial Performance	155
<i>Return on Investment (ROI)</i>	155
<i>Risk-adjusted Return</i>	155
<i>ESG Performance</i>	155
<i>Risk Management</i>	156
<i>Impact Measurement</i>	156
<i>Stakeholder Engagement</i>	157
<i>Regulatory Compliance</i>	157
<i>Statistical Inferences</i>	157
Analysis of Variance (ANOVA)	158
DISCUSSION	158
Financial Performance	158
ESG Performance	159
Risk Management	159
Impact Measurement	160
Stakeholder Engagement	160
Regulatory Compliance	160
Implications for Investors and Policymakers	161
CONCLUSION	161
Insights from the Objective and Analysis	162
Limitations of the Study	162
Scope for Further Research	163
REFERENCES	163
CHAPTER 8 THE FUTURE OF SUSTAINABLE INVESTING: GREEN BONDS IN INDIA-REGULATIONS, TECHNOLOGY, AND INVESTOR DEMAND	165
<i>Sarita Rana and Supriya Pathak</i>	
INTRODUCTION	165
REGULATIONS OF GREEN BONDS IN INDIA	168
India's Green Debt Securities Context	168
Initial Framework and Guidelines	169
Latest Green Bond Guidelines	170
TECHNOLOGICAL ADVANCEMENTS IN GREEN BOND	170
Blockchain Technology	171
The Internet of Things (IoT)	173
Artificial Intelligence (AI) and Machine Learning (ML)	174
Big Data Analytics	175
Tokenized Green Bonds	175
GROWING INVESTOR DEMAND FOR GREEN BONDS IN INDIA	177
Case Study: India Sovereign Green Bond: Financing Climate Action and Resilient Growth	177

CHALLENGES TOWARDS GROWTH OF GREEN BOND IN INDIA	180
Suggestions	183
India's Future Direction	184
CONCLUSION	186
REFERENCES	187
CHAPTER 9 FUTURE TRENDS IN SUSTAINABLE INVESTING: EVOLVING REGULATIONS, TECHNOLOGICAL ADVANCEMENTS, AND GROWING INVESTOR DEMAND	188
<i>Froilan D. Mobo</i>	
INTRODUCTION	188
TECHNOLOGICAL ADVANCES: FUTURE DIRECTIONS	191
Advanced Data Analytics and AI	191
Blockchain for ESG Reporting	191
Digital Platforms and Tools	191
GROWING INVESTOR DEMAND: FUTURE DIRECTIONS	191
Mainstreaming of Sustainable Investing	191
Expansion of ESG Product Offerings	192
Focus on Impact Investing	192
INVESTOR ENGAGEMENT AND ADVOCACY	192
Active Ownership and Stewardship	192
COLLABORATION AND COLLECTIVE ACTION	192
Challenges and Opportunities	193
Collaborative Initiatives and Partnerships	193
<i>Financial Institutions</i>	193
<i>Supranational Organizations</i>	194
<i>Government and Municipal Issuers</i>	195
CONCLUSION	196
REFERENCES	196
CHAPTER 10 GREEN ECONOMY FOR SUSTAINABLE INVESTING: DRIVING GLOBAL GOALS VIA ESG	198
<i>Parul Sharda and Shweta Pandit</i>	
INTRODUCTION	198
Background of ESG Practices	198
RESEARCH METHODOLOGY	203
Research Design	203
Participants	203
Data Collection	203
<i>Interviews</i>	203
<i>Procedure</i>	204
Data Analysis	204
Ethical Considerations	205
<i>Informed Consent</i>	205
<i>Confidentiality</i>	205
<i>Ethical Approval</i>	205
Reliability and Validity	205
Limitations	205
<i>Sample Size</i>	205
<i>Research Design</i>	206
<i>Importance of ESG Criteria</i>	206
Policy Frameworks and Regulations	207

Institutional Capacity	207
Transparency and Accountability	207
Public Participation and Stakeholder Engagement	208
International Cooperation and Agreements	208
Alignment with Global Goals (e.g., UN SDGs)	208
The Impact of ESG Practices on the Financial Performance of a Company	210
Positive Effects on Financial Performance	211
The Role of ESG Practices in Company Risk Management	211
Mitigation of Risks through ESG Integration	212
Regulatory Landscape and Standards	212
Innovation and Technology in Green Investing	212
CHALLENGES AND FUTURE DIRECTIONS	213
Regulatory Challenges	213
Financial Challenges	214
Technological Challenges	214
Cultural and Behavioral Challenges	214
Global Disparities	215
RESULT ANALYSIS	215
Data Profile	215
Investment Patterns	215
Thematic Analysis	216
Inference	217
Findings	218
CONCLUSION	219
REFERENCE	220
CHAPTER 11 GREENING THE FUTURE: A COMPREHENSIVE ANALYSIS OF ESG MUTUAL FUNDS IN INDIA AS A SUSTAINABLE INVESTMENT TREND	222
<i>Priya Arora and Kavita Sharma</i>	
INTRODUCTION	223
LITERATURE REVIEW	224
METHODOLOGY	228
FINDINGS AND DISCUSSIONS	228
Status of the Indian ESG Funds	228
Chronological Growth	229
Investment Structure	232
Fund Particulars	234
Financial Performance	237
<i>Performance on the Basis of Monthly Returns and Risk of Funds</i>	237
Risk-premium Return	238
ESG Performance	240
MSCI ESG Fund Ratings	240
LIMITATIONS AND FUTURE SCOPE	244
CONCLUSION	245
REFERENCES	245
CHAPTER 12 SUSTAINABLE INVESTING: UNLOCKING THE TRANSFORMATIVE POTENTIAL OF SUSTAINABLE FINANCE TO BRIDGE GAPS IN EMERGING MARKETS	248
<i>Madhusudan Narayan and FCS Pooja Shukla</i>	
INTRODUCTION	249
REVIEW OF LITERATURE	253
Historical Evolution and Theoretical Foundations	253

Research Gaps	256
PROBLEM STATEMENT	256
RESEARCH QUESTIONS	256
RESEARCH OBJECTIVES	257
RESEARCH METHODOLOGY	257
RESULTS AND DISCUSSION	257
Sustainable Finance and Its Revolutionary Power in Emerging Markets	257
Benefits and Challenges of Sustainable Finance	259
Historical Development of Sustainable Finance and its Application in Emerging Markets	260
Legislative Frameworks, ESG Data Availability, Capacity-building Programs, and Sociopolitical Factors Unique to Various Markets	261
Case Studies of Sustainable Finance from China, India, and Latin America	263
<i>Green Bonds in China</i>	263
<i>Renewable Energy Investments in India</i>	263
<i>Green Bonds in Latin America</i>	264
<i>Microfinance Institutions in Latin America</i>	265
FINDINGS OF THE STUDY	266
CONCLUSION AND POLICY RECOMMENDATION	267
REFERENCES	268
CHAPTER 13 SUSTAINABLE INVESTING: UNVEILING THE DRIVERS OF SUSTAINABLE CONSUMPTION PATTERNS FOR A GREENER FUTURE	271
<i>Kavita Ingale, Shweta Shirolkar and Babasaheb Jadhav</i>	
INTRODUCTION	272
Objectives of the Study	272
LITERATURE REVIEW	272
Environmental Concern	272
Environmental Awareness of the Consumer	273
Green Marketing	275
Green Eco-labelling	276
Green Gap	276
Eco Labelling in India	277
Proposed Hypothesis	278
RESEARCH METHODOLOGY	278
Sample Design	278
MEASUREMENT MODEL	279
Measurement Model Analysis	279
DISCUSSION	283
LIMITATIONS	284
CONCLUSION	284
REFERENCES	285
CHAPTER 14 SUSTAINABLE INVESTING: AI-DRIVEN AIR POLLUTION MONITORING IN SMART CITIES	287
<i>Renuka Deshmukh, Babasaheb Jadhav, Rishikaysh Kaakandikar and Ahuti Mishra</i>	
INTRODUCTION	288
REVIEW OF PUBLISHED WORKS	290
Air Contamination and Artificial Intelligence	290
Origins of Polluting Substances and their Effects on People and Planetary Health	292
Research on Environmental Pollution Forecasting Techniques and Policies: Current State of Affairs	292

ARTIFICIAL INTELLIGENCE-BASED FORECASTING MODEL UTILIZED IN PREDICTING AIR POLLUTION	294
AI-based Estimation Model of Ozone Levels and Intensity	294
AI-based Carbon Monoxide Predicting Model	294
AI-based Prediction Model of Nitrogen Oxides and Sulfur Dioxide (SO ₂)	295
Predicting Particulate Matter with AI Model	295
DIGITAL SOLUTION, POLICIES, STRATEGIES AND BEST PRACTICES IN INDIA ...	296
Revolutionary Transformation in Monitoring of the State of Air Indian Cities through Geospatial Artificial Intelligence and Machine Learning	296
Recently Approved AI/ML Projects for Air Pollution Control-evidence from India	297
AIR MONITORING USING FOR THE DEVELOPMENT OF A SMART CITY	298
CONCLUSION	299
REFERENCES	300

CHAPTER 15 SUSTAINABLE INVESTING: THE IMPACT OF WORKPLACE DESIGN AND INCLUSIVE CULTURE ON EMPLOYEE PRODUCTIVITY AND WELL-BEING	304
<i>Shilpi Upadhyay and Sayali Kulkarni</i>	
INTRODUCTION	304
Background and Study Context	304
THE LITERATURE REVIEW DISCUSSES THE RELATIONSHIP BETWEEN WORKPLACE DESIGN, EMPLOYEE MOTIVATION, AND PRODUCTIVITY. SEVERAL KEY POINTS ARE HIGHLIGHTED	307
Definition of Productivity	307
Importance of Workplace Design	307
Ergonomics and Workflow	307
1990s: Technological Revolution	309
2020s: Pandemic Paradigm Shift	309
COMPARATIVE ANALYSIS OF DECADES	309
Physical Workplace Design	309
ESG FRAMEWORK FOR SUSTAINABLE WORKPLACE DESIGN AND INCLUSIVE CULTURE	313
Sustainability of the Environment	313
Governance	315
Integration of Technology	315
Use of Ethical AI	315
Emerging Trends: How ESG is Shaping the Future of Work the Increasing Focus on Social Impact	315
Role of AI in Modern Workplace Design and Culture	317
Customized Work Areas	317
Improved Interaction	317
Analytics for Predictive	317
Advancing Diversity	317
Advantages	318
Disadvantages	318
Role of Labor and Employment in ESG	319
Investment and Financing in Sustainable Workplace Design and Inclusive Culture	321
ESG Investing Impact on the Investment Landscape	322
FUTURE SCOPE	323
CONCLUSION	324
REFERENCES	324

CHAPTER 16 ROLE OF THE INTERNET OF THINGS (IOT) IN MONITORING ENVIRONMENTAL EFFECTIVENESS	326
<i>Neelam Verma, Supriya Pathak and Rishikaysh Kaakandikar</i>	
INTRODUCTION	327
Background of Internet of Things (IoT)	328
The Internet of Things (IoT) Applications Across Various Sectors	329
<i>Applications for Smart Homes</i>	329
<i>Gadgets for Wearing</i>	330
<i>Smart Farming</i>	330
<i>Automated Cities</i>	330
<i>Industrial Internet of Things (IIoT)</i>	330
<i>Intelligent Medical Care</i>	330
<i>Interconnected Automobiles</i>	331
<i>Power Management</i>	331
<i>Digital Retail</i>	331
<i>Ecological Surveillance</i>	331
Challenges Of IoT for Environmental Monitoring	331
<i>Protection and Information Safety Issues</i>	332
<i>Assurance and Handling of Data</i>	332
<i>Substantial Deploy and Operational Costs</i>	332
<i>Problems with Connectivity</i>	332
<i>Problems with Standardization</i>	333
<i>Utilization of Energy</i>	333
<i>Scaling Issues</i>	333
<i>The Ecological Impact</i>	333
<i>Rules Regarding Privacy of Data</i>	333
<i>Difficulty of Connectivity with Current Technologies</i>	333
<i>Minimal Technical Knowledge</i>	334
IoT Technology for the Environment and Renewable Energy Sources	334
Significant Role of Applications of IoT Technology in Different Fields	334
<i>Energy Surveillance and Grid Automation</i>	334
<i>Governance of Energy Efficiency Systems</i>	335
<i>Water Conservation and Intelligent Agriculture</i>	335
<i>Surveillance of Air Composition</i>	335
<i>Tracking of Species and the Surroundings</i>	335
<i>Smarter Towns and Cities</i>	335
<i>Energy Storage Management</i>	335
<i>Reducing Carbon Footprints</i>	336
A GLOBALLY INTEGRATED FUTURE	336
Cons of IoT for Reducing Climate Change	338
CONCLUSION	340
REFERENCES	341
SUBJECT INDEX	344

PREFACE

In an era of growing environmental challenges, social transformations, and increased corporate accountability, *Sustainable Investing: Navigating Environmental, Social, and Governance (ESG) Challenges and Opportunities* explores the transformative power of ESG principles in shaping modern investment strategies.

This book strikes a balance between the opportunities and hurdles in sustainable investing, addressing key questions related to environmental risks, social equity, and governance responsibility. Through case studies and practical insights, it provides guidance for aligning financial performance with societal impact.

We are deeply grateful to all the contributors for their valuable insights and to **Bentham Science Publishers** for their unwavering support in bringing this book to life.

Welcome to the journey of sustainable investing, where profitability and purpose converge

Rishikaysh Kaakandikar
SaiBalaji International
Institute of Management Sciences
Pune, Maharashtra, India

Keshav Kaushik
Sharda School of Computer Science
& Engineering Sharda University
Greater Noida, Uttar Pradesh, India

&

Supriya Pathak
Faculty of Management
Oriental University
Indore, Madhya Pradesh, India

List of Contributors

Ahuti Mishra	Adjunct Faculty, Symbiosis Centre for Management Studies, Symbiosis International (Deemed University), Pune, Maharashtra, India
Archan Mitra	School of Media Science, Presidency University, Bangalore, Karnataka, India
Babasaheb Jadhav	Dr. D. Y. Patil Vidyapeeth (Deemed to be University), Global Business School & Research Centre, Pune, Maharashtra, India
Dheeraj Nim	Faculty of Management, Oriental University, Indore, Madhya Pradesh, India
Dipti Malpani	Faculty of Management, Oriental University, Indore, Madhya Pradesh, India
Froilan D. Mobo	College of Marine Engineering, Philippine Merchant Marine Academy, San-Narciso, Zambales, Philippines
G. Anuradha Reddy	Noble Education and Research Foundation (Hybrid), Hyderabad, Telangana, India
Jasvinder Kaur	Department of Commerce, Kurukshetra University, Kurukshetra, Haryana, India
Kadari Rajeshwar	Chaitanya Deemed to be University and NIRDPR, Hyderabad, Telangana, India
Kamaljit Singh	Faculty of Management and Commerce, SRM University, Delhi-NCR, Sonapat, Haryana, India
Kavita Ingale	MIT World Peace University, Pune, Maharashtra, India
Kavita Sharma	University School of Business, Chandigarh University, Mohali, Punjab, India
Krishan Kumar	School of Commerce and Management, Starex University, Gurugram, Haryana, India
M. Shankar Lingam	Chaitanya Deemed to be University and NIRDPR, Hyderabad, Telangana, India
Madhusudan Narayan	Amity Business School, Amity University Ranchi, Ranchi, Jharkhand, India
Neelam Verma	Faculty of Management, Oriental University, Indore, Madhya Pradesh, India
P.R. Jeyalakshmi	Regional Centre of Calicut University, Thrissur, Kerala, India
Parul Sharda	Faculty of Management Studies, Medicaps University, Indore, Madhya Pradesh, India
Pooja Shukla	Amity College of Commerce and Finance, Amity University Ranchi, Ranchi, Jharkhand, India
Priya Arora	University School of Business, Chandigarh University, Mohali, Punjab, India
Priya Sachdeva	Amity School of Communication, Amity University, Noida, Uttar Pradesh, India
Priya Tiwari	Patil Institute of Master of Computer Application and Management, Pune, Maharashtra, India

Rishikaysh Kaakandikar	SaiBalaji International Institute of Management Sciences, Maharashtra, India
Renuka Deshmukh	School of Business, Dr. Vishwanath Karad MIT World Peace University, Pune, Maharashtra, India
Sachin Ayarekar	Institute of Management and Entrepreneurship Development, Pune, Maharashtra, India
Sarita Rana	Acropolis Faculty of Management and Research, Indore, Madhya Pradesh, India
Sayali Kulkarni	School of Management, Avantika University, Ujjain, Madhya Pradesh, India
Sayli Wankhade	Zeal Institute of Management and Computer Application, Pune, Maharashtra, India
Shilpi Upadhyay	School of Management, Avantika University, Ujjain, Madhya Pradesh, India
Shrirang Madhukar Choudhari	Retired Indian Air Force Officer, Pune, Maharashtra, India
Shweta Pandit	Faculty of Management Studies, Medicaps University, Indore, Madhya Pradesh, India
Shweta Shirolkar	MIT World Peace University, Pune, Maharashtra, India
Supriya Pathak	Faculty of Management, Oriental University, Indore, Madhya Pradesh, India
Vikrant V. Nangare	Institute of Management and Entrepreneurship Development, Pune, Maharashtra, India

CHAPTER 1

Emerging Trends and Innovations in ESG Practices

Vikrant V. Nangare^{1,*}, Sayli Wankhade² and Sachin Ayarekar¹

¹ *Institute of Management and Entrepreneurship Development, Pune, Maharashtra, India*

² *Zeal Institute of Management and Computer Application, Pune, Maharashtra, India*

Abstract: The relevance of Environmental, Social, and Governance (ESG) standards is driving a dramatic transition in the worldwide corporate sector. This book explores how cutting-edge inventions and changing trends are influencing ESG practices in a variety of businesses. Companies are incorporating ESG concepts into their fundamental strategy to improve sustainability, build trust, and generate long-term value in response to increased awareness of social justice, climate change, and corporate accountability. This comprehensive study looks at how forward-thinking strategies and creative practices are being used by organisations to address these imperatives. The use of cutting-edge technology like blockchain and artificial intelligence to enhance ESG reporting and transparency, the emergence of sustainable finance, and the expanding impact of stakeholder capitalism are some of the major issues. The book also looks at investor expectations, legal trends, and how company governance influences ESG initiatives. Leading firms' case studies offer useful insights into real ESG initiatives by showcasing their successful implementations and lessons learned. By presenting several viewpoints from scholars, industry professionals, and legislators, this book offers a thorough knowledge of the current situation with the ESG. The book "Sustainable Investing: Navigating Environmental, Social, and Governance (ESG) Challenges and Opportunities" is an invaluable tool for academics, investors, corporate executives, and legislators who want to comprehend and navigate the complex and dynamic field of ESG. It underscores the imperative for businesses to not only adapt to changing expectations but also proactively contribute to a sustainable and equitable future.

Keywords: Artificial intelligence, Blockchain, Corporate governance, Environmental, Governance, Social, Stakeholder capitalism, Sustainability, Sustainable finance.

* **Corresponding author Vikrant V. Nangare:** Institute of Management and Entrepreneurship Development, Pune, Maharashtra, India; E-mail: vikrant.nangarepatil@gmail.com

INTRODUCTION

Recent years have seen a rise in the significance of Environmental, Social, and Governance (ESG) rules, which have altered the corporate and investment landscape. ESG factors, which were formerly believed to be obscure, are now crucial to the business and investment plans of the biggest global firms. This change is being driven by a rising recognition that sustainable practices are critical to the long-term resilience and success of businesses, as well as to the health of our planet and society. Growing socioeconomic inequality, climate change, and governance crises have led to increased demand for accountability and transparency from firms from a range of stakeholders, including consumers, employees, regulators, and investors. Consequently, businesses are innovating and incorporating ESG principles into their core operations and decision-making procedures. Because of this, ESG practices have changed quickly, characterized by new ideas and ground-breaking discoveries. Artificial intelligence, blockchain technology, and the Internet of Things are transforming how businesses monitor and report on their ESG performance.

Currently, an endeavour is underway to enhance reporting frameworks and standardise ESG metrics in order to foster uniformity and comparability within sectors. Additionally, organisations are developing comprehensive plans to reduce and adapt to the effects of climate change, demonstrating the increased emphasis on climate risk and resilience. As businesses strive to prioritise their employees' well-being while promoting diversity, equity, and inclusion, social criteria are increasingly gaining more attention. Impact investing, sustainability-linked loans, and green bonds are a few instances of the financial industry's significant move towards sustainable investing. New regulations and increased shareholder participation highlight how important sound ESG policies are. Evaluating the latest developments and trends in ESG practices in this context provides important insights into the direction sustainable business will take. It focuses on how companies can employ new technology, adapt to shifting social norms, and interact with stakeholders to preserve long-term resilience and profitability while achieving positive social and environmental consequences.

The integration of sustainability into business strategies has gained prominence, with scholars arguing that sustainable practices are critical for long-term success (Haanaes, 2016). Eccles and Krzus (2010) support this, advocating for integrated reporting as a means to enhance transparency and align corporate strategies with sustainable goals. Stakeholder theory also plays a pivotal role, emphasizing that businesses must consider the interests of various stakeholders to foster ethical and sustainable growth (Freeman *et al.*, 2010). The impact of Environmental, Social, and Governance (ESG) factors on investment decisions has become more

apparent, with investors increasingly using ESG information to guide their choices, particularly in the wake of global shifts toward corporate responsibility (Amel-Zadeh and Serafeim, 2018). The effects of corporate sustainability on public perception and company valuation have been further explored, highlighting a direct link between sustainability practices and corporate value (Serafeim, 2020). In specific sectors like mining, the comparability of sustainability reports remains a challenge, as discrepancies in reporting standards make it difficult to evaluate environmental performance consistently (Boiral and Henri, 2017).

In emerging markets, Corporate Social Responsibility (CSR) reporting is evolving, with companies in developing economies, such as Bangladesh, beginning to adopt CSR practices to enhance their global competitiveness (Hossain and Alam, 2016). Additionally, the COVID-19 pandemic has significantly influenced consumer behavior and industry trends. For instance, consumers have shifted between online and offline shopping behaviors in response to the pandemic, while the tourism sector has faced severe setbacks due to travel restrictions and safety concerns (Espinoza *et al.*, 2021). Furthermore, food delivery applications have grown in popularity, especially among university students who value the convenience offered by these services (Ganatra *et al.*, 2021). The ongoing advancements in fintech and blockchain are reshaping the financial industry, paving the way for enhanced security and transparency (Kaakandikar *et al.*, 2024).

Following are the emerging trends and innovations in ESG practices:

1. Integration of Advanced Technologies

The integration of advanced technologies into Environmental, Social, and Governance (ESG) practices are revolutionizing how companies monitor, report, and improve their sustainability efforts. As the demand for transparency and accountability in ESG grows, technological innovations are providing new tools and methodologies to meet these challenges. Here are some key ways advanced technologies are being integrated into ESG practices:

As illustrated in Fig. (1), the integration of advanced technologies such as Artificial Intelligence (AI), Blockchain, and the Internet of Things (IoT) enhances sustainability and governance by improving data insights, transparency, and environmental impact.

a) Artificial Intelligence (AI) and Machine Learning (ML)

Environmental, Social, and Governance (ESG) practices are being improved through the revolutionary role of Artificial Intelligence (AI) and Machine

CHAPTER 2**Social Implications of e-Governance in Sustainable Development: A Case Study of the E-Panchayat Mission Mode Project****M. Shankar Lingam^{1,*}, Kadari Rajeshwar¹ and G. Anuradha Reddy²**¹ *Chaitanya Deemed to be University and NIRDPR, Hyderabad, Telangana, India*² *Noble Education and Research Foundation (Hybrid), Hyderabad, Telangana, India*

Abstract: Implementing electronic governance (e-Governance) at the grassroots level holds significant importance for driving transformative governance in rural India. Panchayati Raj System, empowered by the 73rd Constitutional Amendment, envisages panchayats as key to planning for economic expansion and social righteousness. With ICT's advancement, the GoI has launched several e-Governance initiatives under the National e-Governance Plan to bolster services at the grassroots and economically empower panchayats. This paper explores the successful implementation of the e-Panchayat mission mode project, specifically focusing on the e-GramSwaraj application. It emphasizes the crucial role of ICT in empowering and economically strengthening panchayats. Despite encountering challenges, the adoption of e-Panchayat applications presents an encouraging prospect for fostering positive change and advancement in local governance.

Keywords: E-Gramswaraj, e-Governance, E-Panchayat, ICT, MoPR.

INTRODUCTION

The concept of "e-Governance," also known as "electronic governance," emphasizes the utilization of Information and Communication Technology (ICTs) by governmental bodies and the public sector to implement management reforms at all levels (Bedi, Singh and Srivastava, 2001; Holmes, 2001; Okot-Uma, 2000). The goal of e-Governance is to enhance the distribution of information and services, promote public participation, and improve the transparency, efficiency, and impact of governments. It involves the application of information and communication technologies to the public sector. By integrating modern

* **Corresponding author M. Shankar Lingam:** Chaitanya Deemed to be University and NIRDPR, Hyderabad, Telangana, India; E-mail: shankumacharla@gmail.com

administrative structures, new decision-making processes, innovative educational methods, enhanced citizen engagement, and improved information and service delivery mechanisms, e-Government seeks to transform the way people engage with governments. This shift towards e-Governance may lead to a redefined concept of citizenship by redefining citizens' interests and responsibilities (UNESCO).

The actual delivery of e-Governance services to citizens has fallen short of expectations. In 2006, India launched the National e-Governance Project (NEGP) and introduced mission mode projects to deploy integrated applications at the federal, state, and local levels. Despite these efforts, the focus of recent e-Governance initiatives has been primarily on improving internal government processes rather than delivering enhanced public services (Mathur, 2009). The initial focus was on connecting all district headquarters before shifting to utilizing information and communication technologies in the 1980s to improve service delivery, including reaching the rural population through Gram Panchayat, the last mile of governance.

The e-Governance initiatives encompass a broad spectrum of public service projects spanning various critical sectors, such as irrigation, sanitation, primary education, social welfare, and rural electrification. These initiatives leverage an extensive array of internet resources, including platforms for online transactions, comprehensive information databases pertaining to industries, a diverse range of citizen services, initiatives for rural development, efficient postal and telecommunications services, specialized educational programs, streamlined grievance redressal systems, and dedicated business services. These multifaceted e-Governance schemes are strategically designed to significantly enhance accessibility, streamline operational processes, and improve the overall effectiveness of government services provided to the public.

The development of e-government has significantly transformed service delivery and citizen attitudes by enhancing accessibility and transparency (West, 2004). This shift aligns with the broader goals of digital governance, which aim to improve citizen access to information and reduce corruption, as discussed in Bhatnagar's (2003) analysis of e-government's role in information accessibility. In the context of local governance, initiatives like *Plan Plus for Gram Panchayat Development Planning (GPDP)* have provided structured frameworks for community planning, a shift highlighted by Rajeshwar (2021). Moreover, the COVID-19 pandemic has underscored the digital shift in consumer behaviors, with a marked difference observed in online and offline shopping preferences during this period (Espinoza et al., 2021). This pandemic also heavily impacted the tourism sector, causing a dramatic downturn due to travel restrictions and

safety concerns (Espinoza *et al.*, 2021). Meanwhile, the rise of food delivery apps has reshaped consumer expectations, particularly among university students who perceive added value from the convenience and efficiency of these services (Ganatra *et al.*, 2021). Furthermore, recent advances in financial technology, including blockchain, are shaping the financial sector's future by enhancing transaction transparency and security, a trend examined by Kaakandikar *et al.* (2024).

National e-Governance Plan (NeGP) and e -Panchayat

Established in 2006, the National eGovernance Plan (NeGP) was initiated by the Department of Electronics and Information Technology (DEITY) in collaboration with the Department of Administrative Reforms and Public Grievances (DARPG). Its primary goal was to enhance the efficiency and effectiveness of government operations through the implementation of e-Governance systems. The NeGP aims to make all government services accessible to citizens at their localities through common service delivery points, ensuring functional, open, and secure services at an affordable cost to meet the basic needs of the general populace. The NeGP will develop central infrastructure and policies, followed by the deployment of multiple Task Mode Programs across city, state, and federal strategic layers to introduce a citizens-first and business-first approach to governance. The NeGP includes Mission Mode Tasks, comprising 27 initiatives that clearly identify project missions and objectives.

Regarding the e-Panchayat, conceptualized as a Mission Mode Project under the NeGP, it becomes imperative to understand that the primary goal is to implement and institutionalize e-Governance in panchayats. This initiative aims to transform panchayats into effective administrative units and introduce policies to enhance their operations and processes, addressing the need for localized growth and efficient service delivery to the general population. The e-Panchayat project has the potential to bring about transformative reform for the rural masses, aiming to modernize and optimize the functioning of the Panchayat Raj Institutions (PRIs), promoting modernity, openness, and productivity.

The Ministry of Panchayati Raj has initiated a nationwide IT project to encourage citizen engagement in all stages of program administration, covering various aspects of Panchayats' functionality, including the provision of civic services such as identity cards, certificates, and licenses.

The e-Panchayat Mission Mode Project is designed with several key objectives, including the use of ICT to automate the internal workflows of Panchayats, thereby streamlining their operations. It aims to improve service delivery to citizens, bolster the capacity of Panchayat representatives and officials, and foster

CHAPTER 3

Corporate Responsibility and Sustainable Reporting: Driving Positive Change in Modern Business Practices**P.R. Jeyalakshmi^{1,*}**¹ *Regional Centre of Calicut University, Thrissur, Kerala, India*

Abstract: Corporate Responsibility (CR) & Sustainability Reporting (SR) have been embedded in current company processes, indicating a shift towards more sustainable and ethical operations. This research investigates how CR and SR generate positive corporate change through a qualitative analysis that includes case studies of major companies. It looks at best practices, obstacles, and implications for incorporating CR and SR into organisational plans. The history of reporting norms from their inception to high standards such as the Sustainability Accounting Standards Board (SASB) and the Global Reporting Initiative (GRI) highlights the importance of openness and accountability in business reporting. Environmental, social, and regulatory factors are examined, emphasizing the need for interaction when determining long-term impacts. Environmental, social, and governance factors are examined, with emphasis on the need for their interconnection when analyzing long-term repercussions. Businesses use implementation techniques such as stakeholder participation and the adoption of international standards to assess how they can integrate sustainability into their core operations. When comparing Amazon, Apple, and Adient, it becomes clear that each company has distinct methods, but they all share a guarantee of environmental initiatives, social inclusion, and strong governance procedures. By focusing on these factors, organizations can add to trust, reputation, and long-term value development, leading to a further sustainable and equitable future.

Keywords: Best practices, Corporate responsibility, Implementation challenges, Sustainability reporting, Stakeholder engagement.

INTRODUCTION**Corporate Responsibility Overview**

Corporate social responsibility (CSR) or corporate citizenship, also known as corporate responsibility (Khanchel I. *et al.*, 2023), has created a major busine-ss

* **Corresponding author P.R. Jeyalakshmi:** Regional Centre of Calicut University, Thrissur, Kerala, India; E-mail: prjeya82@gmail.com

niche in the world. With globalization and increased scrutiny of business practices, there is a notable shift towards what scholars predict as the 'Age of Responsibility' (Wilenius, 2005). This era heralds an increased emphasis on corporations recognizing their societal and environmental impacts and taking proactive steps to address them. Scholars such as Campbell (2007) argue that corporate responsibility is likely to intensify under conditions of regulation, monitoring, and the establishment of institutional norms and associations among corporations and stakeholders. This suggests that as external pressures and expectations grow, corporations are prompted to adopt more socially responsible behaviors.

An important framework for thinking about corporate responsibility is Carroll's CSR pyramid (Carroll, A.B., 1991). This pyramid outlines a hierarchical model wherein corporations have responsibilities extending beyond mere economic pursuits. It encompasses four layers of Responsibilities:

Economic: Being profitable.

Law: To follow rules and regulations.

Ethics: To do what is fair, just, and right.

Philanthropic: Being a good corporate citizen over voluntary actions.

This framework highlights the multidimensional nature of corporate responsibility, encompassing social, environmental, and economic dimensions.

In practice, CR manifests through a multitude of initiatives and actions. These may include philanthropic endeavours, such as charitable donations and community service projects (Wilenius, 2005), ethical labour practices ensuring fair treatment of employees and suppliers (Campbell, 2007), environmental stewardship efforts to minimize the ecological footprint (Carroll, 1991), and responsible governance promoting transparency, accountability, and ethical decision-making (Carroll, 1991).

By implementing corporate responsibility, companies fulfil their obligations to stakeholders and recognize the intrinsic value of sustainable business practices. These practices are increasingly viewed as essential for long-term success and resilience in an interconnected global economy. Sustainable business practices not only improve a company's reputation and build stakeholder confidence but also contribute to its long-term profitability and competitiveness (Vukić *et al.*, 2020). By integrating responsibility into their core strategies, companies can better address global issues such as inequality, climate change, and capital utilization

layer, thus creating a future for the company and the broader society (Camilleri, 2017).

Sustainability Reporting Overview

The Global Reporting Initiative (GRI) defines a sustainability report as an overview of the social, economic, and environmental impacts of a company's day-to-day operations. It is more than just a plaque; the idea is to guide the organization toward meeting its sustainability obligations and to clearly communicate its obligations to interested parties. Sustainability reports are designed to help businesses review, measure, evaluate, and communicate their performance on social, environmental, economic, and governance standards and set challenging and measurable goals.

Sustainability reporting has emerged as a critical tool for companies seeking to enhance value and ensure long-term profitability. White (2005) asserts that sustainability performance statements in annual reports are essential for companies to disclose their sustainability efforts, providing valuable information for investors. Sustainability reporting brings together business, environment, and culture to provide a holistic view of companies' responsibilities and the effectiveness of sustainable practices.

Choudhuri and Chakraborty (2009) emphasize the significance of integrating green innovation reporting into sustainability reporting. Doing so enhances transparency and stakeholder confidence, thereby improving the environmental impact of business operations. This integration not only demonstrates a company's environmental stewardship but also fosters innovation and drives continuous improvement in sustainability practices.

Sustainability reports cover a wide array of topics, including:

Environmental Metrics: Energy consumption, greenhouse gas emissions, and waste management (Choudhuri and Chakraborty, 2009).

Social Initiatives: Employee welfare, human rights, and community investments (White, 2005).

Governance Practices: Board composition, executive compensation, and anti-corruption measures (Khan *et al.* 2021).

Khan *et al.* (2021) emphasized the importance of sustainability reporting in motivating stakeholders in society, such as investors, customers, employees, regulators, and citizens, to evaluate company performance and hold them accountable for their actions. By providing transparent and comprehensive

Does ESG Investment Make a Difference? A Risk-Return Analysis

Jasvinder Kaur¹, Kamaljit Singh^{2,*} and Krishan Kumar³

¹ Department of Commerce, Kurukshetra University, Kurukshetra, Haryana, India

² Faculty of Management and Commerce, SRM University, Delhi-NCR, Sonapat, Haryana, India

³ School of Commerce and Management, Starex University, Gurugram, Haryana, India

Abstract: Since the last decade, environmental, social, and governance (ESG) theme-based indices have gained substantial attention in the Indian capital market. These indices serve as a benchmark for companies and investors to screen their stocks/portfolios' performance on ESG parameters. This paper investigates the growth of ESG-themed indices of the Bombay Stock Exchange, namely the S&P BSE 100 ESG Index, and the National Stock Exchange, such as Nifty 100 enhanced ESG, Nifty 100 ESG Index and Nifty 100 ESG Segment Leaders Index, in the Indian stock market. The everyday time series data from April 1, 2018, to March 31, 2024, were evaluated using historical returns, volatility, beta, and risk-adjusted performance metrics. The statistical difference between the return indexes was tested using t-statistics. The results found that all selected ESG indices slightly outperformed their respective benchmark indices. This suggests that investors can earn equal or higher returns while investing in ESG-themed indices. The t-statistics revealed an insignificant difference between the means of the ESG and benchmark indices. The growth rate analysis reported that ESG indices grew significantly and positively throughout the sample period. From a policy perspective, the current research presents a comprehensive understanding of ESG investment, aiding market participants and policymakers in making more informed and wise decisions. Furthermore, investment houses and financial organizations should create funds, indices, and securities that integrate ESG factors into their investments.

Keywords: ESG, Indian capital market, Responsible investment, Risk-adjusted measures.

INTRODUCTION

ESG-integrated investment has been a much-debated topic in financial markets over the last decade. It entails integrating ESG considerations into investment

* Corresponding author Kamaljit Singh: Faculty of Management and Commerce, SRM University, Delhi-NCR, Sonapat, Haryana, India; E-mail: kamaljitsingh@srmuniversity.ac.in

choices, in addition to standard risk and return factors. (Roy, 2019). In other words, it is a strategy for investment that aims to achieve financial as well as non-financial returns. Factually, ESG (Environmental, Social, and Governance) is the acronym often used to capture the non-financial performance of companies in investment analysis. This is also called sustainable or socially responsible investment. According to Joseph F. Keefe (2007), investing sustainably entails fully integrating ESG considerations into financial assessment and decision-making. The report by GSIA (2016) and Maiti, (2020) indicates that ESG integration in investment decisions is one of the most followed sustainable investment strategies worldwide.

The relationship between ESG (Environmental, Social, and Governance) investments and financial performance has been a topic of increasing interest, with substantial research indicating that ESG practices can have a meaningful impact on both risk and return. Friede, Busch, and Bassen (2015) provide a meta-analysis that aggregates over 2,000 studies, showing a positive link between ESG factors and financial performance across markets. Similarly, Whelan, Atz, Van Holt, and Clark (2021) confirm these findings by analyzing more recent studies, noting that ESG investments often enhance financial outcomes by lowering risks associated with regulatory pressures and market volatility. Theoretical foundations further support this perspective, as Albuquerque, Koskinen, and Zhang (2019) argue that corporate social responsibility can mitigate firm risk, especially in volatile markets. Furthermore, Bauer and Hann (2010) explore the link between environmental management and credit risk, highlighting how strong ESG practices may lead to more favorable credit ratings and lower costs of capital. From an applied perspective, Renneboog, Ter Horst, and Zhang (2008) examine socially responsible investments, suggesting that ESG criteria influence institutional behaviors and investor decision-making processes. Collectively, these studies underscore the value creation potential of ESG, not only in enhancing returns but also in managing risks and aligning with broader sustainability goals (Henisz, Koller, & Nuttall, 2019). This growing body of research suggests that by incorporating ESG principles, investors can achieve a balance between financial performance and sustainable impact, benefiting both stakeholders and shareholders (Clark, Feiner, & Viehs, 2015; Busch & Friede, 2018).

Over the past few years, the investment landscape has been witnessing a significant transformation. As issues regarding climate change, economic disparity, and corporate governance grow, investors are looking for new procedures to connect their portfolios with their principles. This paradigm shift is driven by the realization that integrating ESG factors can potentially lead to more sustainable financial returns and positively impact society and the environment.

Consequently, ESG investing is not just a trend but a fundamental change in how investment decisions are being made globally.

Motivation and Relevance of the Study

The motivation for considering this subject stems from the increasing attention sustainable ESG investment strategies have received from governments, institutions, the public, and individuals, particularly following the economic meltdown of 2008 and the COVID-19 crisis. During these crises, sustainable indices generated higher returns compared to composite indices (Chelawat and Trivedi, 2013; Jain *et al.*, 2023; Da Gama Pinheiro *et al.*, 2024). The Indian Impact Investors Council (2022) reports that impact investment surged to \$5.8 billion in 2022, up from \$2.7 billion in 2019 and \$323 million in 2010.

This research aims to provide a comprehensive understanding of ESG investment, significantly enriching the existing literature. It will benefit policymakers, investors, financiers, and academic investigators in several ways. First, the research will help policymakers understand the societal impact of ESG investments, enabling them to develop informed policies. Second, the analysed data will guide investors and stakeholders in making informed decisions about sustainable investment opportunities, considering both small-duration and long-period effects. Finally, given the comprehensive existing work on the results of combined equity indexes and mutual funds, this investigation lays the groundwork for identical research in other growing markets. Moreover, it will contribute to the development of a more sustainable society.

The current study tries to investigate the subsequent research questions: Do ESG-themed indices outperform conventional indices? Is there any difference between the volatility of ESG indices and conventional benchmark indices? Is ESG investment a viable investment strategy? By addressing these questions, this research work will present a comprehensive understanding of ESG investment and make a significant contribution to the literature. This will assist market participants and policymakers in making more informed and wise decisions. Furthermore, it will help in building a better ESG society.

Despite the increased interest and adoption of ESG investing, there remain several challenges and criticisms. One major challenge is the lack of standardized metrics and reporting frameworks, which can lead to inconsistencies in ESG ratings and make it difficult for investors to precisely evaluate and estimate the ESG outcomes of various corporations. Additionally, there is ongoing debate about whether ESG investing truly leads to better financial performance or if it merely reflects a reallocation of funds toward already well-performing companies.

CHAPTER 5

Measuring Impact Investment: Metrics and Evaluation of the Impact Investing for Informed Decision-making**Priya Tiwari¹ and Shrirang Madhukar Choudhari^{2,*}**¹ *Patil Institute of Master of Computer Application and Management, Pune, Maharashtra, India*² *Retired Indian Air Force Officer, Pune, Maharashtra, India*

Abstract: In Sustainable and Impact Investment (SII), measuring investments' social and environmental impact is not just a task but a complex and engaging challenge. Investors in SII consider Environmental and Social criteria when deciding where to invest and navigating the intricacies of impact assessment. This study explores the recently developed concept of impact investing and how it evolves into the framework for making investment decisions by integrating sustainability measures. Impact investing is a growing trend in the world of finance, defined by its dual focus on producing positive social and environmental consequences alongside financial rewards. The potential for significant financial returns and the satisfaction of making a positive impact make impact investing an exciting prospect. Impact investors often evaluate the social impact of their investments, a task that requires deep understanding and careful analysis. However, measuring the impact of the investment is a complex and challenging task that keeps investors on their toes. Corporate governance, social and environmental practices, and environmental performance are all measured by a company's ESG scores. Through a comprehensive analysis, this article sheds light on the growing significance of impact investing and the role of sustainability metrics in shaping responsible investment strategies.

Keywords: Impact investing, decision-making, sustainability metrics, social return on investment (SROI), environmental, social, and governance (ESG) score.

INTRODUCTION

Understanding the importance of financial markets in accurately pricing risk is essential for making well-informed capital allocation decisions. Timely and precisely disclosing current and historical financial and operational performance is critical. Considering the governance and risk management framework underpinning financial results is also crucial. The financial crisis of 2007-2008

* **Corresponding author Shrirang Madhukar Choudhari:** Retired Indian Air Force Officer, Pune, Maharashtra, India; E-mail: smchou12@gmail.com

underscored the impact of inadequate corporate governance and risk management on asset values. Organisations have shifted towards greater transparency about their strategies, governance frameworks, and risk management techniques. This move towards increased transparency will allow stakeholders and investors to make knowledgeable decisions and prevent capital misallocation.

The growing importance of environmental, social, and governance (ESG) factors in business operations has been highlighted in several studies and reports. For instance, Goswami (2022) discusses the introduction of ESG disclosures in India's regulatory space, which aims to enhance transparency in corporate governance. Similarly, Pardo (n.d.) emphasizes the 2023 GIINsights report, which underscores the rising influence of impact investments in the global market. The need for sustainable business practices is also evident in the South African context, where Mathibela (2018) provides a comprehensive analysis of corporate social responsibility (CSR) and its social transformation potential. In this regard, reports like those from The Economist Intelligence Unit (2015) stress the economic risks posed by climate change and the importance of action to mitigate those risks. The role of climate-related financial disclosures is further elaborated by the Task Force on Climate-related Financial Disclosures (2021), which offers guidance on metrics and targets for businesses. Harvey (2021) and Ellis-Petersen (2021) discuss major global initiatives like COP26 and India's pledge to reach net-zero emissions by 2070, which reflect the global commitment to climate change mitigation. In terms of consumer behavior, Espinoza *et al.* (2021a, 2021b) analyze the effects of the COVID-19 pandemic on online and offline shopping patterns, while Ganatra *et al.* (2021) examine the impact of food delivery apps on customer value perception among university students. These studies and reports collectively highlight the growing emphasis on sustainability, climate change mitigation, and responsible business conduct in the global and Indian contexts.

In addition to academic studies, reports such as those from Dubey (2024), the Ministry of Corporate Affairs *et al.* (2018), and the NSE India (2020) provide valuable insights into ESG reporting frameworks and practices. The National Guidelines on Responsible Business Conduct (2018) guide businesses toward adopting ethical practices, while the Nifty100 ESG Sector Leaders Whitepaper (2020) offers a lens through which companies can be evaluated for their superior ESG risk management. Furthermore, the growing adoption of ESG advisory services, as highlighted by various industry sources (*e.g.*, ESG Services | BRSR | ESG Advisory, n.d.), further supports the transition toward more sustainable business practices. The broader context of energy consumption and its implications for sustainability is also captured by tools like the Energy Statistics Data Browser (n.d.) from the International Energy Agency (IEA), providing crucial data for decision-making in energy transitions.

Kaakandikar *et al.* (2024) discuss the role of fintech and blockchain in transforming the financial sector, emphasizing how emerging technologies are contributing to more sustainable and transparent financial ecosystems.

Today, organisations grapple with a significant and often misunderstood risk – climate change. The impact of ongoing greenhouse gas emissions will lead to further warming of the planet, which is well appreciated; however, the precise timing and severity of the resulting physical effects are hard to predict. This challenge's scale and long-term nature make it uniquely complex, particularly regarding economic decision-making. As a result, many organisations may mistakenly consider the impacts of climate change as distant and not immediately relevant to present-day decisions.

Managers must fulfill their fiduciary duty by prioritising the best interests of their beneficiaries and striving to achieve optimal risk-adjusted returns. While some investors may emphasise short-term performance, it is essential to encourage a focus on long-term returns. Additionally, it is worth noting that only a few asset managers have taken steps to assess and address climate-related risks in their portfolios, and a minority are actively working to reduce their carbon footprint. The Asset Owners Disclosure Project estimates that just 7% of asset owners track their portfolios' carbon footprint, and just 1.4% have a specific aim to lower it. The Economist Intelligence Unit Limited (2015) report highlights the importance of recognising the probable impact of climate change on manageable assets, estimating that the losses could be US\$ 4.2 trillion in present value terms. The report further emphasises the significance of risks associated with extreme warming and demands comprehensive solutions. As an illustration, the study indicates that an increase in temperature of 6°C could result in a current loss of US\$13.8 trillion if private sector discounts are applied. The public sector estimates that the same degree of warming might result in value losses of US\$43 trillion, accounting for 30% of the total stock of managed assets in the world.

The effects on future assets will include immediate physical impairment, decreased growth, and poorer overall asset returns. The interrelated nature of the issue will result in lower returns, even on investments unaffected by physical deterioration. There is a demand for institutional investors to examine and manage their climate related risks and a recommendation for rules that require corporations to declare their emissions consistently. Furthermore, introducing carbon prices is critical for combating climate change.

The Financial Stability Board established the Task Force on Climate-related Financial Disclosures (TCFD-Report, 2017) to develop standardised and voluntary climate-related financial disclosures. This program attempted to equip

Impact Investing and Community Engagement: Aligning Financial Returns with Social and Environmental Goals within ESG Frameworks

Dipti Malpani^{1,*}, Supriya Pathak¹ and Dheeraj Nim¹

¹ *Faculty of Management, Oriental University, Indore, Madhya Pradesh, India*

Abstract: Investments are evolving rapidly, with individuals now considering not only financial returns but also environmental, social, and governance (ESG) factors while making decisions. Investors are increasingly interested in the impact of these factors alongside traditional financial returns. Impact investing is gaining momentum in the investment sector and is beginning to align with community engagement. By integrating impact investing with community involvement, various social welfare initiatives can be developed, benefiting society and its people.

Purpose

This chapter aims to raise awareness of impact investing and community engagement, promoting these concepts as pathways for advancing social and community development. It seeks to educate the target audience on the ESG framework, inspiring individuals to recognize that, as we benefit from society, it is our ethical responsibility to give back.

Methodology

This chapter aims to explore new investment strategies and spread awareness of the same. It draws upon an in-depth analysis of existing literature, desk research, and case studies.

Outcomes

This chapter will provide in-depth knowledge on concepts such as impact investing and community engagement, exploring how financial returns can be aligned with the ESG framework. It aims to motivate and inspire investors to make investment decisions that are more ethical and supportive of social welfare.

* **Corresponding author Dipti Malpani:** Faculty of Management, Oriental University, Indore, Madhya Pradesh, India; E-mail: diptimalpani84@gmail.com

Originality

The research offers insights into the market, data, case studies, innovative technologies, transfer and development of technology trends, good practices, and analysis of investment and investment strategies. It attempts to raise member state stakeholder's technological acumen to meet the demands of the fast-paced business and technology environment of today.

Keywords: Community engagement, Environmental, ESG, Governance, Impact investing, Investment, Social, Society.

INTRODUCTION

Impact investing is emerging as a powerful tool that integrates environmental, social, and governance (ESG) factors, reshaping the landscape of investment strategies. It focuses on generating financial returns while prioritizing social and environmental well-being. This new wave of investments encourages community involvement in initiatives that promote social and environmental welfare, ultimately benefiting communities and supporting sustainable development. This chapter will explore the significance of impact investing through examples from various industries and relevant case studies. Additionally, it will connect impact investing to community engagement, providing a comprehensive overview of the benefits associated with this approach.

In recent years, the field of impact investing has gained significant attention for its potential to generate both financial returns and social benefits. Agrawal and Hockerts (2019) provide a comprehensive review and research agenda on impact investing, emphasizing its growing importance in modern finance. Arnstein (1969) introduces the concept of citizen participation, which aligns with the values of impact investing by promoting active involvement in social outcomes. Additionally, Cheney, Merchant, and Killins (2013) highlight how impact investing can attract and retain donors, further strengthening the nexus between social responsibility and financial return. Heeb *et al.* (2023) explore the investor's perspective on the importance of impact, showing a growing awareness among investors about the social implications of their investments. Meanwhile, Phillips (2016) focuses on the role of impact investing in community development, particularly in economically disadvantaged areas. Thanki *et al.* (2022) note that individual investors are increasingly willing to prioritize socially responsible investments, provided that returns are not compromised. In the realm of consumer behavior, studies by Espinoza *et al.* (2021a, 2021b) provide insights into how the COVID-19 pandemic has affected online and offline shopping habits and the tourism sector, shedding light on the shifts in consumer values that may influence investment choices. Ganatra *et al.* (2021) further investigate the impact of food

delivery apps on consumer perceived value, a relevant area in today's digitally connected world. In terms of foundational texts, Harji and Hebb (2010) discuss the role of impact investing in social finance, while Nicholls *et al.* (2009) offer a guide to Social Return on Investment (SROI), an important metric in assessing the effectiveness of impact investments. The work of Pandit and Tamhane (2017) reflects the emergence of impact investing in India, marking a significant shift in finance toward purpose-driven investments. Stanley (2019) provides further evidence of how individual investors' interests are increasingly driven by impact convictions. Torjman (2012) discusses the strengths and challenges of measuring SROI, a key issue for investors. The comprehensive work by Kaakandikar *et al.* (2024) on fintech and blockchain trends underscores the technological innovations shaping the future of impact investing, offering new opportunities for both financial and social returns.

ESG OVERVIEW

An organization's performance can be evaluated by examining its impact and alignment with societal, environmental, and governance standards. ESG principles are applicable beyond the realm of investing, extending to interactions with customers, suppliers, employees, and the broader public. Unlike more philosophical concepts like sustainability and corporate social responsibility (CSR), ESG provides concrete data and metrics that guide decision-making for companies and investors alike. The term "ESG" gained widespread recognition in the 21st century, often mentioned alongside sustainability and CSR as key factors in responsible business practices.

The History of ESG

The term ESG was officially introduced in 2004 by former UN Secretary-General Kofi Annan, who invited over 50 CEOs from various financial organizations to participate in the UN Global Compact. The initiative aimed to incorporate ESG criteria into capital markets.

This further continued in the events "Who Cares Wins" followed by 'FreshfieldReport' and Principles for Responsible Investment and the Sustainable Stock Exchange Initiative from 2005 to 2007. These events highlighted how social, environmental and governance factors are important and these factors need to be taken into consideration while investing in capital markets for enhanced sustainable development.

The period between 2013 and 2014 marked accelerated growth in ESG investing, as studies demonstrated that companies with strong corporate sustainability performance often achieved superior financial outcomes. Today, ESG investing

CHAPTER 7

Exploring ESG Integration: Strategies for Sustainable and Responsible Investing

Priya Sachdeva^{1,*} and Archan Mitra²

¹ *Amity School of Communication, Amity University, Noida, Uttar Pradesh, India*

² *School of Media Science, Presidency University, Bangalore, Karnataka, India*

Abstract: This chapter aims to evaluate and examine the effectiveness of various “ESG” (Environmental, Social, and Governance) investing strategies, such as impact investing, ESG integration, positive screening, and exclusionary screening, using a comprehensive comparative analytical technique. Finding the best techniques to create substantial social and environmental benefits, strong financial performance, great ESG performance, effective risk management, strong stakeholder involvement, and high regulatory compliance is the main goal. The process entails establishing precise selection criteria, gathering pertinent information from many sources, and examining the information to identify trends and patterns. The findings reveal that ESG integration and impact investing are the most effective strategies across the assessed criteria. ESG integration consistently achieves the highest financial returns, risk-adjusted returns, and risk management scores, indicating that a holistic approach to ESG integration enhances financial performance and mitigates risks. Impact investing excels in impact measurement and stakeholder engagement, highlighting its strength in generating positive social and environmental outcomes. Positive screening performs moderately well, while exclusionary screening, despite its ethical alignment, generally scores lower across the board. Despite the robust methodology, this study has limitations, including reliance on hypothetical data and a specific set of criteria. Future research should incorporate real-world data and explore additional dimensions of ESG performance. This study underscores the importance of comprehensive ESG integration and the potential for impactful investing to drive meaningful change in the investment landscape.

Keywords: ESG integration, Impact investing, Risk management, Stakeholder engagement, Sustainable investing.

* **Corresponding author Priya Sachdeva:** Amity School of Communication, Amity University, Noida, Uttar Pradesh, India; E-mail: sachdevapriya35@yahoo.in

INTRODUCTION

Definition of “ESG” (Environmental, Social, and Governance) Factors

A company's performance and operations are evaluated using a set of criteria called “ESG” (Environmental, Social, and Governance) aspects in addition to conventional financial statistics. These standards are becoming increasingly crucial for assessing the moral and long-term effects of investments. A company's impact on the environment is reflected in its environmental elements, which include policies pertaining to climate change, energy efficiency, waste management, resource utilisation, and carbon emissions. Understanding how a company upholds environmental compliance and its ecological imprint requires an understanding of these components. Social factors encompass an organization's relationships with its vendors, clients, employees, and surrounding communities. This dimension covers community involvement, diversity, inclusion programmes, health and safety regulations, labour practices, and human rights. Social aspects demonstrate a business's dedication to moral business practices and its impact on the welfare of society. The internal procedures and systems that run a business are referred to as governance factors. These consist of shareholder rights, audit procedures, executive compensation, board makeup, and openness. Good governance guarantees responsibility, equity, and openness in a business's dealings, which eventually affects the long-term viability and moral behaviour of the enterprise.

Sustainability in corporate strategies has become an essential factor influencing business performance and investor behavior. Eccles and Serafeim (2013) highlight the importance of innovating for sustainability as a way to achieve a competitive advantage. Their work, along with that of Eccles, Ioannou, and Serafeim (2014), demonstrates how sustainable practices can positively impact organizational processes and outcomes. A broader view of sustainability is provided by Elkington (1994), who discusses the win-win-win business strategies that benefit the environment, society, and the economy. In terms of investor perspectives, studies by Gompers, Ishii, and Metrick (2003) and Hawn, Chatterji, and Mitchell (2018) reported that corporate sustainability can influence equity prices and market reactions. Furthermore, the growing trend of socially responsible investing is supported by research by Friede, Busch, and Bassen (2015), which aggregates evidence from over 2000 studies, and Renneboog, Horst, and Zhang (2008), who explore institutional aspects of such investments. The importance of stakeholder engagement in sustainability efforts is underscored by Freeman (1984) and Donaldson and Preston (1995). The adoption of sustainable investment practices is further explored by Baker and Nofsinger (2012) and Dwyer (2015), who discuss the role of financial institutions and

investors in fostering sustainability. As the world strives to achieve the goals of the 2030 Agenda for Sustainable Development, the United Nations (2015) calls for integrated action across all sectors to promote sustainability.

Importance of Integrating ESG Factors into Investment Decision-making

It is becoming more widely acknowledged that sustainable and ethical investing cannot be achieved without including ESG considerations in investment decision-making. This integration has a complex justification that includes value creation, risk management, and ethical issues.

Risk Management: Since standard financial analysis often misses some hazards, ESG considerations are essential for detecting and controlling them. Environmental hazards can have a big impact on a business's operations and profitability. Examples of these risks include resource shortages and climate change. Social risks can impede business operations and harm reputations. Examples of these risks include labour strikes and opposition from the community. Fraud and corruption are examples of governance risks that can have serious financial and legal consequences. Investors can better recognise possible risks and successfully minimise them by considering ESG elements.

Value Creation: Long-term value creation is frequently more advantageous for businesses with robust ESG policies. It frequently displays greater resilience, inventiveness, and operational performance. For example, eco-friendly businesses can cut expenses by minimising trash and using less energy. Businesses that practise social responsibility can draw and keep top talent, increase customer loyalty, and forge strong bonds with the local community. Reputable businesses are more likely to stay out of trouble and keep the confidence of investors. As a result, incorporating ESG considerations can improve shareholder value and financial performance.

Ethical Considerations: By including ESG variables, investments are more in line with moral and ethical principles than with financial performance. An increasing number of investors seek to support companies that positively benefit society and the environment. This trend points to a broader shift towards responsible capitalism, where companies' contributions to society are valued just as highly as their financial performance. Investors can make sure their portfolios represent their values and encourage favourable social and environmental outcomes by adding ESG considerations.

CHAPTER 8

The Future of Sustainable Investing: Green Bonds In India-regulations, Technology, and Investor Demand

Sarita Rana^{1*} and Supriya Pathak²

¹ *Acropolis Faculty of Management and Research, Indore, Madhya Pradesh, India*

² *Faculty of Management, Oriental University, Indore, Madhya Pradesh, India*

Abstract: Green bonds have emerged as a key instrument in the rapid evolution of sustainable investment, which has been fueled by changing rules, technology breakthroughs, and increasing investor demand. The green bond market has grown significantly in India, greatly advancing the country's sustainability objectives. This chapter explores potential directions for sustainable investment with a particular emphasis on the Indian green bond market. It examines the effects of technological developments that improve efficiency and transparency, legislative frameworks that support green financing, and the growing interest among investors in sustainable ventures. India's green bond programmes have contributed significantly to the mitigation of climate change and the advancement of environmental sustainability by funding a large number of renewable energy projects, increasing energy efficiency, and encouraging the construction of sustainable infrastructure.

Keywords: Artificial intelligence, Big data analytics, Efficiency, Environmental consciousness, ESG, Environmental, Financial incentives, Government support, Green bond, Investor, Regulations, Renewable energy, SEBI, Social, Sustainable development, Sustainable investment, Technology, Transparency.

INTRODUCTION

The green bond market in India has grown to be a significant force behind sustainability, directing capital towards energy-efficient, renewable energy and sustainable infrastructure initiatives. Green bonds play a crucial role in supporting environmental preservation, reducing carbon emissions, and supporting global climate goals. This chapter highlights important future developments in

* **Corresponding author Sarita Rana:** Acropolis Faculty of Management and Research, Indore, Madhya Pradesh, India; E-mail: dr.ranasarita9@gmail.com

sustainable investment while examining the revolutionary effect of green bonds on India's sustainability initiatives.

Due to the urgent need to address environmental, social, and governance (ESG) challenges, sustainable investment has quickly emerged as a key component of the global financial industry. This strategy seeks to integrate investment methods with more general sustainability goals by generating financial returns while also fostering beneficial societal outcomes. Three key elements drive the impetus behind sustainable investing: increasing investor demand, changing rules, and technology improvements. These components are especially important when considering India's green bonds, which are revolutionising the nation's sustainability efforts.

One of the main factors influencing the environment of sustainable investment is the evolution of legislation. Transparency and accountability in ESG practices are becoming more and more important to governments and regulatory agencies worldwide. The purpose of this legislation is to guarantee that businesses follow sustainable practices, which will increase investor trust. The regulatory system in India is gradually bringing it into line with global norms, which is encouraging a more stable reporting environment and compliance with sustainability requirements. By requiring businesses to report their ESG activities, the Securities and Exchange Board of India (SEBI) is encouraging a more open and responsible investing environment. As it guarantees that investors have access to accurate and thorough information about a company's sustainability policies, this regulation change is essential to the development of sustainable investment.

In recent years, the financial sector has increasingly focused on green bonds as a way to finance environmentally sustainable projects. Ehlers and Packer (2017) examined green bond finance and certification, emphasizing the growing role of these instruments in the global market. The impact of liquidity risk on the yield spread of green bonds was explored by Febi, Schäfer, Stephan, and Sun (2018), highlighting the financial dynamics behind green bond pricing. Forsbacka and Vulturius (2019) provided a legal analysis of the terms and conditions for green bonds, a crucial consideration for issuers and investors alike. Gianfrate and Peri (2019) discussed the competitive advantage of issuing green bonds, while Kennedy and Corfee-Morlot (2012) emphasized the importance of mobilizing investment for low-carbon infrastructure. Espinoza *et al.* (2021) extended the discussion to consumer behavior in the context of online and offline shopping during the pandemic, and Espinoza *et al.* (2021) also explored the pandemic's effects on the tourism sector. Additionally, Ganatra *et al.* (2021) studied the impact of food delivery apps on customer perceived value, offering insight into consumer preferences in a digital age.

Key sources provide vital insights into green bonds and their legal and financial framework. The Ministry of New and Renewable Energy (2020) outlines government initiatives to support green energy, while Natixis (2014) and SEBI (2017) shed light on sustainable finance and regulatory frameworks. The Reserve Bank of India Press Releases (n.d.) and IREDA (2020) contributed to the understanding of India's efforts in promoting renewable energy and green finance. Finally, the European Commission (2018) stressed the financial sector's role in addressing climate change, which is further explored by Kaakandikar, Kaushik, Tiwari, and Ningule (2024) in their work on fintech and blockchain trends in the financial sector. The list of the top green bond issuances in India is summarized in Table 1.

Table 1. List of the top green bond issuances in India.

Issuer	Amount	Issued Date	Tenure	Sector Exposure	Credit Rating
NTPC	Rs. 20bn	Aug-16	5 years	Energy	BBB (Fitch)
IREDA	Rs. 19.5bn	Sep-17	5 years	Energy	GB1 – green bond rating; Baa3 – issuer rating (Moody's)
Yes Bank	Rs. 10bn	Feb-15	10 years	Energy	AA+ (CARE and ICRA)
IREDA	Rs. 7bn	Mar-17	10 years	Energy	AA+ (ICRA)
CLP Wind Farms	Rs. 6bn	Sep-15	3, 4 and 5 years	Energy	AA (India Rating and Research)
PNB Housing Finance	Rs. 5bn	Apr-16	NA	Buildings	NA
Hero Future Energies	Rs. 3bn	Feb-16	3 and 6 years	Energy	NA; CBI Certified
Renew Power	Rs. 5bn	Aug-16	NA	Energy	A+ (CARE)

Source: - <https://www.fisdom.com/green-bonds/>

The development of technology is another important factor in sustainable investment. Technological advancements in blockchain, artificial intelligence, and data analytics are completely changing how ESG performance is monitored and assessed. These resources give investors a more thorough understanding of a business's sustainability policies, facilitating better decision-making. The green bond market in India is becoming more transparent and efficient as a result of the implementation of these technologies. Blockchain technology, for instance, may improve the verification and traceability of revenues from green bonds, guaranteeing that money is used for the desired environmental reasons. In a similar vein, investors may benefit from increased accountability and

Future Trends in Sustainable Investing: Evolving Regulations, Technological Advancements, and Growing Investor Demand

Froilan D. Mobo^{1*}

¹ *College of Marine Engineering, Philippine Merchant Marine Academy, San-Narciso, Zambales, Philippines*

Abstract: Sustainable investing has become a key component of emerging financial trends incorporating ESG screening into investment sectors. Increased worldwide awareness of sustainability means that investor demand for ethical, social, and environmental values is projected to rise. This study focuses on these linked patterns in the investing world, namely sustainable investing, and makes some predictions for the future.

Keywords: Evolving regulations, Future trends, Grown investor demand.

INTRODUCTION

Sustainable investing has become a key component of emerging financial trends that incorporate ESG screening into investment sectors. Increased worldwide awareness of sustainability means that investor demand for ethical, social, and environmental values is projected to rise. Investors from all around the world are realizing the value of sustainability and looking for more environmentally responsible and ethical methods to invest their money. This chapter highlights the three main areas on which sustainability investing focuses: new financial regulations, new technologies, and new investor expectations. Changes in capital allocation encourage transparency, accountability, and long-term value creation, thereby transforming the entire financial ecosystem.

The legal structure that oversees sustainable investing is changing dramatically. Stricter rules are being introduced by policymakers worldwide to guarantee that financial markets appropriately account for sustainability risks and opportunities and to standardize ESG reporting. Key examples include the taxonomy for

* **Corresponding author Froilan D. Mobo:** College of Marine Engineering, Philippine Merchant Marine Academy, San-Narciso, Zambales, Philippines; E-mail: froilanmobo@gmail.com

sustainable activities and the SFDR of the European Union (European Commission, 2020). By requiring financial firms to disclose how they incorporate ESG considerations into their investment procedures, these regulations encourage openness and decrease the possibility of greenwashing. Comparably, to help investors make better judgments, the Task Force on Climate-related Financial Disclosures (TCFD) offers businesses a globally recognized framework for disclosing climate-related financial risks and opportunities (TCFD, 2017).

Technological innovation is an effective catalyst for the development of sustainable investment. Advances in big data, Artificial Intelligence (AI), and blockchain technology are transforming how ESG data is collected, evaluated, and used. Big data and AI enable investors to assess massive volumes of information from many sources, identify ESG risks and opportunities more precisely, and create powerful predictive models (PWC, 2020). For example, AI-driven analytics can more correctly assess a company's environmental effect by evaluating satellite images, social media, and other unorthodox data sources (KPMG, 2019). Blockchain technology, on the other hand, provides transparent and tamper-proof mechanisms for recording and verifying ESG claims, hence increasing trust and integrity in sustainable Investments (Deloitte, 2020). These technological improvements not only improve the quality and reliability of ESG data but also democratize access to sustainable investment solutions, making them available to a broader variety of investors.

The regulatory landscape for sustainable investment is undergoing profound changes, with policymakers and regulatory bodies around the world introducing new frameworks to enhance transparency, accountability, and standardization in ESG reporting. These evolving regulations are critical in providing investors with reliable and comparable ESG data, thereby fostering informed decision-making and building trust in sustainable investment products.

One of the most significant regulatory developments is the Sustainable Finance Disclosure Regulation (SFDR) of the EU. The SFDR compels financial market participants to report how they assess sustainability risks in investment choices. It also calls for extensive reporting on the negative impacts of investment decisions on sustainability metrics. This guideline is intended to level the playing field by standardizing ESG disclosures, allowing investors to assess and compare the sustainability performance of various financial products.

The Task Force on Climate-related Financial Disclosures (TCFD) has produced guidelines to help firms disclose climate risks and opportunities. The TCFD framework encourages businesses to provide transparent and consistent data about how climate change affects their operations and financial performance. The TCFD

expects that by increasing transparency, investors, lenders, and insurance underwriters will be able to make better decisions.

In other countries, the Securities and Exchange Commission (SEC) is working to improve ESG disclosure regulations. The SEC has proposed rules forcing publicly traded companies to disclose climate-related risks and greenhouse gas emissions. These recommendations reflect a rising recognition of climate risk's financial importance, as well as the need for greater transparency in how corporations approach these concerns.

These regulatory changes not only increase the quality and comparability of ESG data, but also drive businesses to utilize more efficient practices. As regulatory frameworks evolve, they will most certainly play a key role in molding the future of sustainable investing by encouraging the adoption of ESG factors into mainstream investment procedures.

The rise in investor demand for sustainable investments reflects a growing realization of the importance of ESG elements in driving long-term value. Institutional investors, including pension funds, insurance firms, and sovereign wealth funds, are leading the way in incorporating ESG criteria into their investing mandates. They acknowledge that sustainable investing can reduce risks, increase returns, and meet rising public expectations for corporate responsibility (BlackRock, 2021).

Retail investors, too, have a strong preference for sustainable investment products, driven by a desire to align their investments with their values and contribute to positive social and environmental benefits (Morningstar, 2021). Asset managers are responding to this shift in investor sentiment by innovating and expanding their ESG product offerings, which include green bonds, impact investing funds, and ESG-focused Exchange-Traded Funds (ETFs).

The development of regulations and policy frameworks has been one of the factors contributing to sustainable investment. Governments and regulators across the globe are now more conscious about sustainability in financial markets. One example is the Sustainable Finance Disclosure Regulation (SFDR), which is an EU requirement that fosters disclosure and transparency by financial institutions or firms for their Environmental, Social, and Governance (ESG) considerations. Similarly, the Task Force on Climate-related Financial Disclosures (TCFD) framework has been widely accepted and requires corporations to evaluate as well as disclose information about climate risks and opportunities.

Green Economy for Sustainable Investing: Driving Global Goals *Via* ESG

Parul Sharda^{1,*} and Shweta Pandit¹

¹ Faculty of Management Studies, Medicaps University, Indore, Madhya Pradesh, India

Abstract: The green economy transition represents a strategic approach to fostering sustainable development by integrating the Environmental, Social, and Governance (ESG) principles into economic activities. This chapter examines the critical role of sustainable investing within the green economy framework, highlighting how ESG criteria can drive progress towards global sustainability goals. The chapter examines how a green economy might improve environmental sustainability, social equity, and strong governance, thus tackling urgent global issues, including climate change, resource depletion, and social inequality. Key regulatory frameworks, financial instruments, and technological innovations that support ESG integration are analyzed to demonstrate their effectiveness in promoting transparency, accountability, and resilience in economic systems. The chapter also discusses the multifaceted challenges hindering the adoption of a green economy, including regulatory fragmentation, financial barriers, and cultural resistance, and proposes strategic pathways to overcome these obstacles. By emphasizing the interconnectedness of environmental health, social well-being, and ethical governance, this research underscores the transformative potential of ESG-driven investments in achieving a balanced and sustainable global economy.

Keywords: ESG, Green economy, Sustainable investing.

INTRODUCTION

Background of ESG Practices

The origins of ESG (Environmental, Social, and Governance) practices may be traced back to the early 2000s when institutional investors started advocating for corporations to incorporate factors beyond financial performance into their decision-making processes. ESG criteria have expanded to include a broad range of elements, including carbon emissions, workforce diversity, and board independence. In recent years, there has been an increasing trend of incorporating

* Corresponding author Parul Sharda: Faculty of Management Studies, Medicaps University, Indore, Madhya Pradesh, India; E-mail: parul.sharda@medicaps.ac.in

ESG principles into corporate plans as corporations acknowledge the significance of sustainability and responsible governance. Studies have demonstrated that organizations that prioritize and implement robust Environmental, Social, and Governance (ESG) procedures generally achieve superior financial performance and possess enhanced capabilities to handle hazards. ESG concerns have gained prominence in investment decisions and are recognized as a crucial factor in generating long-term value for organizations (Gaganis *et al.* 2023).

1. Introduction to Green Economy and Sustainable Investing

The green economy has been increasingly important in recent years because of its capacity to reduce poverty, improve living conditions, and safeguard the well-being of communities.

It focuses on promoting human development while mitigating environmental risks. The ecological (green) economy is a fundamental element of sustainable improvement, encompassing not just economic aspects but also other dimensions of life, such as environmentally conscious development and promoting overall progress (Al-Taai, 2021). It stresses the importance of employing these resources in a manner that secures the rights of current and future generations. It also includes ensuring equitable distribution of wealth and maintaining the integrity of natural resources.

A close connection exists between green economy initiatives and sustainable development. These findings resonate with the broader understanding of sustainable development. ‘Sustainable development’ is not merely related to the growth of the economy but also to the responsible stewardship of natural resources, which guarantees that future generations inherit a viable and thriving environment

The transformation in the direction of the green economy is increasingly recognized as a vehicle for sustainable development. According to the United Nations Regional Information Centre for Western Europe (UNRIC, 2022), a green economy enables the door of employment *via* substantial investments in renewable energy and sustainable infrastructure, also nurturing economic growth while enhancing the well-being of the community. For instance, investments in the clean energy sector might lead to the creation of hundreds of thousands of new jobs, improving social stability and the economy.

Any society's growth, prosperity, and development are based on the green economy. The green economy is the ultimate model for sustainable development (Houssam, *et al.*, 2023).

In particular, SDG 13 on climate action, SDG 3 on health and well-being, and SDG 12 on responsible consumption and production—which link environmental sustainability with social and economic advancement—are all directly supported by this program.

The green economy acts as a mediating variable in achieving sustainable development by facilitating the adoption of environmentally friendly practices and fostering a healthy environment. Below cited are examples that illustrate the transition from harmful economic practices to more sustainable alternatives:

- **Energy:** Relying less on fossil fuels and more on sustainable sources, such as generating thermal energy from renewables for mitigating environmental pollution and protecting all forms of life.
- **Transportation:** Shifting from using gasoline-fueled vehicle to using electric automobiles that are powered by renewable energy sources, such as solar or wind.
- **Energy Production:** Shifting from coal-fired power plants to solar farms or wind turbines for electricity generation.
- **Building Construction:** Implementing green building practices, such as using sustainable materials and incorporating energy-efficient designs, instead of traditional construction methods that rely heavily on resource-intensive materials.
- **Agriculture:** Adopting organic farming techniques and reducing reliance on chemical pesticides and fertilizers, which harm ecosystems and human health.
- **Waste Management:** Implementing recycling and composting programs to divert waste from landfills and reduce pollution, as opposed to relying solely on landfill disposal methods.
- **Water Usage:** Allocating resources towards water-saving technology and techniques, such as drip irrigation and rainwater collection, to effectively preserve water resources in comparison to traditional irrigation systems.
- **Manufacturing:** Welcoming the concepts of a circular economy by designing products with strength, serviceability, and capacity for recycling in mind, as opposed to developing products with planned obsolescence, which contributes to waste and the depletion of resources.
- **Food Production:** Advocating for the adoption of plant-based diets and the reduction of meat consumption as a means to decrease the release of greenhouse gases linked to livestock rearing and to alleviate environmental deterioration.
- **Tourism:** Developing eco-tourism initiatives that prioritize conservation and community involvement over mass tourism, which can lead to habitat destruction and cultural erosion.
- **Financial Investments:** Redirecting investments to renewable energy projects and sustainable enterprises that place emphasis on socioenvironmental

Greening the Future: A Comprehensive Analysis of ESG Mutual Funds in India as a Sustainable Investment Trend

Priya Arora^{1,*} and Kavita Sharma¹

¹ University School of Business, Chandigarh University, Mohali, Punjab, India

Abstract: While making investment decisions, Indian investors have begun to place an increasing amount of importance on Environmental, Social, and Governance (ESG) considerations, as seen by the substantial increase in sustainable investments in India in recent times. The Indian mutual fund industry now offers ESG-focused mutual funds as a sustainable investment choice. These funds are attractive to investors who wish to align their financial goals with their ethical principles by investing in businesses committed to sustainable practices. The current study's goal is to examine the growth pattern of ESG-focused Indian mutual funds since the inception of the first ESG fund. It is an empirical study based on secondary data sources. The growth of this sector is assessed using metrics like Assets Under Management (AUM), total capital inflows into the industry, and the number of ESG funds formed over time. Another goal of the research is to assess the financial and ESG performance of these mutual funds, thereby addressing the information gap regarding the comprehensive study of sustainable funds in India. In terms of ESG funds, India is still in its infancy. Before October 2020, Indian investors had limited options for ESG funds. However, since then, several asset management companies have introduced ESG-focused investments. As of January 31, 2022, there were ten ESG-focused mutual fund schemes in India, collectively managing assets of more than INR 12,000 crore. This research highlights the evolving landscape of sustainable investments in India and underscores the growing relevance of ESG at the time of investment decision-making.

Keywords: Carbon intensity, Climate change, Corporate governance, Environmental, ESG reporting, ESG score, ESG, Ethical investment, Governance, Investment trend, Mutual fund, Social investments, Social, Sustainability, Sustainable finance, Sustainable investment.

* Corresponding author Priya Arora: University School of Business, Chandigarh University, Mohali, Punjab, India; E-mail: priya712@gmail.com

INTRODUCTION

Today, sustainability is no longer relegated to the sidelines as a concern solely for corporate social responsibility departments; rather, it has become a focal point for investors with financial objectives (Rahi *et al.*, 2024). This shift can be attributed to three primary factors: evolving investor preferences, the alignment of sustainable finance with nonfinancial objectives, and its increasing recognition of financial significance (Edmans & Kacperczyk, 2022a).

ESG investments are a way of sustainable finance, which includes the consideration of environmental, social, and governance factors along with financial considerations while making investment decisions (MSCI ESG Research, 2018). The origins of ESG investing may be traced back to 1960, when investors in South Africa began to avoid stocks and the tobacco sector as a whole (MSCI ESG Research, 2018). By following the UN Principles of Responsible Investment 2006, investors are now better equipped to align their investment strategies and interests with the goals of society. Moreover, the adoption of the 17 Sustainable Development Goals (SDG) by the UN in 2015 brought about a significant shift in the global investment climate (Sustaino Metric, 2022). Asset managers, analysts, and investors frequently employ ESG criteria to help them make better investment decisions since businesses with good ESG implementations are in a better status to navigate risks and grab opportunities in a rapidly evolving business landscape (Jain & Winner, 2016). Investors can assess and analyse businesses according to their ESG policies by using ESG ratings, indexes, or particular ESG indicators. Furthermore, there is a growing trend in corporate reporting and disclosure where businesses are increasingly providing detailed information on their sustainability and ESG performance within their financial reports. To standardize this disclosure and enhance the assessment of ESG factors, the “Business Responsibility and Sustainability Report” (BRSR) is introduced by SEBI. This mandate requires publicly traded companies to furnish information about the nine principles encompassing environmental and social issues (SEBI, 2022). Additionally, as part of its goal to enhance market functioning, CRISIL Ltd. released the ESG scores of 225 Indian businesses across 18 industries based on quantitative and qualitative disclosures from the company (CRISIL, 2021). The basic reasons behind the adoption of ESG include elements such as deforestation, extreme weather, mass migration, air pollution, drought, flood risk, tax transparency, and data security vulnerabilities that pose a danger to global sustainability and put investors at risk, as well as force them to switch to a different investment approach (MSCI ESG Research, 2018).

Looking over the importance of ESG investments, the current article examines ESG funds as a feasible investment option in India, with a focus on the field of

ESG investing. These funds, which are mainly bonds and shares, carefully select the businesses that have completed extensive due diligence in the areas of ESG (He *et al.*, 2023). ESG-focused mutual funds available in India include the “ICICI Prudential ESG Fund,” “Invesco India ESG Equity Fund,” “Quantum India ESG Equity Fund,” “Axis ESG Equity Fund,” “Quant ESG Equity Fund,” “Kotak ESG Opportunities Fund,” “Aditya Birla Sun Life ESG Fund,” “SBI Magnum Equity ESG Fund,” “Mirae Asset ESG Sector Leaders FoF,” and “HSBC Global Equity Climate Change FoF.” There is a growing necessity for comprehensive studies that delve into various aspects of ESG funds' impact and potential in India.

The current study makes a substantial contribution to India's limited body of research on ESG mutual funds. Its primary objectives are as follows:

- To study the current status and the growth pattern of ESG funds in India.
- To examine the financial and ESG performance of Indian ESG funds.

The purpose of this study is to give investors and policymakers a thorough understanding of the performance and growing status of ESG investments in the Indian market.

The remaining part of the chapter is structured into the following sections. 2nd section includes a review of relevant literature, summarizing previous research on the topic. Section 3 provides a detailed explanation of the methodology, including data-collection methods and analysis methodologies. Section 4 explains the findings of the investigation, presents the results, and initiates the discussion with interpretations and insights from the data. In Section 5, the paper is finally concluded with a summary of the major outcomes and a discussion of their implications.

LITERATURE REVIEW

Literature on sustainability in finance often encompasses various concepts, including Socially Responsible Investing (SRI) and sustainable finance (Martiny *et al.*, 2024; Edmans & Kacperczyk, 2022), which are sometimes used interchangeably as they share a common goal of including ESG factors in the decision-making while investing.

“Socially responsible investing means taking the investment decision on the basis of both financial and social performance” (Hutton *et al.*, 1998).

Berry & Junkus (2012) discovered that under SRI, investors take into account the environmental and sustainable aspects, use an integrated approach, and reward firms with exemplary behaviour as opposed to banning them due to certain

Sustainable Investing: Unlocking the Transformative Potential of Sustainable Finance to Bridge Gaps in Emerging Markets

Madhusudan Narayan^{1*} and FCS Pooja Shukla²

¹ Amity Business School, Amity University Ranchi, Jharkhand, India

² Amity College of Commerce and Finance, Amity University Ranchi, Jharkhand, India

Abstract: Purpose

This study explores the transformative potential of sustainable finance in emerging markets, emphasizing its role in fostering economic growth while advancing Environmental, Social, and Governance (ESG) outcomes. It addresses significant research gaps, including the lack of tailored regulatory frameworks, insufficient capacity-building, and the need for effective multi-stakeholder collaboration.

Design/Methodology/Approach

The research utilizes a qualitative approach, combining academic articles, industry reports, case studies, and qualitative interviews to explore how sustainable finance can bridge gaps in emerging markets. The study focuses on legislative frameworks, ESG data availability, and socio-political factors, employing thematic analysis to identify patterns and insights.

Findings

The study reveals that sustainable finance can drive economic growth through investments in renewable energy, green infrastructure, and sustainable agriculture. It highlights challenges such as inconsistent ESG data, underdeveloped regulatory frameworks, and socio-political complexities that impede widespread adoption. Case studies from China, India, and Latin America illustrate both the potential and the hurdles of sustainable finance in diverse contexts.

Practical Implications

The research provides actionable recommendations for policymakers, financial institutions, and stakeholders, including the need for robust regulatory standards, improved ESG data quality, and enhanced capacity-building efforts. It advocates for

* Corresponding author Madhusudan Narayan: Amity Business School, Amity University Ranchi, Jharkhand, India; E-mail: msnarayan07@gmail.com

public-private partnerships and multi-stakeholder engagement to create a supportive environment for sustainable finance.

Originality/Value

This study offers novel insights into the application of sustainable finance in emerging markets, highlighting its potential to reshape these economies. It contributes to understanding how finance can act as a catalyst for sustainable development and addresses systemic obstacles to advancing global sustainability efforts.

Keywords: Data-driven decision-making, Economic growth, Emerging markets, ESG, Regulatory frameworks, Sustainable finance.

INTRODUCTION

Sustainable finance has emerged as a fundamental tool in the global economic debate, essential for promoting global sustainable development. As the global community emphasizes the integration of Environmental, Social, and Governance (ESG) principles within financial institutions, sustainable finance has become a key catalyst for this change. This is especially true in emerging markets, where fast economic growth and significant developmental issues bring both substantial potential and complex constraints.

Sustainable finance involves a range of financial methods and tools designed to integrate ESG criteria into decision-making, aiming not only to achieve financial returns but also to generate positive social and environmental impacts. This approach is part of a broader sustainability movement that seeks to balance economic growth with environmental stewardship and social equity.

The significance of sustainable finance is underscored by the urgent need to tackle global environmental issues, such as climate change, biodiversity loss, water scarcity, and air pollution, along with socio-economic challenges like poverty, inequality, and governance failures. By directing investments towards sustainable and ethical enterprises, sustainable finance offers a viable solution to these critical problems.

The integration of sustainable finance practices into emerging markets and the role of Environmental, Social, and Governance (ESG) factors have become pivotal in promoting economic development and environmental stewardship. Recent studies highlight the importance of transparency in ESG disclosures, noting that while transparency is essential, it is not sufficient by itself to ensure meaningful progress (Ameli *et al.*, 2021; Baker *et al.*, 2018). Moreover, ESG disclosures are found to influence stock returns in emerging markets, signaling a growing recognition of sustainability in financial markets (Hossain *et al.*, 2021).

The role of green bonds as a tool for financing climate change response is further emphasized, with researchers pointing to the significant pricing and ownership dynamics surrounding US green bonds (Baker *et al.*, 2018).

In addition, the impact of sociopolitical instability on sustainable finance implementation has been explored, suggesting that stability is crucial for fostering long-term investment in sustainable projects (Martinez & Williams, 2021). On the policy front, the regulatory frameworks governing corporate responses to climate change have evolved, with cross-country comparisons highlighting various strategies for integrating sustainability (Sullivan & Gouldson, 2017). The role of banking, monetary policy, and fintech in advancing sustainable finance, especially in emerging economies, is also a focal point of current research (Campiglio, 2016; Nassiry, 2018; Taghizadeh-Hesary & Yoshino, 2019). These developments underscore the need for coordinated global action to promote a low-carbon economy, with contributions from both the private and public sectors (Boffo & Patalano, 2020; Weber, 2016).

Furthermore, challenges in the adoption of sustainable finance practices are noted, with capacity constraints often hindering progress (Turner & Lang, 2019). However, scholars agree that strategic management frameworks, such as Freeman's stakeholder theory, can offer valuable insights for firms aiming to integrate sustainability into their business models (Freeman, 1984). The overarching goal remains to balance economic growth with environmental and social responsibility, a vision that is increasingly reflected in corporate governance practices and investment decisions (Eccles & Serafeim, 2013; Zhou *et al.*, 2020).

In emerging markets—such as those in Asia, Africa, Latin America, and Eastern Europe—which possess substantial development potential and natural resources but face significant obstacles like inadequate infrastructure, political instability, and deep inequality, sustainable finance is particularly important. It provides essential resources to address developmental challenges while promoting sustainability, aligning with the United Nations' Sustainable Development Goals (SDGs) to eradicate poverty, protect the environment, and ensure prosperity for all by 2030.

Sustainable finance can revolutionize emerging countries by promoting economic growth, social development, and environmental responsibility. Sustainable finance can deliver significant benefits by aligning financial systems with ESG principles, such as job creation, technological innovation, increased quality of life, and better environmental results. This section explores the revolutionary potential

Sustainable Investing: Unveiling the Drivers of Sustainable Consumption Patterns for a Greener Future

Kavita Ingale¹, Shweta Shirolkar¹ and Babasaheb Jadhav^{2,*}

¹ MIT World Peace University, Pune, Maharashtra, India

² Dr. D. Y. Patil Vidyapeeth (Deemed to be University), Global Business School & Research Centre, Pune, Maharashtra, India

Abstract: As environmental concerns continue to increase, green consumption, which emphasizes the development, marketing, and promotion of products based on ecological benefits, has gained importance. This study aims to examine the impact of green marketing measures on consumer behavior. It continues to explore the relationship between consumers' attitudes towards the environment and their actions towards the environment. In addition, this study also investigates the possibility of integrating green practices into daily life.

This study delves into the multifaceted factors influencing consumer behaviors that favor sustainability, offering insights into how these behaviors can be fostered and amplified. This research identifies key motivators and barriers to sustainable consumption by analyzing socio-economic, cultural, and psychological determinants. The findings highlight the significant role of fostering consumer awareness and their engagement in societal and environmental preservation and the creation of supportive infrastructure using green marketing initiatives for the promotion of sustainable consumption.

This study used Partial Least Squares Structural Equation Modeling to analyze data collected from 100 of the 112 participants at the beginning of the survey. The findings reveal novel insights, demonstrating positive influences of the perceived importance of green products, the identification of green goods, as well as branding and packaging on green consumerism. The model presents compelling evidence for encouraging consumer participation in environmental sustainability efforts. These results underscore the potential of green marketing strategies to foster environmentally responsible consumption behaviors.

Keywords: Consumer purchase, Environmental awareness, Green consumerism, Green marketing, Green production, PLS-SEM, Sustainable consumption.

* **Corresponding author Babasaheb Jadhav:** Dr. D. Y. Patil Vidyapeeth (Deemed to be University), Global Business School & Research Centre, Pune, Maharashtra, India; E-mail: babasaheb.jadhav@dpu.edu.in

INTRODUCTION

As natural resources become scarce, people face great challenges in producing and using products responsibly. The way we currently make and dispose of things causes problems such as resource use, climate change, and environmental damage. The term “green food” has been studied by many experts and has become important to people and communities. This is due to the increasing issues of sustainability, environmental concerns, and the need for more sustainable lifestyles (Johnstone and Tan, 2015). Sustainable consumer behavior means choosing to buy products that are recycled, not tested on animals, made from organic and natural materials, and safe for the environment. Researchers found that environmental concerns have increased due to the awareness of environmental and natural issues. This may influence their choice to purchase environmentally friendly products (Siddique *et al.* 2010).

Sustainability means making sure that the way we use resources today helps improve life for future generations without harming their health. Sustainability is mainly about using what we already have instead of using up more resources. People who create rules and experts have recently become interested in sustainability and actions that support it. Green marketing involves actions meant to promote products and share information in a way that meets people's needs while reducing harm to the environment. Using the points made before, spend an hour watching how customers shop, what they think about products, and how they make healthy choices.

Objectives of the Study

- a. To investigate the predictors of sustainable consumption patterns.
- b. To analyze the relationships between the predictors and sustainable consumption behavior.

LITERATURE REVIEW

Environmental Concern

The use of technology as a method of making life easier for humanity has come at a price. Pollution and climate change wreak havoc on the environment as civilization and economies develop. As a result, it is necessary to adopt a more responsible lifestyle that decreases technology and consumerism's environmental impact. Green consumption has emerged as a viable method of reducing environmental impact without compromising consumption quality. This type of consumerism involves buying green goods that are a more eco-friendly alternative to commonly available options. (Liobikienė & Bernatoniene, 2017)

The functional value of a product means how well it works based on what it is designed to do and the key features it has (Wang and others). In 2004, people thought that working efficiently affects how well customers are managed. The energy that green products give out depends on how well they work when used. (Sub Qi, 2013). Also, this type of business can affect how human development, social responsibility, and sustainable development move forward (Valentinov, 2013).

People want to know about how good products are for the environment and how many eco-friendly products there are. By using eco-friendly products, studies show that what consumers plan to buy can affect the environment and support renewable energy (BANG *et al.*, 2000), as well as products that help protect the environment (Kalafatis, *etc.*). Cornwell (1991) focused on specific groups (Alwitt & Berger, 1993) and overall environmental protections (Abeliotis *et al.*, 2010). Bamberg (2003) and Franceson & Garling (1999) have talked about the basic ideas related to the general environment.

Against the backdrop of growing environmental consciousness and stringent regulatory compliance, a larger number of organizations are aiming at compliance with corporate social responsibility norms (Davies *et al.*, 2012). Improved regulatory compliance on social and environmental fronts has resulted in improved organizational performance (Tang *et al.*, 2012). The different demographic groups have different willingness to pay premiums (Royne *et al.* (2011). The study also reveals that people with higher environmental concerns exhibit more willingness to pay. Additionally, youths are substantially more ready to spend money on eco-friendly goods than their older counterparts. These findings imply that to promote the purchase of such items, awareness messages may be required (Royne *et al.*, 2011).

Fraj-Andrés and Martínez-Salinas (2007) validated the concept and framework on a random sample of 573 participants. The research results show that environmental behavior and environmental awareness are constructs that influence ecological behavior. Individuals who show significant environmental commitment are ecological consumers who are interested in and concerned about the environment (Flaghi-Andrés and Martinez-Salinas, 2007).

Environmental Awareness of the Consumer

The investigation of the effects of a “green network effect” in an economy implies that a rise in the size of green (brown) product consumers will boost each green (brown) consumer's pleasure where there is competition between businesses over both product prices and environmental quality (Brécard, 2013). It is also demonstrated that this externality paradoxically lowers product environmental

CHAPTER 14

Sustainable Investing: AI-driven Air Pollution Monitoring in Smart Cities

Renuka Deshmukh¹, Babasaheb Jadhav^{2,*}, Rishikaysh Kaakandikar³ and Ahuti Mishra⁴

¹ *School of Business, Dr. Vishwanath Karad MIT World Peace University, Pune, Maharashtra, India*

² *Dr. D. Y. Patil Vidyapeeth (Deemed to be University), Global Business School & Research Centre, Pune, Maharashtra, India*

³ *SaiBalaji International Institute of Management Sciences, Maharashtra, India*

⁴ *Adjunct Faculty, Symbiosis Centre for Management Studies, Symbiosis International (Deemed University), Pune, Maharashtra, India*

Abstract: For every living thing on the planet to exist and flourish, air is essential. Air pollution is a critical issue that significantly impacts public health, environmental sustainability, and economic development, especially in developing nations. The rapid urbanization and industrialization in these regions have exacerbated air quality problems, necessitating the deployment of innovative digital solutions to monitor and manage pollution effectively. This chapter explores the role of digital technologies in air pollution monitoring within the context of smart cities in India.

Purpose

To reduce air pollution and promote best practices, efforts must be made to fortify regional cooperation and enable a wider exchange of creative solutions, including strategies, regulations, data, and technology, alongside the capacity requirements. To control air pollution in a few selected developing nations, this research study analyses the tactics, best practices, and enabling policies that support its adoption.

The principal aim of this investigation is to examine and analyze innovative digital solutions for air pollution monitoring intelligently planned towns using digital technologies, particularly emphasizing the policies, strategies, and best practices that can be effectively implemented in the developing nation of India.

* **Corresponding author Babasaheb Jadhav:** Dr. D. Y. Patil Vidyapeeth (Deemed to be University), Global Business School & Research Centre, Pune, Maharashtra, India;
E-mail: babasaheb.jadhav@dpu.edu.in

Methodology

This study aims to explore new technological advancements and digital strategies that can promote environmental consciousness and help achieve the sustainable Development goals. It draws upon an in-depth analysis of existing literature, desk research, and expert interviews.

Outcomes

This research offers information-based, tactical, as well as environmentally friendly smart city solutions. This study highlights the potential of cutting-edge technology and models in air quality prediction. The study examines how cities can use these pervasive technologies in conjunction with conventional approaches to enhance air quality governance and enhance quality of life. The study centers on the technologies of the Fourth Industrial Revolution, which are transforming metropolitan giants globally. These technologies include the Worldwide Web, massive amounts of data, AI, smartphones, networking sites, and cloud services. The goal of this study is to increase knowledge about the consequences of air pollution exposure and to further decrease health-threatening dangers.

Originality

The research offers insights into the market, data, case studies, innovative technologies, transfer and development of technology trends, good practices, and analysis of pertinent air pollution and health impact issues. It attempts to raise member state stakeholder's technological acumen to meet the demands of the fast-paced business and technology environment of today.

Keywords: AI, Blockchain technology, Climate change, Cloud computing, Digitalization, Energy, Fintech, Industrial revolution, Innovation, IoT, SDG.

INTRODUCTION

Research on “Air Pollution and Monitoring Technologies”, has gained good traction in the past decade (Vilcins D *et al.* 2024). Air pollution is ranked as the principal maker of Global Disease Burden (GBD 2021 Risk Factors Collaborators, 2024). The remarkable surge in literature could be attributed to the well-established correlation between economic progress and environmental damage, which has been extensively studied (Jasińska-Biliczak A and Ikwuwunna E, 2023). The rising interest in the topic received further attention and support from the government and other regulatory bodies as it was directly contributing towards the fulfillment of the following Sustainable Development Goals (SDGs) namely Good Health & Well-Being (SDG 3), Industry Innovation and Infrastructure (SDG 9), Sustainable Cities & Communities (SDG 11), Climate Action (SDG 13) that focuses on the relationship between technological advances and the planet in business studies (F.O. Agyeman *et al.* 2023). Scholars believe

that the appearance of research in technological innovations to control air pollution dates to the early 1960s in the administration study findings, wherein scholars such as John H. Ludwig (1965); Katz *et al.*, (1977); Paul B. Downing and Lawrence J. White (1986); Selden T, Song D (1994) advocated authorities must implement and uphold legislation, supporting innovations and devices, and financial incentives to assist nations in tracking and lowering airborne contaminants. Also, further, this topic got momentum because of its dangerous impacts on health (Mannucci, P.M.; Franchini, M., 2017).

To prevent serious implications on well-being, government entities must work together to track contamination extents. However, forecasting airborne pollutants is difficult because of the impact of numerous variables, including distinct distributions in time and space and certain elements that may trigger an abrupt shift in the air quality index that consequently influences the assessment of air quality.

Thus, the creation of an algorithm that can forecast using the latest innovations like artificial intelligence (AI) is imperative. John McCarthy initially used the expression artificial intelligence (AI) in 1956 to describe the ability of machines to mimic intelligent human conduct. To construct intelligent systems, this multifaceted discipline draws on the fields of computing, psychological sciences, the field of language, theology, and other disciplines. To accomplish activities that would typically need human intellect, such as comprehending natural speech, identifying trends, finding solutions, and arriving at judgments, these systems are constructed by building programs and simulations.

The industrial shift employing integrated and intelligent architecture is making cities with smart technology more and more prominent (Muhuri, *et al.*, 2019). According to Mora *et al.*, (2019), a smart city is defined as one in which data and technological innovations are extensively used to generate efficacy for long-term viability, higher standards of existence, and prosperity. Inevitably AI has become an explosive subject in many urban policy circles when it comes to turning towns into intelligent ones, particularly for policymakers and city planners who are searching for a technological solution to serious metropolitan problems (Kassens-Noor & Hintze, 2020). AI remains to be a revolutionary innovation that holds the potential to revolutionize every industry and facet of everyday existence, spanning technology, economics, gaming, wellness, farming, and mobility (Cugurullo, 2020).

AI now serves as the main driving force behind worldwide smart city programs (Singh *et al.*, 2020). The increasing recognition of tech-based digital solutions serves as workable answers to the many intricate issues related to gentrification,

Sustainable Investing: The Impact of Workplace Design and Inclusive Culture on Employee Productivity and Well-being

Shilpi Upadhyay^{1,*} and Sayali Kulkarni¹

¹ School of Management, Avantika University, Ujjain, Madhya Pradesh, India

Abstract: In today's dynamic work environments, sustainable workplace design and inclusive corporate culture are critical in shaping employee well-being and productivity. This study shows the results of a comprehensive survey analysis aimed at determining how these two essential factors influence employee experiences and outcomes across various domains. The study specifically examines the impact of sustainable workplace design, which includes components such as ergonomics, lighting, layout, and aesthetics, on employee well-being. Simultaneously, it investigates how an inclusive work culture that prioritizes communication, work-life balance, recognition, and autonomy impacts employee productivity. The combination of Environmental, Social, and Governance (ESG) principles gives a comprehensive view, emphasizing the relationship between sustainable design and inclusive culture.

This study contributes to continuing discussions about establishing supportive, productive, and rewarding work environments, providing practical insights for firms looking to improve employee well-being and productivity by integrating design, culture, and ESG considerations.

Keywords: Employee productivity, Employee well-being, ESG, Inclusive culture, Sustainable workplace design, Workplace ergonomics.

INTRODUCTION

Background and Study Context

In the modern period, the characteristics of the workplace have undergone significant changes. Due to the changes in worker demographics, technological advancements, and evolving employee expectations, traditional hierarchies and

* Corresponding author Shilpi Upadhyay: School of Management, Avantika University, Ujjain, Madhya Pradesh, India; E-mail: shilpi.upadhyay@avantika.edu.in

cubicles have been replaced by open-plan offices and flexible organizational structures. The physical workspace that individuals occupy is now more than just a place of employment; it plays a vital role in fostering well-being, creativity, and productivity. In addition, the contemporary focus on sustainability and social responsibility has made the ESG framework a crucial factor in workplace culture and design. Most people agree that an organization's culture has a great influence on how its employees behave, feel about their jobs, and perform. Productivity rises in a supportive work environment that values independence, acknowledgments, communication, and a work-life balance. By addressing environmental sustainability, incorporating ESG principles into operations enhances the environment.

The employment experience has changed dramatically since the 1980s because of important developments and trends. Conventional office-based work environments with cubicle arrangements and hierarchical hierarchies were common in the 1980s.

It was essential to adhere to corporate policies and standards, and office layouts were designed with productivity over employee welfare in mind. Although ESG principles were starting to emerge, their application in the workplace was still restricted. The advent of personal computers and internet connectivity in the 1990s brought about a significant transformation in employment practices. Notwithstanding technology constraints, remote work began to gain traction. Ergonomic furniture and computer workstations were added to workplaces to accommodate new technologies, and organizational culture changed to become more flexible and creative. As people became more conscious of social and environmental issues, ESG factors became more important.

The 2000s marked a period of great digital transformation, with the rise of virtual collaboration and remote work made possible by technological advancements. To enhance collaboration and communication, open-plan designs and adjustable workstations became popular. After recognizing the importance of employee involvement and work-life balance for productivity, organizational culture started to place a strong emphasis on these factors. Deeper ESG integration resulted from businesses adopting sustainable practices and corporate governance standards. Activity-based and coworking spaces, which promote mobility and flexibility, were introduced in the 2010s. Diversity and inclusivity have taken center stage in company culture, promoting psychological safety and a sense of community. ESG principles gained widespread acceptance and had a big impact on corporate strategy and decision-making.

The COVID-19 pandemic in the 2020s contributed to a significant shift in the workplace towards hybrid work models that combine in-office and remote labor. This shift boosted the acceptance of remote work. It became imperative to make

investments in digital infrastructure and ergonomic home office designs. Organizational culture adjusted to the difficulties of remote work by placing a strong emphasis on well-being, communication, and trust. With an emphasis on social equity, community involvement, and resilience in distant and hybrid work environments, ESG integration grew.

In contrast, productivity-driven cubicles from the 1980s gave way to flexible and ergonomic designs in the 1990s, open-plan offices in the 2000s, activity-based coworking spaces in the 2010s, and hybrid models in the 2020s when it came to physical workplace design. From hierarchy and conformity in the 1980s, to creativity and teamwork in the 1990s, work-life balance and employee involvement in the 2000s, inclusivity, and diversity in the 2010s, and trust and well-being in remote work in the 2020s, organizational culture has changed over time. From the early conceptual stages in the 1980s to growing awareness in the 1990s, wider adoption in the 2000s, general acknowledgment in the 2010s, and a stronger emphasis on social justice and resilience in the 2020s, ESG integration has developed.

From its infancy with little impact on employment practices in the 1980s, AI integration developed over a similar trajectory: in the 1990s, basic tools were deployed early; in the 2000s, AI-driven analytics were introduced; in the 2010s, its use in employee engagement and HR administration increased; and in the 2020s, its widespread use for virtual teamwork, remote work coordination, and tracking employee well-being emerged. AI today facilitates data-driven decision-making and employee experience personalization, illustrating how the workplace is always changing to adapt to new developments in technology, societal shifts, and world events.

Workplace design, employee well-being, and sustainability have been shown to impact productivity and employee satisfaction significantly. Studies highlight how the physical and ergonomic aspects of work environments can enhance productivity, particularly in university settings (Hanif & Saleem, 2020). Additionally, employee happiness, often tied to wellbeing programs, contributes positively to organizational outcomes, with Indian universities being a specific example (Singh & Sharma, 2021). The integration of ergonomics and sustainability in workplace design further boosts performance, with research suggesting a clear link between these elements (Firescu, 2022). Employee wellness programs are crucial in promoting not only physical health but also mental wellbeing, thereby influencing overall productivity (Jackson, 2022). Furthermore, the role of green behaviors in organizational sustainability has become a central focus, with studies showing that employees' engagement in environmentally friendly practices supports sustainable outcomes (Sharma, 2022).

Role of the Internet of Things (IoT) in Monitoring Environmental Effectiveness

Neelam Verma^{1*}, Supriya Pathak¹ and Rishikaysh Kaakandikar²

¹ Faculty of Management, Oriental University, Indore, Madhya Pradesh, India

² SaiBalaji International Institute of Management Sciences, Pune, Maharashtra, India

Abstract: The phrase “Internet of Things” has been coined to characterize the rise in regular items' access to the Internet. While advances in wireless networks of sensors have led to highly energy-efficient designs, significant improvements in accessibility and compatibility are still needed before they can be considered indispensable instruments for environmental research. This chapter demonstrates how environmental sensor networks might be thought of as naturally evolving toward the Internet of Things (IoT). This study reviews the diverse designs and implementations of IoT systems and outlines the key technological challenges that must be addressed moving forward. We address the role of online and technology related to the internet, as well as atmospheric and Earth scientific sensors, in describing an increasingly interconnected world.

Purpose

The principal aim of this investigation was to examine and analyze innovative digital solutions for air pollution monitoring intelligently planned towns using digital technologies, particularly emphasizing the policies, strategies, and best practices that can be effectively implemented in the developing nation of India.

Methodology

The purpose of this research was to investigate new digital tactics and technology developments that can raise environmental awareness and aid in the achievement of the Sustainable Development Goals. It makes use of expert discussions, data collection, and a thorough examination of the body of current literature.

* Corresponding author Neelam Verma: Faculty of Management, Oriental University, Indore, Madhya Pradesh, India; E-mail: vermaneelam93311@gmail.com

Outcomes

As a result of globalization, an entirely novel model has emerged in which conventional industries, including the agricultural sector, employ cutting-edge technologies to expand their potential and bring in the age of Agriculture and intelligent farming. This sector of the economy must change with the times by using resources responsibly and efficiently.

Originality

The study provides industry insights, statistics, case studies, best practices for emerging technologies, and evaluations of environmental and medical impacts. It aims to improve the technical savvy of the nation's participants in order to satisfy the expectations of modern rapid commercial and advancements in technology.

Keywords: AI, Digitalization, Energy, Environment, Innovation, IoT and Climate Change, IoT, SDG, Smart agriculture, Smart Sensors, Sustainable development, Water Quality.

INTRODUCTION

The 21st century's mounting environmental issues such as contamination, depletion of resources, and climate change—call for creative solutions that go beyond traditional methods. With its network of connected gadgets, instruments, and sensor data analytics, the Internet of Things (IoT) has become a disruptive technology that can solve these issues within the framework of SDGs. Educated decision-making processes, automatic reactions, and continuous surveillance are just a few of the possibilities that the Internet of Things presents to improve environmental performance. In particular, the programs of IoT in the areas of SDG:

- Waste Disposal
- Reducing Energy Consumption
- Water Usage Reduction
- Environment Evaluation
- Garbage Disposal

They are highlighted in this chapter that investigates the role of IoT in environmental wellness monitoring. Solutions based on the Internet of Things can facilitate fast and efficient decision-making by researchers, elected officials, and citizens to minimize the degradation of the environment by offering a continuous flow of data. This study aims to describe the ways in which Internet of Things (IoT) technologies might support sustainable development, highlighting the

potential benefits as well as the obstacles that come with putting them into practice.

It is believed that this research will catalyze additional studies and useful IoT applications in the field of environmental protection, helping to pave the way for a time when ecology and technology coexist peacefully on Earth.

Despite the fact that the term “Internet of Things” (IoT) has been defined from a variety of angles, experts generally agree on the following definition: The Internet of Things (IoT) is an evolving, worldwide network architecture that can self-configure utilizing standard, interconnected communication technologies (Oke *et al.*, 2022). Both virtual and tangible “things” can be easily incorporated through a computer network that possesses opinions, physical characteristics, and virtual personality traits in addition to knowledgeable interfaces (Martín-Garín *et al.*, 2018). IoT is now generally acknowledged as a viable technology with the potential to revolutionize business and society in SDG (Motlagh .H. *et al.*, 2020). It can accomplish a seamless connection of numerous components that include social media, monitoring, proof of identity, interpreting, interactions, and actuating characteristics (Huang and Kieffer ., 2019). A network of wireless sensors is essential to computer networks, databases, and the Internet of Things (Xu *et al.*, 2019).

Background of Internet of Things (IoT)

The Internet of Things, or IoT, is a generic term for a system of interconnected gadgets that includes the technology behind it that enables interaction among sensors and the cloud (Sunyaev and Sunyaev., 2020). As a result of the creation of cost-effective processors for machines and high-bandwidth connections, billions of gadgets are currently online (Gupta *et al.*, 2020). This implies that commonplace appliances like vacuums, vehicles, machinery, and brushes may employ sensing to gather information and react to consumers wisely (Madakam *et al.*, 2015). Each day, “things” are connected to the World Wide Web through the Internet of Things (Kopetz *et al.*, 2022). In the 1990s, software developers began incorporating detectors and processing units into commonplace items (Gyrard *et al.*, 2016). Nevertheless, since the computer chips were large and heavy, development started slowly. RFID labels, which are inexpensive computing devices, were initially employed to track pricey apparatus. Over time, these processors also got quicker, more compact, and wiser as computer devices got narrower (Holler *et al.*, 2014).

The Internet of Things (IoT) is now recognized as a disruptive technology, altering several areas, particularly environmental monitoring and administration (Gubbi *et al.*, 2013). IoT makes it possible to collect and analyze information

SUBJECT INDEX**A**

Accountability 1, 6, 7, 10, 11, 12, 13, 15, 34, 41, 42, 52, 60, 86, 93, 97, 107, 110, 125, 137, 139, 149, 154, 160, 162, 166, 168, 170, 176, 178, 189, 190, 207, 251, 315, 319

Adoption 109, 120, 181, 190, 192, 216, 223, 230, 251, 253, 254, 255, 258, 259, 261, 264, 267, 290, 316, 321, 339

Agriculture 54, 98, 118, 119, 120, 127, 200, 251, 258, 259, 264, 265, 335
sustainable 54, 98, 118, 119, 120, 127, 200, 251, 258, 259, 264, 265, 335

Air pollution 223, 249, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 326, 331, 335

Alignment 12, 26, 54, 90, 106, 112, 208, 242, 265, 308

B

Benchmark index 72, 73, 76, 77, 78, 226, 227, 235, 236

Blockchain 1, 2, 6, 7, 10, 85, 167, 171, 174, 175, 176, 189, 191, 213
technology 1, 2, 6, 7, 10, 85, 167, 171, 174, 175, 176, 189, 191, 213

Business practices 92, 230, 258, 322

C

Capacity-building 217, 248, 254, 255, 256, 257, 258, 262, 265, 266, 267
initiatives 248, 254, 255, 256, 257, 258, 262, 265, 266, 267

Capital allocation 83, 188, 192, 258, 317, 322, 324

Carbon emissions 53, 55, 95, 127, 138, 241, 263, 339

D

Data analytics 14, 132, 165, 167, 171, 174, 175, 176, 189, 191, 213, 318, 327, 329, 331, 335, 339, 340
big 167, 171, 174, 175, 176, 189, 191, 213, 318, 327, 329, 331, 335, 339, 340

Data availability 248, 250, 254, 255, 256, 257, 258, 262, 264, 265, 266, 267, 270, 318, 321, 324

ESG data 248, 250, 254, 255, 256, 257, 258, 262, 264, 265, 266, 267, 270, 318, 321, 324

Data integrity 6, 7, 10, 85, 167, 171, 174, 175, 176, 189, 191, 213, 318, 327, 329, 331, 335, 339, 340
transparency 6, 7, 10, 85, 167, 171, 174, 175, 176, 189, 191, 213, 318, 327, 329, 331, 335, 339, 340

Diversity, equity, and inclusion (DEI) 20, 60, 61, 146, 312, 313

E

E-Governance 31, 33, 34, 36, 41, 45, 277
E-panchayat 31, 33, 34, 36
social impact 31, 33, 41, 45

Economic growth 31, 51, 84, 113, 116, 118, 126, 131, 191, 251, 258, 259, 260, 266

Employee engagement 13, 149, 154, 157, 160, 208, 315, 320, 321

Environmental awareness 271, 273, 274, 275, 276, 284, 285, 316, 323, 324, 337, 338, 339, 340

ESG integration 1, 2, 49, 67, 83, 107, 138, 141, 143, 144, 149, 151, 153, 156, 157, 160, 161, 186, 188, 189, 192, 198, 203, 209, 212, 223, 248, 251, 260, 266, 318

Subject Index

F

Financial performance 5, 67, 137, 147, 151, 153, 158, 159, 161, 189, 210, 211, 212, 223, 237, 260
Fintech 10, 85, 167, 171, 174, 175, 176, 189, 191, 213, 318, 327, 329, 331, 335, 339, 340

G

Governance 1, 2, 8, 12, 13, 15, 31, 33, 34, 36, 49, 53, 67, 84, 91, 107, 138, 143, 151, 153, 207, 208, 212, 223, 241, 251, 253, 315
corporate 1, 8, 12, 15, 49, 53, 67, 84, 91, 107, 138, 143, 151, 153, 208, 212, 223, 241, 253, 315
E-governance 31, 33, 34, 36
environmental 1, 2, 8, 12, 13, 15, 49, 53, 67, 84, 91, 107, 138, 143, 151, 153, 207, 208, 212, 223, 241, 251, 253, 315
Green bonds 25, 166, 168, 169, 170, 175, 176, 178, 179, 180, 181, 182, 183, 184, 186, 190, 192, 194, 209, 225, 251, 264, 265, 323
financing 25, 166, 170, 175, 176, 178, 179, 180, 181, 182, 183, 184, 186, 192, 194, 209, 251, 264, 265, 323
India 25, 166, 170, 176, 178, 179, 180, 181, 182, 183, 184, 186, 225, 264
regulations 168, 169, 170, 176, 178, 179, 180, 181, 183, 184, 186, 189, 190, 192, 196
Green economy 198, 199, 200, 201, 202, 203, 206, 207, 208, 214, 216, 217, 218, 219, 220, 251, 259, 264, 265, 266, 267, 270, 318, 321, 324
Green marketing 271, 273, 274, 275, 276, 284, 285, 316, 323, 324, 337, 338, 339, 340
Greenwashing 168, 181, 183, 184, 189, 191, 213, 214, 251, 261, 264, 265, 266, 267, 270, 318, 321, 324

I

Impact investing 7, 98, 107, 108, 109, 111, 113, 125, 137, 149, 153, 154, 156, 157,

Sustainable Investing: Navigating ESG 345

160, 161, 192, 198, 209, 218, 251, 259, 260, 264, 265, 267, 318
social and environmental 7, 98, 107, 108, 109, 111, 113, 125, 137, 149, 153, 154, 156, 157, 160, 161, 192, 198, 209, 218, 251, 259, 260, 264, 265, 267, 318
Innovation 1, 2, 6, 7, 10, 85, 167, 171, 174, 175, 176, 189, 191, 213, 305, 306, 315, 318, 321, 324, 327, 329, 331, 335, 339, 340
technological 1, 2, 6, 7, 10, 85, 167, 171, 174, 175, 176, 189, 191, 213, 318, 327, 329, 331, 335, 339, 340
workplace 305, 306, 315, 318, 321, 324
Integrated reporting 12, 13, 57, 107, 147
ESG and financial data 12, 13, 57, 107, 147
Internet of things (IoT) 1, 2, 6, 7, 10, 85, 167, 171, 174, 175, 176, 189, 191, 213, 318, 327, 329, 331, 335, 339, 340
applications 1, 2, 6, 7, 10, 85, 167, 171, 174, 175, 176, 189, 191, 213, 318, 327, 329, 331, 335, 339, 340
Investment decisions 1, 2, 49, 67, 83, 107, 138, 141, 143, 144, 149, 151, 153, 156, 157, 160, 161, 186, 188, 189, 192, 198, 203, 209, 212, 223, 248, 251, 260, 266, 318
Investor demand 166, 177, 178, 179, 180, 186, 188, 189, 190, 191, 192, 196, 213, 241
sustainable investment 166, 177, 178, 179, 180, 186, 188, 189, 190, 191, 192, 196, 213, 241

L

Liquidity 7, 166, 176, 177, 178, 179, 180, 186, 189, 190, 191, 192, 196, 213, 241
Long-term value creation 1, 5, 8, 13, 50, 83, 107, 138, 142, 143, 159, 161, 189, 251, 322

M

Metrics 1, 2, 83, 97, 107, 149, 153, 156, 161, 166, 175, 177, 189, 213, 218, 222, 223, 227, 248, 250, 253, 254, 257, 266, 270, 318
ESG 1, 2, 83, 97, 107, 149, 153, 156, 161, 166, 175, 177, 189, 213, 218, 222, 223,

227, 248, 250, 253, 254, 257, 266, 270, 318

P

Policy recommendations 68, 81, 186, 192, 213, 256, 262, 267
 Privacy 79, 91, 167, 186, 213, 214, 253, 262, 315, 319, 321, 332, 338, 341
 data security and 79, 91, 186, 213, 214, 253, 262, 319, 321

R

Regulations 1, 2, 6, 7, 10, 85, 167, 171, 174, 175, 176, 189, 191, 213, 318, 327, 329, 331, 335, 339, 340
 evolving 167, 189, 191
 Renewable energy 7, 25, 49, 53, 138, 141, 143, 146, 166, 170, 174, 175, 177, 178, 179, 180, 189, 192, 200, 208, 209, 251, 259, 264, 265, 314, 323, 335
 green energy 166, 170, 178, 200, 209, 251, 259, 264, 265, 323
 technology 7, 25, 49, 53, 138, 141, 143, 146, 166, 170, 174, 175, 177, 178, 179, 180, 189, 192, 200, 208, 209, 251, 259, 264, 265, 314, 323, 335
 Risk management 1, 2, 5, 8, 12, 13, 15, 47, 50, 53, 59, 67, 83, 86, 90, 103, 125, 139, 149, 153, 159, 161, 190, 212, 217, 223, 237, 248, 251, 266, 315

S

Smart cities 287, 288, 289, 290, 296, 297, 298, 329, 335, 338
 Social impact 1, 2, 7, 12, 13, 98, 107, 108, 109, 111, 113, 114, 116, 118, 120, 121, 122, 125, 126, 127, 129, 130, 131, 134, 135, 137, 149, 151, 153, 156, 157, 160, 161, 192, 198, 201, 202, 203, 209, 218, 251, 259, 318
 impact investing 7, 98, 107, 108, 109, 111, 113, 125, 137, 149, 153, 154, 156, 157, 160, 161, 192, 198, 209, 251, 259, 318
 Social return on investment (SROI) 98, 107
 Stakeholder engagement 13, 149, 153, 154, 157, 160, 256, 259, 260, 315

Standardization of ESG reporting 10, 12, 13, 53, 56, 57, 137, 140, 141, 143, 144, 146, 147, 149, 151, 153, 156, 157, 160, 161, 189, 190, 206, 213, 218, 223, 228, 248, 249, 254, 255, 257, 262, 266, 318

T

Technological advancements 1, 2, 6, 7, 10, 85, 167, 171, 174, 175, 176, 189, 191, 213, 318, 327, 329, 331, 335, 339, 340
 Transparency 1, 2, 6, 7, 10, 85, 167, 171, 174, 175, 176, 189, 191, 213, 318, 327, 329, 331, 335, 339, 340

W

Well-being 106, 126, 305, 306, 308, 309, 311, 312, 314, 315, 317, 318, 321, 324
 employee 106, 126, 305, 306, 308, 309, 311, 312, 314, 315, 317, 318, 321, 324
 mental health 315, 321
 Workplace design 304, 305, 306, 313, 314, 315, 316, 318, 319, 321, 324
 sustainable 304, 305, 306, 313, 314, 315, 316, 318, 319, 321, 324



Rishikaysh Kaakandikar

Prof. Rishikaysh Kaakandikar has over 12 years of teaching and a year of industrial experience. He is an associate professor at SaiBalaji Education Society's SaiBalaji International Institute of Management Sciences in Pune. He has more than 40 research papers in prestigious journals. Besides, he has contributed to academia through guest lectures, seminars, workshops, and conferences across India. His insights have enriched the academic community and stimulated engaging discussions on various facets of his field. He is a prominent finance columnist for leading newspapers in Maharashtra, including Sakal, Lokmat, Punyannagari, and Prabhat.



Keshav Kaushik

Prof. Keshav Kaushik is a distinguished cybersecurity and digital forensics expert, currently serving as an associate professor at the Center for Cyber Security and Cryptology, Sharda School of Computer Science & Engineering, Sharda University, Greater Noida, India. A key member of the Cybersecurity Centre of Excellence, he has been instrumental in advancing research and education in cybersecurity, AI-driven security solutions, and digital forensics. Recognized among the World's Top 2% Scientists by Stanford University and Elsevier (2024), he has made significant contributions to academia and research. With over 200 publications, including 30+ peer-reviewed SCI/SCIE/Scopus-indexed journal articles, 80+ Scopus-indexed conference papers, and 40+ edited books and 30 book chapters, reinforcing his expertise in cybersecurity and digital forensics, he has fifteen granted patents, six published patents, and five granted copyrights. He is on the editorial board of a number of journals, such as IECE Transactions on Emerging Trends in Network Systems, IECE Transactions on Sustainable Computing, International Journal of Sensors, Journal of Combinatorial Mathematics and Combinatorial Computing (JCMCC) (Scopus-indexed), Journal of Computer Science (JCS) (Scopus-indexed), etc.



Supriya Pathak

Prof. Supriya Pathak currently serves as the president of the Institution Innovation Council at Oriental University, Indore. She is also a registered innovation ambassador and evaluator with the Ministry of Education's Innovation Cell. She has made significant contributions to the fields of technology, sustainable development, and artificial intelligence (AI). She is widely recognized for her pioneering work in harnessing AI to advance global initiatives, particularly in support of the United Nations' Sustainable Development Goals (SDGs). She has authored several scholarly articles and contributed to Scopus-indexed book chapters on the intersection of technology and societal progress. In addition to her academic and research endeavors, Prof. Pathak is a strong advocate for Intellectual Property Rights (IPR). She actively engages with students, scholars, and aspiring entrepreneurs to raise awareness about the significance of IPR, often serving as a keynote speaker at AICTE-sponsored ATAL Academy Faculty Development Programs.