



Aid in SERVICE: STRATEGIC OUTLINE FOR MERGING LEGAL PRINCIPLES WITH MANAGEMENT PRACTICES

Editors :

Dr. Ayanita Banerjee
Dr. Kaushik Banerjee
Dr. Deepshikha Datta
Dr. Soumen Saha
Dr. Sanjay Bhadra

Dr. Sudipta Adhikary
Dr. Paramita Bhattacharyya
Dr. Rubi Dutta
Mr. Subham Chatterjee



Taurean

Aid in Service:
**Strategic Outline for Merging
Legal Principles with
Management Practices**

Aid in Service:

Strategic Outline for Merging Legal Principles with Management Practices

Editors

Dr. Ayanita Banerjee

Fellow of Social Science Research Council, Professor, Department of Basic Science and Humanities, University of Engineering and Management Kolkata. Director. Centre of Excellence in Literature Language and Communication Skills.(CELLCS). IEM- Kolkata. University of Engineering and Management Kolkata .

Dr. Kaushik Banerjee

Director, Student Counselling & Head of the School, School of Law, Brainware University

Dr. Deepshikha Datta

Director of Research and Projects, Brainware University

Dr. Soumen Saha

Associate Professor, School of Commerce, Brainware University

Dr. Sanjay Bhadra

Associate Professor and HOD, Department of Electrical Engineering, Institute of Engineering and Management, New Town Campus, University of Engineering and Management, Kolkata-700160

Dr. Sudipta Adhikary

Associate Professor & Research Coordinator, School of Law, Brainware University

Dr. Paramita Bhattacharyya

Assistant Professor & Programme Coordinator (BALLB), School of Law, Brainware University

Dr. Rubi Dutta

Assistant Professor of Law, Tezpur Law College, Assam

Mr. Subham Chatterjee

Assistant Professor, School of Law, Brainware University



TAUREAN PUBLICATIONS

Kolkata • New Delhi

Taurean Publications

108/1A, Bidhan Nagar Road (Ultadanga)
Kolkata-700067

Ph: 033-35747945

M: +91 8240535650, +91 9681434521, +91 9123681983

Email: taureanpublicationskolkata@gmail.com

Website: www.taureanpublications.in

Copyright © Reserved

1st Published : 2025

ISBN : 978-93-49804-68-5

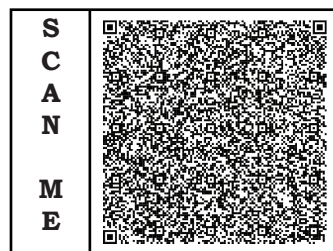
(Aid in Service: Strategic Outline for Merging Legal Principles with Management Practices)

Cover Design : Urna Sengupta

Typography : Urna Sengupta

All rights reserved. No part of this book may please be reproduced or utilized in any form by any means, electronic or mechanical, including photocopying, recording or by any information storage or retrieval system without permission in writing form the publisher.

Price : 500/-



Printed by :

Maa Sarada Enterprise
Belur, Howrah-711202
West Bengal

Preface

In this era of 21st century, in every moment, businesses need to deal with complex challenges in terms of the intersection between law and management. This book, *An Aid in Service: Strategic Outline for Merging Legal Principles with Management Practices*, offers a comprehensive understanding how these two domains complement each other. The chapters explore real-world issues, legal frameworks, ethical decision-making, business sustainability, and other related topics.

The first chapter deals with the sustainability for MSMEs. It explores how green knowledge and market pressure shape long-term survival. The chapter concludes that successful management requires attention to both market forces and regulatory landscapes.

Ethics in the workplace is also a prominent theme in business. One chapter is dedicated to investigate the role of customary ethics to comply with the human rights law.

Healthcare accessibility is examined through the lens of cross-border telemedicine. The chapter highlights legal challenges in delivering care across borders and how policy shifts can improve access. It paints a vivid picture of how regulatory barriers, if left unaddressed, can block lifesaving innovation, but also how smart reforms can bridge critical gaps.

Gender equality in the workplace is another powerful focus. Through an analysis of Indian labour laws, the authors explore progress and limitations. They show how legal protections can advance equity, but also emphasize the role of proactive management in fostering inclusive cultures.

The shift towards privatized healthcare raises questions about balancing public good with private incentives. The chapter on this topic provides a nuanced exploration of policy, economics, and patient welfare, reminding readers that legal frameworks must evolve alongside market dynamics.

Public health is further explored through research on vaccination programs and infant mortality rates. The authors highlight how legal support for vaccination policies can improve health outcomes, offering a compelling case for stronger public-private partnerships in healthcare. Corporate social responsibility (CSR) takes center stage in another

chapter, where the authors unpack the legal and ethical dimensions of CSR initiatives. They argue that CSR is more than a compliance exercise — it's an opportunity for businesses to align with societal values and build long-term trust.

Technology's growing influence on compliance is also explored. A chapter on automated compliance systems shows how technology can streamline legal adherence, while also posing new ethical and social questions. The authors urge managers to adopt tech solutions thoughtfully, balancing efficiency with human impact.

Green entrepreneurship and eco-friendly startups are celebrated as engines of change. The authors explore how legal frameworks can either foster or hinder sustainable innovation, advocating for policies that empower businesses to lead the green revolution.

A standout chapter serves as a guide to integrating legal considerations into management strategies. It offers practical steps for leaders to navigate regulations without losing strategic agility, showing that legal foresight can be a competitive advantage rather than a burden.

Leadership ethics are examined through the lens of economic judgment and law. The authors encourage leaders to view ethical decision-making as a cornerstone of sustainable success, emphasizing that legal literacy can enhance both moral clarity and strategic vision.

Occupational stress and mental health are explored through an integrated legal and managerial perspective. The chapter highlights the importance of mental health protections, showing how legal safeguards and supportive management practices can improve employee well-being and productivity.

Finally, the book concludes with a chapter on green energy policies and sustainable business models. It illustrates how legal incentives can drive the transition to renewable energy, painting an optimistic vision of businesses leading the way to a sustainable future.

Together, these chapters illustrate the profound connections between law and management. They show that businesses thrive not despite legal constraints but because of them — when they use the law as a tool for innovation, ethics, and long-term impact.

We hope this collection inspires readers to embrace an integrated approach to leadership, one where strategic decision is informed by legal wisdom and a commitment to societal well-being. Let this book be a resource, a guide, and a call to action for those eager to shape the future of business with both purpose and precision.

Acknowledgment

We extend our heartfelt gratitude to everyone who contributed to this book, *An Aid in Service: Strategic Outline for Merging Legal Principles with Management Practices*. The collective knowledge and insights of researchers, and industry professionals has been made this book a remarkable success. We sincerely thank our esteemed editors, Dr. Ayanita Banerjee, Dr. Kaushik Banerjee, Dr. Deepshikha Dutta, Dr. Soumen Saha, Dr. Sanjay Bhadra, Dr. Sudipta Adhikary, Dr. Paramita Bhattacharyya, Dr. Rubi Dutta, and Mr. Subham Chatterjee, for their expertise guidance and dedicated support for shaping this book.

We are also grateful to the contributing authors for their scholarly research and valuable Insights. Their in-depth analyses have enriched this book, making it a valuable resource for academics as well as professionals.

Special thanks to Taurean Publications for transforming it into a book with their publishing expertise. We appreciate their professionalism for making this into a high-quality publication.

This book is a collaborative work of all the stakeholders. We hope it serves as a useful tool for legal frameworks with management practices in a meaningful and impactful way.

With gratitude,

Editorial

Businesses, in this era of complexity, require a seamless blend of legal principles and management strategies. Both fields play a crucial role not only in decision-making but also risk management, and organizational efficiency. Legal frameworks in one hand ensure compliance, while on the other hand management principles drive growth and productivity. A strategic approach to integrate these aspects leads to an efficient organization to navigate business complexities efficiently.

In a business, legal principles deal with governance, contracts, and dispute resolution. They protect the rights of stakeholders and ensure ethical practices. A legal perspective of business strengthens the credibility and trust among stakeholders ensuring compliances with the legal principals like labour laws, intellectual property rights, and corporate regulations and many others.

On the other hand, Management focuses on efficiency, leadership, and innovation. It deals with optimization of process and productivity, minimizing the managerial risk. Leadership inspires teams, setting goals, fostering a positive workplace culture. Innovative management strategies drive competitive advantage ensuring organizations stay relevant in a rapidly evolving market. Effective management integrates various elements of management practices, creating a dynamic, adaptable, and forward-thinking business environment.

Thus, the integration of legal principles with management practices is essential for organizational success. It fosters structured growth in any business model. Managerial decision making along with strategic objectives backed by legal constraints lead to a sustainable business. A governance structure aligned with legal standards enhances operational effectiveness in the business. This fusion creates a resilient framework capable of navigating complex business environments. By aligning strategic managerial objectives with legal safeguards, organizations can enhance stability, innovation, and long-term trust among stakeholders.

CONTENTS

1. A Study on Impact of Vaccination on Infantmortality Rate in India	1
<i>Dr. Jayeeta Majumder Dr. Sourav Gangopadhyay</i>	
2. Green Knowledge And Green Pressure on MSMES' Sustainability: An Application of Extended Marketing Mix	10
<i>Aparajita Sanyal</i>	
3. Gender Equality At Work – Through The Lens of Labour Laws With Special Reference To India	26
<i>Mrs. Bulbul Roy Chowdhury (Ghosh)</i>	
4. Effective Implementation of Corporate Social Responsibility: Legal and Ethical Considerations	36
<i>S.A.Thameemul Ansari¹, T.A. Mohamed Ihlas²</i>	
5. Detection of Mental Stress in Undergraduate Using Algorithms of Machine Learning Model	43
<i>¹Dr. Kaushik Chanda¹, Mr. Subhadip Nandi², Ms. Anudeepa Gon³, Mr. Soumya Roy⁴</i>	
6. Production of Bioplastics from Fruit Waste: Advancing Sustainability and Achieving SDG 12	53
<i>Ujjal Dey¹, Maman Sidhanta¹, Suryadeep Kanji¹, Sandhimita Mondal²</i>	
7. Innovative Green Entrepreneurship And Eco Friendly Start-ups	62
<i>¹Dr. Jaswinder Kaur, ²Jaspreet Singh, ²Rahul</i>	
8. The Shift Towards Privatized Healthcare In India	69
<i>Dr. Dipanwita Chattopadhyay</i>	
9. The Ethical Compass of Enterprise : Economic Judgement and the Law of Leadership	76
<i>Dr. Santanu Ray Chaudhuri</i>	
10. Tracing the Efficacy of the Rights of Persons with Disabilities Act 2016: A Study in Mizoram	88
<i>Lawmsangpuia Ralte</i>	
11. Trade Liberalization And Legal Reforms In Post-1991 India : Evaluating The Productivity and Efficiency Dynamics of the Manufacturing Industry	96
<i>Dr. Sanchita De</i>	

12. Legal Challenges In Cross- Border Telemedicine and Its Impact on Healthcare Accesibility in India	114
<i>Ayan Banerjee</i>	
13. Legal and Manegerial Perspectives on Automated Compliancein India : Investigate From Socio-Legal Lens	122
<i>Dr Joydeb Patra¹, Dr Prodipta Barman¹, Dr Tamal Gupta¹</i>	
14. A Predictive Framework For Cyber Risk : Advancing Board-Level Governance in The Digital Era	144
<i>¹Soumya Roy, ¹Subhadip Nandi, ²Dr. Kaushik Chanda, ¹Anudeepa Gon</i>	
15. Occupational Sress and Mental Health: Bridging Insights for Legal and Managerial Frameworks	158
<i>Ms Saptaparni Roy Chowdhury</i>	
16. The Intersection of Law and Administration in Healthcare Governance	167
<i>¹Bhaskarjit Roy, ²Ranjana Paul</i>	
17. Bridging Boudaries : A Comprehensive Guide to Integrating Legal Frameworks into Management Strategies	177
<i>¹Pooja Rana, ²Mangeet Kaur</i>	
18. Green Energy Policies and Sustainable Business Mode	184
<i>¹Mr. Subhadip Nandi, ²Dr. Kaushik Chanda, ¹Ms. Anudeepa Gon ¹Mr. Soumya Roy</i>	
19. CSR and Human Rights: The Legal Responsibilities of Corporations	192
<i>Ms. Neha Parveen¹, Ms. Nishi¹, Ms. Shilpi Manne¹</i>	
20. Towards Zero Waste: A Case Study on Circular Economy and Sustainable Solid Waste Management in Academic Institution	200
<i>Suryadeep Kanji¹, Soumita Maji¹, Debalina Samanta¹, Ujjal Dey¹, Maman Sidhanta¹, Pratima Halder², Shruti Ghoshal², Sudipta K Das², Sandhimita Mondal³</i>	
21. Securing the Digital Future : Cyber Law, Data Governance, and Emerging Technologies	209
<i>Sourav Sadhukhan¹, Promita Dey¹</i>	
22. Cyber Law and Data Governance in the Age of Digital Transformation	218
<i>¹Ms. Anudeepa Gon, ²Dr. Kaushik Chanda, ¹Mr. Shubhadip Nandi, ¹Mr. Soumya Roy</i>	
23. Pertinence of Customary Ethics in Compliance to the Human Rights Law Under the Constitutionof India at Workplace	228
<i>Avimannu Das</i>	



A Study on Impact of Vaccination on Infantmortality Rate in India

Dr. Jayeeta Majumder

Associate Professor, Department of Hospital Management
Brainware University, Kolkata

Dr. Sourav Gangopadhyay

Associate Professor, Department of Hospital Management
Brainware University, Kolkata

Abstract

Infant mortality rate is regarded as one of the most hazardous indicator in any country. There are so many factors which are associated with the infant mortality rate, among them vaccination is one of the most important factor. Vaccine is meant to give protection against deadly diseases by activating the immunity system. Many researchers have conducted survey to prove that vaccine is having great impact on the infant mortality rate. In this paper we are trying to find out whether there is any statistically significant relationship existed between IMR and number of fully vaccinated population under one year of age. The data are collected from the annual health survey of India. IMR and number of fully vaccinated data of 2010 to 2014 of Assam, Bihar, Chattisgarh, Madhya Pradesh, Orissa, Uttar Pradesh and Uttarakhand are collected. Simple linear regression methods are followed by using SPSS 17. The analysis shows both the variables are significantly related with each other in 95% confidence level. The value of R^2 is .928. Both the variables are negatively correlated with each other.

Key Words: Infant, Mortality Rate, Vaccination.

♦ Introduction

Infant denotes to those age group who aged less than one year of age. The term infant mortality rate denotes the number of death of infant in per 1000 live birth in a given period of time usually in one year in a given population. According to Glossary of statistical terms the IMR denotes number of deaths under one year of age occurring among the total live births in a given geographical area during given year, per 1000 live births occurring among the population of the given geographical areas during the same year. According to a report published by WHO, countries in African region is having highest IMR and it is nearly six times more than the countries of Europe. Though the IMR is decreasing but still many countries are having a major issue as IMR is still very high. Globally about

4.2 million infants have died in the year 2016. The number of IMR indicates the health situation of a country. The high IMR denotes the country is more likely to have poor sanitation, poor level of education, and poor level of hygiene, malnutrition and many more. According to a report published by Gholam Reza Sharifzadeh et. al. the major cause of IMR is due to prematurity or low birth weight, congenital disease, gastroenteritis, respiratory infection etc. According to another report published by Weldearegawi Berhe et. al. (2015), the main cause of IMR is due to bacterial sepsis, prematurity, birth asphexia. A report published by Bairoliya Neha et. al. shows that the IMR is mainly due to three factors congenital anomaly, perinatal condition and followed by SUDI i.e. sudden unexpected death of Infant. According to a report published by WHO, the leading causes of IMR are Birth complication, acute respiratory infection, congenital anomaly, intrapartum related complication, diarrhoea etc.

India is the second most populous country of the world, also it has huge geographical area and has wide Variety of people are living in the country of various cast, religion, social and economical status. India is a developing country and it has huge opportunity to flourish but some issues are still bothering continuously specially the health. According to a report published by Indexmundi, the crude birth rate of India was about 24.79 in the year 2000 and in the year 2017 it is become 19. Though the number is reducing substantially but still birth rate of India is huge. According to a report by Every Preemie, the annual birth in India is about 25794000 In India IMR is also a major issue. The number of IMR is decreasing in India. According to Niti Ayog, in the year 2000 the IMR was 68 and in the year 2016 it is become 34. So in sixteen years the number of IMR is come into half.

The main causes of IMR in India are pneumonia, diarrhoea, sepsis, prematurity etc. the Government of India is trying to minimize the IMR and the number of IMR is decreasing. According to a research paper published by Basani G. Diego et. al. it states that prematurity & low birth weight, neonatal infection, birth asphyxia etc. are the major cause of IMR.

Some major steps have taken to reduce IMR, according to a report published by Ministry of Health and Family Welfare, Government of India on December 2014 such as,

- **Universal Immunization Program:** In this program some steps are taken such as - the Government of India has started special immunization week (SIW) program. In this program the areas of low immunization coverage are targeted in every year. The ASHA workers are given target to increase the immunization coverage. The beneficiary list is formed on a regular basis to facilitate the process of coverage. Recommendation of three doses of Rotavirus vaccine along with three doses of DPT in a phased manner is given by the National Technical Advisory Group on Immunization.
- **Promotion of breast feeding** the Government of India has launched several awareness programs regarding breast feeding. The Mothers Absolute Affection or MAA in short is a nationwide program by honorable Union Ministry of

Health and Family Welfare, and its ultimate motive is to enhance the breast feeding practice in India. The breast feeding has many positive effects on the child health according to K. Park, the breast feeding provides full nutrition to the child, it gives protection from the infections such as diarrhoea, and most importantly it reduces the infant mortality.

Ministry of Women and Child Development has launched several programs to facilitate the process of infant and young child feeding practices. The village health nutrition days increases the knowledge level regarding nutrition and child care practices among the village mothers.

- **Training of health care and paramedical staff:** National Health Mission has organized different training program for the nursing personnel, doctors and ANM to handle the early diagnosis and case management of common problem of children and mother.

The **JSSK** or **Janani Shishu Suraksha Karyakaram** provides free drugs, diagnosis, blood and diet, free transportation from home to institutions or referral units for all sick infants.

- **Promotion of institutional delivery** by skilled birth attendant **through JSY** or **Jannani Suraksha Yojana**.

To give **Emphasis on facility based new born care at different health care level** the Government of India has established Special new born care unit or SNCUs, New Born Stabilization Units or NBSUs for giving care to sick new born at different level by NHM.

Vaccine is one of the greatest inventions of the science. Vaccines are the elements which trigger the immune system of our body against disease. According to CDC the immunization is helpful to protect the child, vaccine protect the child from those diseases which causes mortality, morbidity or disability. The vaccine is safe and effective. As it protects different diseases to be occurred, it is capable to save money and time. Proper immunization to a community can be able to protect the future generation from the diseases. Such as small pox has eradicated from the world permanently; polio has eradicated from many countries including India. These are the indicator of success of immunization program. In India the Ministry of Health and Family Welfare has launched extended program of immunization in the year 1978. In the year 1985 the program was renamed as Universal Immunization Program or UIP in short. India has launched national Immunization Schedule. In this schedule several vaccines are included such as BCG, TT, OPV, Rotavirus, IPV and many more. BCG gives protection from the tubercular meningitis, disseminated TB; TT gives protection from tetanus; rotavirus for diarrhoeal diseases; PCV for diseases caused by bacterium *Streptococcus pneumoniae*.

♦ **Relation between immunization and infant mortality rate**

The immunization is able to prevent many deadly diseases so it could be said that the IMR is closely related with the number of vaccine administered in a population. In Annual Health Report of India, it can be found that the numbers

of fully immunized children are increasing year by year and the number of infant mortality rate is decreasing year by year in India. Also in the state wise annual report, it can be seen that those states who are having large proportion of fully immunized children, they have lesser number of IMR and those who have lower proportion of fully immunized children are having higher number of IMR. There is significant gap between urban and rural areas can also be observed, urban population have lower IMR and they have higher number of fully immunized children; and the rural have higher IMR as they have lower proportion of fully immunized children. Many research papers of all over the world have shown that there is significant correlation between IMR and number of immunization.

♦ **Objective**

The objective of the study is to find out the correlation between Infant Mortality Rate and number of full immunization rate. In this study Infant mortality rate is dependent variable and number of vaccination is independent variable.

♦ **Methodology**

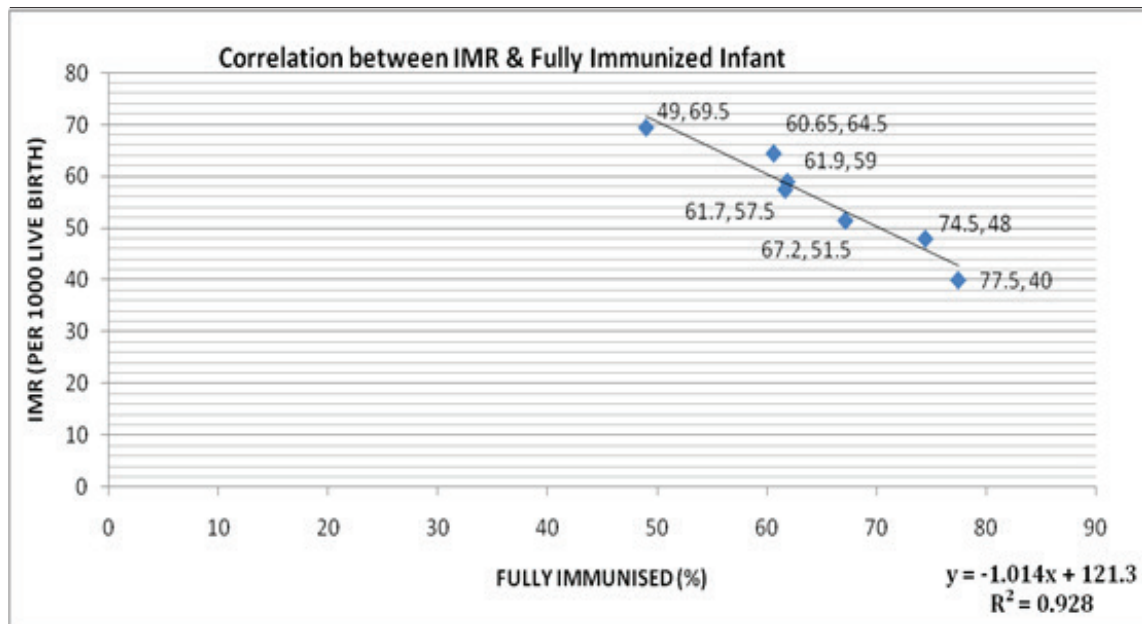
Firstly, the full immunization rate and infant mortality rate are collected from the annual health survey report. Four years' data i.e. from 2010 to 2014 are collected from 11 different states of India. The names of the states are Assam, Bihar, Odisha, Chhattisgarh, Madhya Pradesh, Uttar Pradesh and Uttarakhand. Averages of IMR and immunization rate are calculated and simple linear regression is tested with the help of SPSS17 version.

♦ **Data Interpretation**

The chart below is showing the IMR and full immunization rate in different states of India. 7 states are plotted in the chart, namely Assam, Bihar, Chattisgarh, Madhya Pradesh, Orissa, Uttar Pradesh and Uttarakhand.

STATE	FULLY IMMUNISED (%)	IMR (PER 1000 LIVE BIRTH)
Assam	61.7	57.5
Bihar	67.2	51.5
Chattisgarh	74.5	48
Madhya Pradesh	60.65	64.5
Orissa	61.9	59
Uttar Pradesh	49	69.5
Uttarakhand	77.5	40

Here are the data are plotted in a scatter diagram. The X axis is showing percentage of full Immunization and Y axis for IMR. A regression line has drawn which can be seen as negatively slopped. The value of Y is $-1.014X+121.3$. That means the variables i.e. IMR and the percentage of fully Immunized are negatively correlated. The R2 value is given which is .928. This proves that the relation between those two variables is statistically significant in 95% confidence level.



Then the data are plotted in SPSS17 and simple linear regression process has run and the shows up like that below.

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	Fully Immunized		Enter

a. All requested variables entered.

b. Dependent Variable: IMR

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.963 ^a	.928	.914	2.94745

a. Predictors: (Constant), Fully Immunized

ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	561.991	1	561.991	64.690	.000 ^a
	43.437	5	8.687		
Residual	605.429	6			
Total					

a. Predictors: (Constant), Fully Immunized

b. Dependent Variable: IMR

Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	121.300	8.230		-8.043	.000
Fully Immunized	-1.015	.126	-.963		

a. Dependent Variable: IMR

The analysis shows that the level of significance is below .05. The R² is .928. So it proves that the infant mortality rate is significantly associated with the percentage of fully immunized i.e. immunization has a strong negative correlation with the IMR.

♦ Review of Literature

According to Miler Z. Neil et. al. (2011), IMR is regarded as one of the most valuable health indicator. The study shows that there is a significant correlation between number of fully vaccinated population and IMR of the same population. It indicates that those country are having higher IMR must increase the number of vaccine doses. The country having few number of vaccine in the nation based scheduled immunization are suffering from higher IMR. Every country should be looking whether the existing immunization schedule is able to fulfill their target or not. Another study made by D. Jeremy et. al. (2010), the number of death due to measles can be reduced by proper administration of MCV. In the paper it was discussed that the measles mortality decreases as the coverage of MCV has increased from 26 % to 86%. The study also shows increasing from 75% to 90% MCV coverage reduces measles mortality rates by 60%. McGovern E. Mark et. al. (2015) states in a research paper that there are plenty of proof

that the vaccine is able to prevent many deadly diseases and in that way they can be able to prevent the death of infant. Many develop country is trying to enhance the immunization program to reduce the infant death. Many under developed countries show significant good result in the process of reduction of IMR as promotion of immunization worked nicely. The study also shows that as the coverage of vaccine increased from 0% to 100% the mortality level is getting lowered by 24%. According to onekoochiengosewe tom (2016), shows there is significant relationship between under 5 mortality rate and immunization rate. The immunization is the cost effective way of live saving steps. As the study shows the author suggested that it is needed to be implemented the immunization program to increase the health status of the community by decreasing the rate of IMR. In a research paper by Brian Greenwood (2014), it is stated that vaccine has eradicated many deadly diseases. Many more other kinds of deadly diseases can be prevented by it such as diarrhoeal diseases, pneumonia. Inclusions of rotavirus and pneumococcal conjugate are able to decline the infant death even further. Govind Singhal (2016) states that about 20 million children and 40 million pregnant mothers are not getting fully immunized packet, though the vaccine is helpful for the child health. Many vaccines are including in the immunization schedule continuously to cover more types of deadly diseases. It is the most cost effective measures. Walker AM et. al. (1987), states that non immunized infants have more than 6.5 times more mortality rate than that of those who are immunized. According to a report published in the Business insider by Abigali Tracy (2015), 70% of the unvaccinated children are living in three countries India, Nigeria, and Democratic Republic of Congo. Whereas the countries like US is having low IMR and high rate of vaccination. A report published in The Sydney Morning Herald by Harriet Alexander in November 2016, during the time between 2005 to 2014 about 54 children have died in vaccine preventable diseases and the vaccines were available.

♦ **Limitation of the Study**

- Due to limitation of available data, time and fund, data from few districts of few years have collected. Wide range of data may show different result.
- Infant mortality rate is depending upon many factors, in this study only number of vaccinated are considered, other factors were not put in analysis.
- Data are all secondary in nature, no primary data is collected.

♦ **Conclusion**

The paper has shown that the number of immunized has great impact on the infant mortality rate of a community. The statistical analysis has also shown that the number of immunized is having significant relation with the infant mortality rate. Life expectancy during the infant age is very low as the children are more prone to suffer with many deadly diseases. For that reason, Government of many countries are trying to minimize the infant mortality rate by implementing many health care program including vaccination. Many vaccines are included in

the immunization program in many countries so as to give protection from the deadly diseases. India is a vast country; under Universal Immunization Program many vaccines are always including in the list to improve the community health including infant health.

Reference

- Organisation for Economic Co-operation and Development. (n.d.). Age-specific mortality rate (ASMR). Retrieved from <https://stats.oecd.org/glossary/detail.asp?ID=1347>
- World Health Organization. (n.d.). Neonatal and infant mortality. Retrieved from http://www.who.int/gho/child_health/mortality/neonatal_infant_text/en/
- Bioline International. (n.d.). Article on child health. Retrieved from <http://www.bioline.org.br/pdf?pe08054>
- PLOS Medicine. (2018). Research on child health and mortality. Retrieved from <https://journals.plos.org/plosmedicine/article/file?id=10.1371/journal.pmed.1002531&type=printable>
- Indian Journal of Community Medicine. (2010). Article on child health in India. Retrieved from <https://medind.nic.in/icb/t10/i11/icbt10i11p1312.pdf>
- National Center for Biotechnology Information. (2011). Research on child health and vaccines. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3042727/pdf/nihms256118.pdf>
- World Health Organization. (n.d.). Causes of child mortality. Retrieved from www.who.int/gho/child_health/mortality/causes/en/
- Press Information Bureau. (2014). Government release on immunization. Retrieved from <https://pib.nic.in/newsite/PrintRelease.aspx?relid=112332>
- UNICEF. (n.d.). Child health in India. Retrieved from <http://unicef.in/AddNewPage/PreView/19>
- Index Mundi. (n.d.). Infant mortality rate in India. Retrieved from <https://www.indexmundi.com/g/g.aspx?c=in&v=25>
- Healthy Newborn Network. (n.d.). India's newborn health statistics. Retrieved from <https://www.healthynewbornnetwork.org/hnn-content/uploads/India-1.pdf>
- Centers for Disease Control and Prevention. (n.d.). Reasons to vaccinate children against measles. Retrieved from <https://www.cdc.gov/measles/downloads/matte-reasons-vaccinate.pdf>
- National Health Portal of India. (n.d.). Universal immunization programme. Retrieved from https://www.nhp.gov.in/universal-immunisation-programme_pg
- National Center for Biotechnology Information. (2011). Study on child mortality and vaccination. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3170075/>

-
- PLOS One. (2010). Study on vaccination and child mortality. Retrieved from <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0013842>
 - American Journal of Epidemiology. (2015). Study on epidemiology and child health. Retrieved from <https://academic.oup.com/aje/article/182/9/791/96333>
 - National Center for Biotechnology Information. (2014). Research on child health in developing countries. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4024226/>
 - International Journal of Community Medicine and Public Health. (n.d.). Study on child health in India. Retrieved from <http://www.ijcmph.com/index.php/ijcmph/article/viewFile/769/654>
 - Business Insider. (2015). The link between unvaccinated kids and child mortality. Retrieved from <https://www.businessinsider.com/these-maps-show-the-link-between-unvaccinated-kids-and-child-mortality-2015-2?IR=T>
 - Sydney Morning Herald. (2016). Children who died from vaccine-preventable diseases. Retrieved from <https://www.smh.com.au/healthcare/children-who-died-from-diseases-preventable-by-vaccination-quantified-20161122-gsul3h.html>
 - Park, K. (2013). Park's textbook of preventive and social medicine (22nd ed.). M/s Banarasidas Bhanot Publishers.
 - Roy, R. N., Mahajan, B. K., & Gupta, M. C. (2013). Mahajan & Gupta textbook of preventive and social medicine (4th ed.). Jaypee Brothers Medical Publishers.
 - Saha, T. K. (2018). S. C. Basu's handbook of preventive and social medicine (3rd ed.). Current Books International.



Green Knowledge And Green Pressure on MSMEs' Sustainability: An Application of Extended Marketing Mix

Aparajita Sanyal

Assistant Professor, Amity Business School
Amity University Kolkata

Abstract

Over the past ten or so years, environmental imbalances have reached a horrifying level, and environmental issues have become people's top worry. Because of this, corporate business houses have started to diversify their trade operations in areas where market segmentation is based on green issues. This study suggested a strategic model to investigate how green pressure and green knowledge affect micro, small, and medium-sized businesses' (MSMEs') ability to maintain a competitive edge. The literature review of green management practices, such as green knowledge, green brand image, green production, green process, etc., and their hypothesized relationships form the basis of the suggested theory.

Key Words: Green Knowledge, Green Pressure, Green Marketing, Green Brand Image, Sustainable Competitive Advantage, MSME

♦ Introduction

In this environmental era, enterprises are prone to implementing green marketing (GM) strategies to diminish their ecological impact. Ecological problems such as land degradation, acid rain, ozone layer depletion, greenhouse effect, etc. are increasing day by day. Similarly, consumers are also becoming aware of the environmental issues and devastating environmental pollution arising from different manufacturing industries in the world (Chen, 2011). Consumers have started showing their interest in organic products or eco-friendly products such as recycled products, biodegradable products, energy savings appliances, hybrid cars, organic clothing, etc. On the other hand, the firms are also facing several challenges like varying customer demands, high prices of green products, etc., by adopting GM (Mehta, 2013). In this era, investment in environmental performance is a necessity. The problems of green marketing are consumer confusion, consumer cynicism, and poor credibility, as pointed out by (Polonsky, 1995). Some of the familiar entities that consumers can relate to the green marketing

concepts are Ozone Friendly, Recyclable, Environmentally Friendly, Refillable, etc. (Mehta, 2013). So, GM is swiftly shifting towards cultural movement from a trendy marketing tactic because of the increasing consumer demand for eco-friendly products produced in a sustainable way. The study has reflected 13 major conceptions of GM, which are consumers, carbon, energy, and global as the largest themes, whereas crisis, people, power, fuel, water, work, product, time, organic content, etc., are the others (Luck & Giyanti, 2009). Their study revealed the importance of green consumerism and also gave valuable facts that could be utilized by policymakers, government, and GM practitioners. Green marketing refers to the phenomenon that deals with the marketing of environmentally safe products or services. Therefore, green marketing is the amalgamation of a wide scope of arrangements, starting from the foundation of green product creation to the packaging process, allocation, and marketing campaign. So the question comes up whether the green knowledge and skills of the management and green practices direct the firm towards a sustainable competitive advantage. The environmental awareness of the consumers and international environmental protection regulation are two major driving factors that are forcing companies to implement these green management practices (Chen, Lai, & Wen, 2006).

Sustainability reporting (SR) is the published declaration and communication of a company about its environmental, social, and economic impacts on the basis of its daily activities along with the organization's movement toward them (Global Reporting Initiative, 2019); (Jose & Saraf, 2013). Mainly large companies follow SR organisations (Reynolds & Yuthas, 2008); (Sen, Mukherjee, & Pattanayak, 2011); while MSMEs don't follow all SR indicators (Tutterow, 2014). An empirical study has been conducted to find the link between how green innovation can stimulate manufacturing MSMEs towards eco-friendly behavior (Singh, Chakraborty, & Roy, 2016). According to them green organizational improvement and green process have major credence on business performance. Their result advocated that the firm's focus on organizational innovation and green process entails continuous investment, high cost, poor flexibility, prolonged payback duration for technical ventures. However, MSMEs are still away from realization of the significance of environmental conservation, which can accomplish them towards profitability, lower cost and higher efficiency (Epstein & Roy, 2000). MSMEs don't consider environmental benefit as their responsibility because they can't validate their benefits from it (Van Hemel & Cramer, 2002).

♦ Literature Review

Knowledge is the combination of several components like-expert insight, experience, contextual information and values, which put the base for combining and assessing fresh information and practices (Davenport & Prusak, 1998). Green knowledge or environmental knowledge can be defined as the environmental or general knowledge about the natural environment and its relationship with its major ecosystem according to Frywell and Lo (2003). It is not much about the

condition of the environment, where we survive; much about how those conditions can be taken into consideration for achieving socio economic development in a sustainable way (Jamison, 2001).

Previous studies have shown that ecological management activities facilitate the firm to improve their business performance along with diminishing their negative impact on the environment (Hofer et al., 2012); (Lucas & Noordewier, 2016). Research revealed that environmental skills not only assist to progress green product development, but also advance the quality of the new product, shorten the development cycle and hence improve the firm's competitiveness (Dai, Cantor, & Montabon, 2017). By adopting a proactive environmental approach, a firm can go beyond fundamental agreement with rules and regulations on environmental matter (Bowen, Cousins, Lamming, & Farukt, 2001). A firm with a proactive environmental attitude seeks for more resource efficiency by reducing its energy usage, lowering raw material cost and producing premium products, which can shrink their environmental burden (Hart, 1995 ; Sharma & Vredenburg, 1998; Christmann, 2000) The marketing mix generally includes 4 Ps i.e. - product, price, place and promotion. An additional three Ps in marketing mix, which constitutes a total seven Ps in marketing mix known as service marketing mix (Booms, 1981). This paper study is done based on 7 Ps of marketing mix. Green marketing mix tactics permit the companies to go for new market segmentation or to enter into a new market, where the customer concern is there towards the environment (Leonidou, Katsikeas, & Morgan, 2013).

The term "green perceived risk" was proposed by a research (Chen & Chang, 2013). Another study to has described it as "the expectation of negative environmental consequences associated with purchase behaviour" (Peter & Ryan, 1976). Perceived risk is a combination of physical, social, financial, performance and psychological risk (Jacoby & Kaplan, 1972). So the perceived risks generate negative consequences and uncertainty on customers' purchase intention. In every business every day, the firm's owners need to take risks.

The study has revealed that the companies should develop their green brand loyalty and green brand image to enhance their consumers' green buying behavior (Chen, Huang, Wang, & Chen, 2020). Besides, the firms interested to raise their green brand image, can't only remove the anxiety of environmental punishment, but also help them to enhance their customers' green purchase behavior. Green brands can make potential differentiation from their competitors and also strengthened green brand relationship with the consumers (Fournier, 1998). Furthermore, since brand image has a positive impact on consumers' buying behavior, it can decrease consumers' perceived risk and simultaneously boost the purchasing probability (Flavian, Guinaliu, & Torres, 2005).

On corporate strategy, the concept of competitive strategy was first introduced by Igor Ansoff (Ansoff, 1965). Competitive advantage could also involve manipulation of resources, resulting the distinctive position of the company as compared to its competitors . The shareholders of the firm can get great return through sustainable competitive advantage (Lin, Lobo, & Leckie, 2017).

♦ Research Gap

Research gap is basically the missing component in the present research studies. In this paper from the existing Literature Review it is observed that only studies have been developed on the understanding on green marketing, green marketing practices and strategies. But it has not yet analyzed whether green knowledge and green marketing mix can initiate to accomplish the sustainable competitive advantage of the firm. This study proposes a framework to measure how to implement of the green strategy on MSMEs; how it impacts on sustainable competitive advantage of MSMEs etc. So, this careful research to be completed which has not winded up yet because the result and conclusion must put new light on the problem.

The intention of this study is to understand how MSME's sustainability depends on the owners' green knowledge and its green brand image. So this paper has proposed a framework for MSMEs to analyze how owners' green knowledge and seven Green Ps of marketing mix are linked with MSME's sustainability. Further it could disclose also which green practices that MSMEs should adopt for its sustainability.

Sustainability is progressively becoming a future research area and an applicable topic (Bhadauria, Toms, Green Jr, & Meacham, 2014). The future research might examine green marketing strategies adopted medium and small enterprises as their studies are constrained only in large enterprises (D'Souza, Taghian, Sullivan-Mort, & Gilmore, 2015). Focuses and efforts are given mostly on the large firms. In most of the cases issues of SMEs are marginalized or ignored (Matlay, Mitra, & Barr, 2002). In Indian SMEs specially, there is the need of study on leveraging awareness. So, this paper tries to make an initiative to fulfil this research gap.

♦ Research Objective

The prime intention of this paper is to propose a conceptual model for MSMEs that may examine the relationships among green knowledge, the elements of green practices, green brand image and sustainable competitive advantage. This theoretical model has not been empirically tested yet. Therefore this paper is:

- To develop a green analytical business framework for MSMEs for their sustainable future opportunities
- To attract the attention of the owners to reinforce sustainable competitive advantage through green business model and green brand image.
- To investigate the correlation between Green Business Model and sustainable competitive advantage

♦ Conceptual Framework

This study summarizes the literature on MSMEs, green knowledge, green marketing, sustainable competitive advantage and green brand image into a novel research framework from the point of reinforcing sustainable competitive advantage of MSMEs. In past many studies have explored the methods of

improving competitive advantage, but no research has explored the effect of green knowledge and green marketing strategy as an intervening factor to measure the effect of sustainable competitive advantage. The proposed research framework is the following:

♦ **The Research Framework**

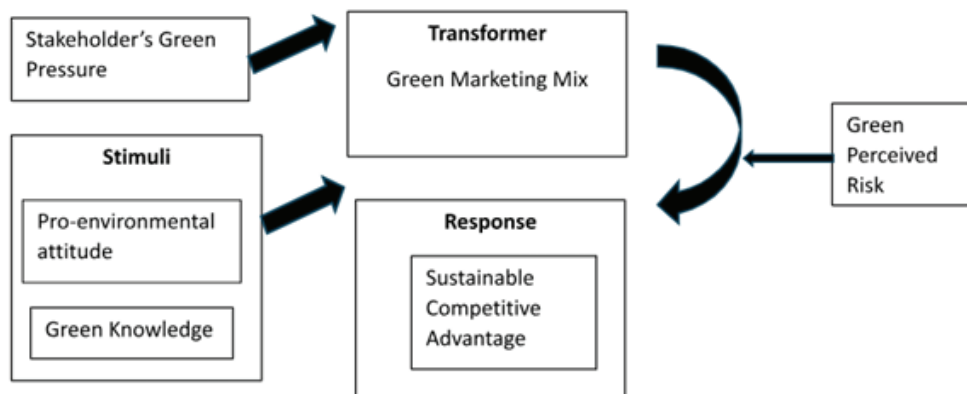


Fig: The effect of stakeholder's green pressure, pro environmental attitude and owner's green knowledge on firm's green marketing strategy (7Ps)

It has been identified that achieving superior environmental knowledge develops much satisfactory pro-environmental behavior (Rokicka, 2002). Environmental knowledge plays a considerable impact on the consumers' green purchase intention (Mostafa, 2009). The environmental knowledge implies what people recognize about the environment and the collective responsibilities essential for sustainability (Kaufmann, Panni, & Orphanidou, 2012). The companies must have appropriate knowledge before implementing alteration in process and product in order to take up a more eco-friendly strategy (Chen, The positive effect of green intellectual capital on competitive advantages of firms, 2008). One study has established the relationships between knowledge management and firm's innovation (Carneiro, 2000). His finding has definite that the fundamental asset of the firm is knowledge management which raises firm's innovation. A consumer gathers knowledge from different sources before making the purchase decision (Zameer, Wang, Yasmeen, Mofrad, & Waheed, 2018). Now-a-days companies are getting pressure from their stakeholders to be eco-friendly and eco-efficient (Dangayach & Deshmukh, 2001). As a result the manufacturing firms have undergone a shift towards eco-efficiency or green productivity.

♦ **The effect of firm's green marketing strategy (7Ps) on green perceived risk**

To diminish customers' perceived risk, the firms must provide enough information to them which facilitate them to compare the environmental functionality of the product with other firms' products (Peattie, 1995). Study revealed that consumer willingness to purchase is negatively driven by perceived risk (Mitchell,

1999). Former researches have highlighted the fact that companies should go for green marketing strategies to lessen customer perceived risk and augment their perceived quality. The adverse effect of the manufacturing ventures can be minimized by the application of socially sensitive and environmentally practices (Baines, Brown, Benedettini, & Ball, 2012). These also harmonize the economic benefits. The companies can implement different green product strategies in order to get growth potential, cost savings and also market opportunities. Price, environmental advertisement and ecological packaging have a positive correlation with consumers' green purchase intention (Ansar, 2013). In spite of the high cost, the customer has a positive purchase intention towards eco-friendly products (Maletic, Maletic, & Gomiscek, 2010). So the customers may be distrustful towards the green claims of the firm if the marketers don't provide the reliable information to them and it will be difficult for the marketers to convince the customers thereafter (Jain & Kaur, 2004).

♦ **The effect firm's green marketing strategy (7Ps) on creating green brand image, green trust and sustainable competitive advantage**

It is important for the companies to accentuate on green marketing, because it will be one of the reinforcing factors for creating a firm's green brand image (Zameer, Wang, Yasmeen, Mofrad, & Waheed, 2018). The products which consume recyclable/organic materials or use minimal amounts of toxic chemicals or apply ethical packaging with eco-responsible labels can make contributions towards sustainable futures (Shang, Lu, & Li, 2010); (Song-Turner, Courvisanos, & Zeegers, 2014). Green products also affect the performance of the firm (Leonidou, Katsikeas, & Morgan, 2013). Green prices can offer a profitable benefit and good connotation for customers (Goh, Goh, Ariffin, & Salamzadeh, 2019). For pricing advantage, pricing strategy is applied also on the packing of the product (Song-Turner, Courvisanos, & Zeegers, 2014). The desire for eco-friendly goods can be interpreted by the consumer's willingness to bear the premium cost for it (Polonsky & Rosenberger III, 2001).

♦ **Discussion and possible managerial implication**

Green business practice is one of the major initiatives adopted by the firms to retain sustainability in the environmental era. However prior studies have recommended that there are vast challenges for the business units to incorporate ecological missions into their business policies. He suggested also that firms must seek opportunities to enhance their product's ecological performances to reinforce their brand image. This proposed framework is an initiative to broaden the relationship between green marketing strategies and sustainable competitive advantage. This strategic model picks up the literature from various fields of green initiatives like green marketing, green process, green product, green SCM, green brand image, green perceived risk, green competitive advantage, green knowledge in the context of MSMEs. In the past there are many studies in the field of green marketing practices but there is no study, either empirically or conceptually, that has methodically recognized a strategic model of sustainable

competitive advantages combining the green marketing mix. Eco-efficiency means functioning of the manufacturing operations more responsively, innovatively and must be based on sustainable competitiveness. These manufacturing strategies have a relevance to small and medium enterprises (SMEs) and large scale enterprises as they are significantly dependent on each other. SMEs contribute considerably to the development of the national economy due to the current inclination of outsourcing. So the business objective and mission plan of SMEs require to be evolved after a cautious study of the human resource affair, current technology, level of competition and environment.

References:

- Aaker, D. (1996). Building Strong Brands–The Free Press. A Division of Simon & Schuster. Inc./D. Aaker.–NY.
- Akhavan, P., & Jafari, M. (2008). Towards learning in SMEs: an empirical study in Iran. *Development and Learning in Organizations: An International Journal*.
- Ansar, N. (2013). Impact of green marketing on consumer purchase intention. *Mediterranean Journal of Social Sciences*, 4(11), 650-650.
- Ansoff, H. I. (1965). *Corporate strategy: An analytic approach to business policy for growth and expansion*. McGraw-Hill Companies.
- Arena, M., & Azzone, G. (2012). A process-based operational framework for sustainability reporting in SMEs. *Journal of Small Business and Enterprise Development*.
- Azzone, G., & Noci, G. (1998). Identifying effective PMSs for the deployment of “green” manufacturing strategies. *International Journal of Operations & Production Management*.
- Baines, T., Brown, S., Benedettini, O., & Ball, P. D. (2012). Examining green production and its role within the competitive strategy of manufacturers. *Journal of Industrial Engineering and Management*, 53-87.
- Ball, P. D., Evans, S., Levers, A., & Ellison, D. (2009). Zero carbon manufacturing facility—towards integrating material, energy, and waste process flows. *Proceedings of the Institution of Mechanical Engineers, Part B: Journal of Engineering Manufacture*, 223(9), 1085-1096.
- Barnes, D., Hinton, M., & Mieczkowska, S. (2004). E-commerce in the old economy: three case study examples. *Journal of Manufacturing Technology Management*.
- Baumann, H., Boons, F., & Bragd, A. (2002). Mapping the green product development field: engineering, policy and business perspectives. *Journal of cleaner production*, 10(5), 409-425.

- Beckford, C. L., Jacobs, C., Williams, N., & Nahdee, R. (2010). Aboriginal environmental wisdom, stewardship, and sustainability: lessons from the Walpole Island First Nations, Ontario, Canada. *The journal of environmental education*(41(4)), 239-248.
- Behrend, T. S., Baker, B. A., & Thompson, L. F. (2009). Effects of pro-environmental recruiting messages: The role of organizational reputation. *Journal of Business and Psychology*(24(3)), 341-350.
- Bhadauria, V. S., Toms, L., Green Jr, K. W., & Meacham, J. (2014). Do green information systems impact performance? *International Journal of Productivity and Quality Management*(13(4)), 377-394.
- Biswas, A., & Roy, M. (2015). Leveraging factors for sustained green consumption behavior based on consumption value perceptions: testing the structural model. *Journal of Cleaner production*, 95, 332-340.
- Booms, B. (1981). Marketing strategies and organizational structures for service firms. *Marketing of services*.
- Bowen, F. E. (2002). Does size matter? Organizational slack and visibility as alternative explanations for environmental responsiveness. *Business & Society*(41(1)), 118-124.
- Bowen, F. E., Cousins, P. D., Lamming, R. C., & Farukt, A. C. (2001). The role of supply management capabilities in green supply. *Production and operations management*(10(2)), 174-189.
- Boztepe, A. (2012). Green marketing and its impact on consumer buying behavior. *European Journal of Economic & Political Studies*(5(1)).
- Bukhari, S. S. (2011). Green Marketing and its impact on consumer behavior. *European Journal of Business and Management*(3(4)), 375-383.
- Bulsara, H. P., Kabiraj, S., Priya, M. S., & Priya, S. S. (2017). Exploring green business functions and green brand equity: proposition of a conceptual framework. *International Journal of Qualitative Research in Services*, 2(4), 262-279.
- Carneiro, A. (2000). How does knowledge management influence innovation and competitiveness? *Journal of knowledge management*.
- Chang, C. H., & Chen, Y. S. (2014). Managing green brand equity: The perspective of perceived risk theory. *Quality & Quantity*(48(3)), 1753-1768.
- Chang, H. H., & Chen, S. W. (2008). The impact of online store environment cues on purchase intention: Trust and perceived risk as a mediator. *Online information review*.
- Chaudhuri, A. (1997). Consumption emotion and perceived risk: A macro-analytic approach. *Journal of Business Research*,(39(2)), 81-92.
- Chen, Y. S. (2008). The positive effect of green intellectual capital on competitive advantages of firms. *Journal of business ethics*(77(3)), 271-286.
- Chen, Y. S. (2011). Green organizational identity: sources and consequence. *Management decision*.

- Chen, Y. S., & Chang, C. H. (2013). Towards green trust The influences of green perceived quality, green perceived risk, and green satisfaction. *Management Decision*.
- Chen, Y. S., Huang, A. F., Wang, T. Y., & Chen, Y. R. (2020). Greenwash and green purchase behaviour: the mediation of green brand image and green brand loyalty. *Total Quality Management & Business Excellence*(31(1-2)), 194-209.
- Chen, Y. S., Lai, S. B., & Wen, C. T. (2006). The influence of green innovation performance on corporate advantage in Taiwan. *Journal of business ethics*(67(4)), 331-339.
- Chiang, J. H., & Tseng, M. L. (2005). The impact of environmental characteristic on manufacturing strategy under cleaner production principles guidance. *The Journal of American Academy of Business*(7 (1)), 163-168.
- Christmann, P. (. (2000). Effects of “best practices” of environmental management on cost advantage: The role of complementary assets. *Academy of Management journal*(43(4)), 663-680.
- Coddington, W., & Florian, P. (1993). Environmental marketing: Positive strategies for reaching the green consumer. *McGraw-Hill Companies*.
- Corbett, C. J., & Klassen, R. D. (2006). Extending the horizons: environmental excellence as key to improving operations. *Manufacturing & Service Operations Management*(8(1)), 5-22.
- Cornelissen, G., Pandelaere, M., Warlop, L., & Dewitte, S. (2008). Positive cueing: Promoting sustainable consumer behavior by cueing common environmental behaviors as environmental. *International Journal of Research in Marketing*(25(1)), 46-55.
- Cretu, A. E., & Brodie, R. J. (2007). The influence of brand image and company reputation where manufacturers market to small firms: A customer value perspective. *Industrial marketing management*(36(2)), 230-240.
- Dai, J., Cantor, D. E., & Montabon, F. L. (2017). Examining corporate environmental proactivity and operational performance: A strategy-structure-capabilities-performance perspective within a green context. *International Journal of Production Economics*, 193, 272-280.
- Dangayach, G. S., & Deshmukh, S. G. (2001). Manufacturing strategy: literature review and some issues. *International journal of operations & production management*.
- Dangelico, R. M., & Pontrandolfo, P. (2015). Being ‘green and competitive’: The impact of environmental actions and collaborations on firm performance. *Business Strategy and the Environment*(24(6)), 413-430.
- Daniel, E. M., & Grimshaw, D. J. (2002). An exploratory comparison of electronic commerce adoption in large and small enterprises. *Journal of Information Technology*(17(3)), 133-147.
- Darroch, J. (2005). Knowledge management, innovation and firm performance. *Journal of knowledge management*.

- Davari, A., & Strutton, D. (2014). Marketing mix strategies for closing the gap between green consumers' pro-environmental beliefs and behaviors. *Journal of Strategic Marketing*(22(7)), 563-586.
- Davenport, T. H., & Prusak, L. (1998). Working knowledge: How organizations manage what they know. *Harvard Business Press*.
- Davis, M. C., Leach, D. J., & Clegg, C. W. (2011). *The physical environment of the office: Contemporary and emerging issues*.
- Department of MSME. (2006). MSME Development Act. Retrieved March 2020, from [samadhaan.msme.gov.in: https://samadhaan.msme.gov.in/WriteReadData/DocumentFile/MSMED2006act.pdf](https://samadhaan.msme.gov.in/WriteReadData/DocumentFile/MSMED2006act.pdf)
- D'Souza, C., Taghian, M., Sullivan-Mort, G., & Gilmore, A. (2015). An evaluation of the role of green marketing and a firm's internal practices for environmental sustainability. *Journal of strategic marketing*(23(7)), 600-615.
- Dubey, A. M., Goel, G., & Sahu, G. P. (2013). Effective implementation of competitive advantage and sustainable competitive advantage: a conceptual model. *International Journal of Business Innovation and Research*(7(5)), 519-535.
- Eneizan, B. M., Wahab, K. A., & Bustaman, U. S. (2015). Effects of green marketing strategy 4ps on firm performance. *IJAR*(1(12)), 821-824.
- Epstein, M. J., & Roy, M. J. (2000). Strategic evaluation of environmental projects in SMEs. *Environmental Quality Management*(9(3)), 37-47.
- Flavian, C., Guinaliu, M., & Torres, E. (2005). The influence of corporate image on consumer trust: A comparative analysis in traditional versus internet banking . *Internet research*.
- Florida, R., & Davison, D. (2001). Gaining from green management: environmental management systems inside and outside the factory. *California management review*(43(3)), 64-84.
- Fournier, S. (1998). Consumers and their brands: Developing relationship theory in consumer research. *Journal of consumer research*(24(4)), 343-373.
- Freeman, R. E. (2010). *Strategic management: A stakeholder approach*. Cambridge university press.
- Ganesan, S. (1994). Determinants of long-term orientation in buyer-seller relationships. *Journal of marketing*(58(2)), 1-19.
- Global Reporting Initiative. (2019). *Sustainability report*. Retrieved March 2020, from <http://www.globalreporting.org>.
- Goh, W. H., Goh, Y. N., Ariffin, S. K., & Salamzadeh, Y. (2019). How green marketing mix strategies affects the firm's performance: a Malaysian perspective. *International Journal of Sustainable Strategic Management*(7(1-2)), 113-130.
- Gopinath, S., Sundaram, V. A., Sheshathri, R., & Narashiman, K. (2018). Frame work of conceptual model for quality management in small and medium enterprises. *International Journal of Enterprise Network Management*(9(2)), 143-155.
- Goyal, A. (2014). *Innovations in Services Marketing and Management: Strategies for Emerging*.

- Green, K., Morton, B., & New, S. (1996). Purchasing and environmental management: interactions, policies and opportunities. *Business strategy and the environment*(5(3)), 188-197.
- Gregg, D. G., & Walczak, S. (2008). *Dressing your online auction business for success: An experiment comparing two eBay businesses*. *Mis Quarterly*, 653-670.
- Hart, S. L. (1995). A natural-resource-based view of the firm. *Academy of management review*(20(4)), 986-1014.
- Hayat, K., Jan, S., Ali, F., Nadeem, A., & Raza, W. (2019). Impact of Green Marketing Mix (4Ps) on Firm Performance: Insights from Industrial Sector Peshawar, Pakistan. *Sarhad Journal of Management Sciences*(5(1)), 143-156.
- Hoffman, A. J. (2000). *Competitive environmental strategy: A guide to the changing business landscape*. Island press.
- Hussain, K., & Waheed, A. (2016). Building green brand relations: the role of green brand image as significant driver. *International Journal of Environment, Workplace and Employment*, 4(2), 116-138.
- Jacoby, J., & Kaplan, L. B. (1972). *The components of perceived risk*. ACR special volumes.
- Jain, S. K., & Kaur, G. (2004). *Green Marketing: An Indian Perspective*. *Decision* (0304-0941)(31(2)).
- Jamison, A. (2001). *The making of green knowledge: Environmental politics and cultural transformation*. Cambridge University Press.
- Jose, P. D., & Saraf, S. (2013). *Corporate sustainability initiatives reporting: a study of India's most valuable companies*. IIM Bangalore Research Paper, 428.
- Junior, S. S., da Silva, D., Gabriel, M. L., & de Oliveira Braga, W. R. (2018). The influence of environmental concern and purchase intent in buying green products. *Asian J. Behav. Stud*(3(12)), 183.
- Kainuma, Y., & Tawara, N. (2006). A multiple attribute utility theory approach to lean and green supply chain management. *International Journal of Production Economics*(101(1)), 99-108.
- Kaufmann, H. R., Panni, M. F., & Orphanidou, Y. (2012). Factors affecting consumers' green purchasing behavior: An integrated conceptual framework. *Amfiteatru Economic Journal*(14(31)), 50-69.
- Keerthi, B. S. (2013). A Study on Emerging Green Finance in India: Its Challenges and Opportunities. *International Journal of Management and Social Sciences Research (IJMSSR)*(2(2)), 49-53.
- Keoleian, G. A., Menery, D., & Curran, M. A. (1993). *Life cycle design guidance manual: Environmental requirements and the product system*. Risk Reduction Engineering Laboratory, Office of Research and Development, US Environmental Protection Agency.
- Klassen, R. D., & Whybark, D. C. (1999). The impact of environmental technologies on manufacturing performance. *Academy of Management journal*(42(6)), 599-615.

- Kotler, P. (2011). Reinventing marketing to manage the environmental imperative. *Journal of marketing*(75(4)), 132-135.
- Lam, A. Y., Lau, M. M., & Cheung, R. (2016). Modelling the relationship among green perceived value, green trust, satisfaction, and repurchase intention of green products. *Contemporary Management Research*(12(1)).
- Larashati, H., Hudrasyah, H., & Chandra, N. (2012). 7Ps of green marketing as factors influencing willingness to buy towards environmentally friendly beauty products. In *Proceedings of International Conference on Business Management & IS* , Vol. 1, No. 1.
- Lee, J. S., & Hsieh, C. J. (2010). A research in relating entrepreneurship, marketing capability, innovative capability and sustained competitive advantage. *Journal of Business & Economics Research* (JBER)(8(9)).
- Leonidou, C. N., Katsikeas, C. S., & Morgan, N. A. (2013). Greening” the marketing mix: Do firms do it and does it pay off? *Journal of the Academy of Marketing Science* (41(2)), 151-170.
- Lin, C. Y., & Ho, Y. H. (2008). An empirical study on logistics service providers' intention to adopt green innovations. *Journal of technology management & innovation*(3(1)), 17-26.
- Lin, J., Lobo, A., & Leckie, C. (2017). Green brand benefits and their influence on brand loyalty. *Marketing Intelligence & Planning*.
- Lin, R. J., Tan, K. H., & Geng, Y. (2013). Market demand, green product innovation, and firm performance: evidence from Vietnam motorcycle industry. *Journal of Cleaner Production*, 40, 101-107.
- Lucas, M. T., & Noordewier, T. G. (2016). Environmental management practices and firm financial performance: The moderating effect of industry pollution-related factors. *International Journal of Production Economics*, 175, 24-34.
- Luck, E., & Giyanti, A. (2009). Green marketing Communities and Blogs: Mapping consumer's attitudes for future sustainable marketing. In *Proceedings of the Australian and New Zealand Marketing Academy (ANZMAC) Conference* (pp. 1-9). *Australian and New Zealand Marketing and Management*.
- Ma, Y., Yin, Q., Pan, Y., Cui, W., Xin, B., & Rao, Z. (2018). Green product innovation and firm performance: Assessing the moderating effect of novelty-centered and efficiency-centered business model design. *Sustainability*(10(6)), 1843.
- Madrid-Guijarro, A., Garcia, D., & Van Auken, H. (2009). Barriers to innovation among Spanish manufacturing SMEs. *Journal of small business management* (47(4)), 465-488.
- Maletic, M., Maletic, D., & Gomiscek, B. (2010). *Green product development- customers and producers reflection*.
- Mathiyazhagan, K., Govindan, K., NoorulHaq, A., & Geng, Y. (2013). An ISM approach for the barrier analysis in implementing green supply chain management. *Journal of cleaner production*, 47, 283-297.
- Matlay, H., Mitra, J., & Barr, P. (2002). Managing learning, knowledge and innovation in SMEs: an empirical approach. *Management Research News*(25(8/10)), 126-128.

- Mehta, A. (2013). Green marketing practice in Indian business environment: A conceptual review. *International Journal of Business and Globalisation*(11(2)), 187-209.
- Mishra, D. P., Heide, J. B., & Cort, S. G. (1998). Information asymmetry and levels of agency relationships. *Journal of marketing Research*(35(3)), 277-295.
- Mishra, P., & Sharma, P. (2010). Green marketing in India: Emerging opportunities and challenges. *Journal of Engineering, Science and Management Education*(3(1)), 9-14.
- Mitchell, V. W. (1992). Understanding consumers' behaviour: can perceived risk theory help? *Management decision*.
- Mitchell, V. W. (1999). Consumer perceived risk: conceptualisations and models. *European Journal of marketing*.
- Morsing, M., & Perrini, F. (2009). CSR in SMEs: do SMEs matter for the CSR agenda? *Business Ethics: A European Review* (18(1)), 1-6.
- Mostafa, M. M. (2009). Shades of green: A psychographic segmentation of the green consumer in Kuwait using self-organizing maps. *Expert systems with Applications* (36(8)), 11030-11038.
- Mukherjee, A., & Nath, P. (2003). A model of trust in online relationship banking. *International journal of bank marketing*.
- Nulkar, G. (2014). SMEs and environmental performance—A framework for green business strategies. *Procedia-Social and Behavioral Sciences*, 133, 130-140.
- Padgett, D., & Allen, D. (1997). Communicating experiences: A narrative approach to creating service brand image. *Journal of advertising* (26(4)), 49-62.
- Panigrahi, S. S., & Rao, N. S. (2018). A stakeholders' perspective on barriers to adopt sustainable practices in MSME supply chain: Issues and challenges in the textile sector. *Research Journal of Textile and Apparel*.
- Peattie, K. (1995). Environmental marketing management: Meeting the green challenge. *Financial Times Management*.
- Peattie, K. (2001). Towards sustainability: the third age of green marketing. *The marketing review* (2(2)), 129-146.
- Peattie, K., & Crane, A. (2005). Green marketing: legend, myth, farce or prophesy? *Qualitative market research: an international journal*.
- Peattie, K., Peattie, S., & Ponting, C. (2009). Climate change: a social and commercial marketing communications challenge. *EuroMed Journal of Business*.
- Peter, J. P., & Ryan, M. J. (1976). An investigation of perceived risk at the brand level. *Journal of marketing research* (13(2)), 184-188.
- Polonsky, M. J. (1994). An introduction to green marketing. *Electronic green journal* (1(2)).
- Polonsky, M. J. (1995). A stakeholder theory approach to designing environmental marketing strategy. *Journal of business & industrial marketing*.
- Polonsky, M. J., & Rosenberger III, P. J. (2001). Reevaluating green marketing: a strategic approach. *Business horizons* (44(5)), 21-30.

- Porter, M. E., & Van der Linde, C. (1995). Toward a new conception of the environment-competitiveness relationship. *Journal of economic perspectives* (9(4)), 97-118.
- Prahalad, C. K. (2009). Why sustainability now is the key to innovation. *Harvard business review*.
- Ramanathan, R. (2011). An empirical analysis on the influence of risk on relationships between handling of product returns and customer loyalty in E-commerce. *International Journal of Production Economics*(130(2)), 255-261.
- Rao, P. H. (2003). Greening the supply chain: A guide for managers in Southeast Asia. *Asian Institute of Management*.
- Report of the Expert Committee, RBI. (2019, June 25). Report of the Expert Committee on Micro, Small and Medium Enterprises. Retrieved March 2020, from <https://www.rbi.org.in/>.
- Reynolds, M., & Yuthas, K. (2008). Moral discourse and corporate social responsibility reporting. *Journal of business ethics*(78(1)), 47-64.
- Rokicka, E. (2002). Attitudes toward natural environment: A study of local community dwellers. *International Journal of Sociology*(32(3)), 78-90.
- Rotter, J. B. (1971). Generalized expectancies for interpersonal trust. *American psychologist*(26(5)), 443.
- Sahran, S., Zeinalnezhad, M., & Mukhtar, M. (2010). Quality management in small and medium enterprises: Experiences from a developing country. *International Review of Business Research Papers*(6(6)), 164-173.
- Saxena, P., & Bhattacharyya, A. K. (2010). Inventorisation of environmental risk associated with hazardous waste generated in small scale industrial area of Delhi, India. In *Integrated Watershed Management* , 176-189.
- Schaper, M. (2002). Small firms and environmental management: Predictors of green purchasing in Western Australian pharmacies. *International Small Business Journal*(20(3)), 235-251.
- Seliger, G., & Zettl, M. (2008). Modularization as an enabler for cycle economy. *CIRP annals*(57(1)), 133-136.
- Sen, M., Mukherjee, K., & Pattanayak, J. K. (2011). Corporate environmental disclosure practices in India. *Journal of Applied Accounting Research*.
- Seuring, S., & Gold, S. (2012). Conducting content-analysis based literature reviews in supply chain management. *Supply Chain Management: An International Journal*.
- Shah, S. S., Aziz, J., Jaffari, A. R., Waris, S., Ejaz, W., Fatima, M., & Sherazi, S. K. (2012). The impact of brands on consumer purchase intentions. *Asian Journal of Business Management*(4(2)), 105-110.
- Shang, K. C., Lu, C. S., & Li, S. (2010). A taxonomy of green supply chain management capability among electronics-related manufacturing firms in Taiwan. *Journal of environmental management*(91(5)), 1218-1226.
- Sharma, S., & Vredenburg, H. (1998). Proactive corporate environmental strategy and the development of competitively valuable organizational capabilities. *Strategic management journal*(19(8)), 729-753.

- Singh, M. P., & Roy, M. (2019). A study of sustainability reporting disclosures for manufacturing MSMEs: evidence from India. *International Journal of Entrepreneurship and Small Business*(38(4)), 395-414.
- Singh, M. P., Chakraborty, A., & Roy, M. (2016). The link among innovation drivers, green innovation and business performance: empirical evidence from a developing economy. *World Review of Science, Technology and Sustainable Development*(12(4)), 316-334.
- Song-Turner, H., Courvisanos, J., & Zeegers, M. (2014). Green Marketing the Chinese Way: Insights From a Medium-Sized High-Tech Daily Chemical Firm. *Journal of Asia-Pacific Business*(15(2)), 164-192.
- Soonthonsmai, V. (2007). *Environmental or green marketing as global competitive edge: Concept, synthesis, and implication*. In I. E. Proceeding (Ed.). Venice, Italy.
- Stead, J. G., & Stead, E. (2000). Eco-enterprise strategy: Standing for sustainability. *Journal of business ethics*(24(4)), 313-329.
- Stone, R. N., & Grønhaug, K. (1993). Perceived risk: Further considerations for the marketing discipline. *European Journal of marketing*(27(3)), 39-50.
- Sweeney, J. C., Soutar, G. N., & Johnson, L. W. (1999). The role of perceived risk in the quality-value relationship: A study in a retail environment. *Journal of retailing*(75(1)), 77-105.
- Tariq, M. I., Nawaz, M. R., Nawaz, M. M., & Butt, H. A. (2013). Customer perceptions about branding and purchase intention: a study of FMCG in an emerging market. *Journal of Basic and Applied Scientific Research*(3(2)), 340-347.
- Tariq, S., Jan, F. A., & Ahmad, M. S. (2016). Green employee empowerment: a systematic literature review on state-of-art in green human resource management. *Quality & Quantity*(50(1)), 237-269.
- Tian-Que, L. (2012). *Perceived Risk in Marketing Strategy*. *Business, Economics, Financial Sciences, and Management*, 175-178.
- Tiong, Y. Y., Sondoh Jr, S. L., Igau, O. A., & Tanakinjal, G. H. (2017). Green employee empowerment and green physical evidence: the green service strategy to enhance firm performance. *Asian Journal of Business Research*(7(2)), 94.
- Trujillo, A., Arroyo, P., & Carrete, L. (2014). Do environmental practices of enterprises constitute an authentic green marketing strategy? A case study from Mexico. *International Journal of Business and Management*(9(2)), 175.
- Tutterow, V. (2014). Embedding sustainability into small and medium-sized manufacturing enterprises. *Virginia Tech, Center for Leadership in Global Sustainability (CLiGS)*. Retrieved from <http://www.cligs.vt.edu>
- Van Hemel, C., & Cramer, J. (2002). Barriers and stimuli for ecodesign in SMEs. *Journal of cleaner production*(10(5)), 439-453.
- Wang, Y. H., & Tsai, C. F. (2014). The relationship between brand image and purchase intention: Evidence from award winning mutual funds. *The international journal of business and finance research*(8(2)), 27-40.

-
- Winston, W., & Mintu-Wimsatt, A. T. (2013). *Environmental marketing: strategies, practice, theory, and research*. Routledge.
 - Zameer, H., Wang, Y., Yasmeen, H., Mofrad, A. A., & Waheed, A. (2018). Corporate image and customer satisfaction by virtue of employee engagement. *Human Systems Management*(37(2)), 233-248.
 - Zhu, Q., Sarkis, J., & Lai, K. H. (2008). Confirmation of a measurement model for green supply chain management practices implementation. *International journal of production economics*(111(2)), 261-273.

3

Gender Equality At Work – Through The Lens of Labour Laws With Special Reference To India

Mrs. Bulbul Roy Chowdhury (Ghosh)

Assistant Professor, School of Law,
Brainware University, Barasat, India

Abstract

Gender equality at the workplace is a fundamental feature of promoting an ethical and inclusive work environment. In India, labour laws significantly contribute to dealing with gender inequalities and ensuring equal opportunities for all employees, irrespective of their gender. This abstract discusses how Indian labour laws facilitate gender equality, promote ethical practice, and attempt to eliminate employment discrimination. It mentions some of the important legislative enactments such as the Equal Remuneration Act, 1976, the Maternity Benefit Act, 1961, and the Sexual Harassment of Women at Workplace (Prevention, Prohibition, and Redressal) Act, 2013, which together work to ensure fair treatment and protect the rights of female employees. The Equal Remuneration Act requires that the remuneration for men and women be the same for similar work, making it a primary legal provision challenging wage disparity across genders in any sector. The legal provision will be a central tool in countering one of the most intractable obstacles to gender equality in the workplace: unequal wages for similar jobs and responsibilities. The Maternity Benefit Act similarly protects the working woman from and after pregnancy, ensuring paid maternity leave and job security. This law has been critical in promoting a balanced work-life structure for women and supporting their right to family care without the risk of losing employment. It also reinforces ethical business practices by ensuring that women's contributions are recognized and respected, regardless of their familial roles. Another provision is the Sexual Harassment of Women at Workplace (Prevention, Prohibition, and Redressal) Act that provides for preventing sexual harassment in the workplace with mechanisms to lodge complaints and inquire into such cases. It provides for the safe and respectful workplace for all workers, a key step in stopping gender-based violence and discrimination at workplaces. While these labour laws represent considerable improvement, the question of implementation and effective efficacy leaves much to be desired. Sometimes, inadequate implementation, lack of awareness, and cultural biases foil full realization of gender equality. Therefore, effective implementation with a shift in cultural norms for increased inclusiveness is important in making sustainable and meaningful advancements on the path of

achieving gender equality at work in India. This abstract emphasizes labour laws in fostering ethical practices within Indian workplaces, by setting frameworks that protect women's rights and treat them with equality. Still, these require constant reform, better awareness campaigns, and strong enforcement mechanisms for these laws to translate into authentic, equitable workplace practices. Finally, labour laws are essential for fostering a gender-equal work environment where people of all genders are treated with respect, fairness, and dignity.

Keywords: Gender equality, Labour laws, Workplace ethics, Equal remuneration, Maternity benefits, Sexual Harassment.

♦ Introduction

This chapter provides an overview of the key concepts discussed in the subsequent chapters of this book. The book synthesizes state-of-the-art research on women's economic empowerment in developing country contexts, based on evidence produced by the Growth and Economic Opportunities for Women (GrOW) programme. It provides an overview of findings from GrOW studies that reveal that reducing certain types of gender inequalities, such as in education, can be beneficial to economic growth, but there is very little robust evidence that the same can be said for other inequalities, such as labour market opportunities or credit access (Gillian, 2021). This chapter detail how discriminatory gender norms affect women's work lives and economic opportunities. It also discusses the school-to-work transition of girls in six African countries, citing the multiple and cumulative labour market barriers women face in poverty situations, including limited educational opportunities, unpaid care and domestic work, and early marriage and pregnancy (Gillian, 2021). In one recent survey of the trends in working conditions regulation throughout the Asia and Pacific region, it was argued that there had been a lack of significant historical research into the evolution of labour law throughout much of the developing world (Mitchell, et al 2014). India, it seems, is quite possibly one such example. Though there is enormous literature on Indian labour law and other issues, much of this comes in very disjointed form, in the form of very short articles and notes on the very wide coverage of issues addressed in India's extensive corpus of legislation on employment, social security and labour. In addition, there are several classical labour law books and commentaries that are descriptive of labour institutions and laws (Mitchell, et al 2014). Nevertheless, an English language search for Indian labour law reveals little in the way of what could be described as a single overall history account of its development of central and provincial sources, and its context to its political, social and economic contexts. And, perversely in a country whose constitution guarantees some right of labour, and whose statute law consists of over 150 discrete pieces of labour legislation derived from central and state government power, there is no specialist journal of labour law enabling scholarly concern within the discipline despite the law's prima facie politic industrially-related interest. In this paper we have tried to provide an overview of the development of labour law in India (Mitchell,

et al 2014). Government of India's Ministry of Labour and Employment (MoLE) had initiated on 27 April, 2015 a "Code for Industrial Relations" in the place of the three main labour legislations namely Industrial Employment Act, 1946, the Industrial Disputes Act, 1947, and Trade Unions Act, 1926 (Sudipta, et al 2022). The MoLE put out the draft on its website and comments and critiques could be forwarded by interested stakeholders until May 26, 2015. The 2015 Labour Code on Industrial Relations Bill was enacted after that. Because of differences at the state level, an informal nature to a high extent, and low-quality labour statistics, all contributing to making the dynamics of workplaces complex, it is challenging to capture them under one discipline (Sudipta, et al 2022).

◆ **Historical Background of Indian Labour Law**

Indian labour legislation has historically been the backbone of socio-economic policy, aiming to balance the interests of workers and employers while stimulating industrial growth and social justice. Founded on a legacy of colonial law and post-independence reform, India's labour regulatory framework has changed radically over the decades. But of late, the last couple of years have also witnessed a noteworthy shift in the trend of regulating labour, whereby an effort was made to codify and amalgamate the present legislations, provide greater flexibility to employment measures, and simplify the ease of doing business (Aggarwal, 2023). Indian labour law and industrial relations debate is often compartmentalized into discrete blocks of time, which identify important moments in the evolution of the Indian state and in periods of economic growth and policy. In 1955, Ornati suggested that there were three important periods in the evolution of Indian labour law to that point. The first legislations were principally focused on the supply and regulation of labour, e.g., Indian equivalents of the Masters and Servants provisions in English law, but these were added to by a sequence of factory-style legislation, which provided some minimal degrees of protection, between the 1880s and 1930s (Mitchell, et al 2014). This bill was really a compromise of sorts between British economic interests, wishing protection for their domestic industry against the cheap Indian labour, and Indian social reformers wishing improvement in the conditions in Indian mills which were considered sub human. To some authors, this early stage of labour law reform was primarily 'formal or insignificant' and entailed a 'minimum of interference with the working conditions of labour and the relation between the employer and the worker'. There was a second period (1937-1947), Ornati reports, that was more inventive, and it began with the onset of 'Provincial Autonomy' in the second half of the 1930s, the focus of the Indian Congress Party on workers' rights (like standard of living, trade union rights, right to strike etc.), and the introduction of increased uniformity through the growth of regulation in the workplace. The third period in Ornati's analysis begins with the critical post-Independence legislation of the late 1940s and early 1950s. Ornati's analysis would suggest that there was nothing very eventful about early Indian labour law, but others have argued that there was important progress made in labour legislation in the immediate post-World War One period,

pointing specifically to the influence of several International Labour Organisation (ILO) conventions and the Royal Commission on Labour in the 1920s as major advances (Kennedy, 1965). Indian labour law continued to develop in a second sense; that is, in terms of the relationship between the employer and the individual worker. Here we can identify two broad types of intervention. The first concerns the continued regulation for protective labour standards which took place at both Central and State levels (Mitchell, et al 2014). The second type of development concerns employment security. At first the termination of, or dismissal from, employment was not a proper subject matter of an individual 'industrial dispute' under the Industrial Disputes Act 1947, and but little limitation thereon lay upon the employer's right to dismiss an employee as it pleased,⁷⁵ except in so far as it was required to provide appropriate notice (Mitchell, et al 2014). No restriction on the employer's right to retrench or remove redundant employees was either placed by law. However, through amendments to the Industrial Disputes Act of 1953, 1976 and 1982, the Central government increasingly made key new provisions about retrenchments, lay-offs, and industry and plant shutdowns (Kennedy, 1965).

♦ **Necessity of Labour Law Reforms**

It would be pertinent to remember that some of the issues and variables within India's regulatory environment and labour market do make labour law changes inevitable. The labour laws of India had historically been clumsy and scattered, involving many laws and regulations governing every aspect of labour relation like wages, work conditions, circumstances, labour disputes, social security, and health and safety at the workplace (Aggarwal, 2023). This diversity of rules results in typical instances of regulatory arbitrage, misinterpretation, and compliance problems, especially for firms with operations in more than one jurisdiction. Inflexibility of some clauses, along with onerous dispute settlement and enforcement provisions, smother the flexibility of employment practices and inhibit innovation, productivity, and the generation of jobs (Sharma, 2006). In addition, as globalization, technological advancement, and changes in the nature of employment are unfolding, greater is being achieved to understand that labour law needs to adapt to new challenges which include informal labour, precarious conditions of employment, and uneven access to Social Security (Pratap, 2015). Firms, particularly SMEs are under a huge burden of outdated laws and compliance, and this discourages the formation of formal employment, leads to inefficiency and informality. Complexity of legislations made the rules hard to understand and be complied with by employers and employees (Pratap, 2015).

♦ **Gender Equity In Labour Markets : An Introspection**

The aim of this chapter is to demonstrate how the gender inequalities of society are amplified and perpetuated by market pressures to hinder the capacity of women to contribute towards more balanced measures of economic growth (Naila, 2021). The chapter begins with the ways in which feminist and conventional economics have come to think about labour market discrimination and outlines the conceptual

structure by which an empirical investigation of limitations on women trying to earn a living might go forward. It subsequently provides an empirical account of the intersectional stratification of market opportunities, how gender combines with other socioeconomic disadvantages to locate men and women in the occupational hierarchies of the market (Browne, 2003). It subsequently proceeds to explain the processes through which gender disadvantages in and outside the home work to constrain women's ability to participate in paid work and the kind of work that they can do. The paper then employs study of waged workers and self-employment to make a more realistic account of such limitations as they operate in the labour market. It finally pulls out the policy implications of the analysis (Kabeer, 2021).

♦ **Implementayion of Gender Equility In Labour Market**

Gender equality is a central element of the United Nations' Sustainable Development Goals and a crucial determinant for the progress of economic growth. Women's labour market participation is one of the means by which significant progress can be achieved in the primary development goals of poverty reduction, health access, education, land, technology, and capital, sustainability of the environment, effectiveness of institutions, and democratic participation (Costagliola, 2021). Literature illustrates that a high rate of female labour force participation (in short, LFPR) can bear attributes of gender equality and developmental efficacy, e.g., expanded job opportunities, expanded education opportunity, and elevated domestic decision-making. A high proportion of most studies indicate that an empowered women's status would be associated with lowered fertility as well as reduced maternal mortality (Costagliola, 2021). There have been historical advances in certain areas of gender equality in the past decades in a vast majority of countries, including better education outcomes for women, enhanced life expectancy, lower maternal mortality, falling fertility rates, higher proportions of women elected to be political representatives, and more inclusive legislation to mitigate intimate partner violence (James, 2021). Even with such signs of gender equality, however, they never automatically translate to aggregate improvements to women's or, more broadly, to women's economic empowerment (WEE) labour market outcomes. The chapter summarizes findings from studies supported by the Growth and Economic Opportunities for Women (GrOW) program to provide better understanding of how labour markets structure gender inequalities and WEE (James, 2021). For instance, paid work access is discovered to affect marriage timing and fertility, education attainment, women's own independent earnings, and social networking. Women's labour force participation has the ability to change gender roles and norms in the long run, which dictate what women can do and what they can become throughout the life course. These results provide guidance to the creation of new policy that can possibly reverse the inequality between women and men in terms of labour market participation, career opportunities, and the quality of paid work (James, 2021).

♦ **Future Recommendations:**

Organization of a Labour Pay Commission

Fair remuneration with the establishment of a Labour Pay Commission can promote industrial advancement. Standardization of wage schemes through it has the potential to reduce wage gaps, though it should consider sectoral economic dimensions in order to balance productivity as well as investment.

Social Security and Judicial Safeguarding for Women

Expanding social security to working women would offset stigma and boost participation. Legal measures like anti-harassment laws, equal pay, and flexible working hours—successful in Sweden and Canada—can enhance workplace inclusion.

Protection Against Labour Exploitation

Strengthening the legislation to fight fraud and exploitation is required. Measures like monitoring digital payments, enhanced enforcement, and contracts made transparent can reduce wage theft and worker exploitation in a significant way.

Maternity and Paternity Leave

Greater paid parental leave supports gender equality and work-life balance. Generous Nordic policies have helped bring improved child well-being and women's employment retention. There can be an adoption of a fiscally sustainable model in India.

Right to Work & Protection of Rural Women

Policies ensuring work opportunities for marginalised sections, especially rural women, are required. Legal protection would enhance job security, fair wages, and social benefits.

Special Provisions for Migrant Labourers

Migrant workers need protection against exploitation. Low-cost housing, health insurance, and wage protection—modelled on Germany—need to be accorded high priority in India.

Enlarging Urban Employment Schemes

Upscaling MGNREGA-type schemes to cities can address urban unemployment, ensuring decent wages and jobs to workers in the unorganized sector.

Addressing Future Labour Market Trends

Labour legislations must adapt to the gig economy. Social protection for gig workers, such as in the UK and France, must be brought into Indian policies.

Case Studies and Comparative Analysis

Innovative practices in Germany, Sweden, and Singapore can be adopted for Indian labour reforms. Cross-country analyses can pick out priority areas for reform.

♦ **Conclusion**

The development of labour law in India is a continuous dynamic conversation of economic, social, and political forces. Since the colonial period until the present, labour legislation has been instrumental in shaping employment practices, industrial relations, and social security regimes. However, long-standing issues—i.e., overcomplicating of regulations, gender disparities, informal work, and the effects of globalization—point towards additional reforms to make the labour market more fair, inclusive, and equitable. The following recommendations,

i.e., creating a Labour Pay Commission, enhanced social security for women, guarding against exploitation, and bringing in gig workers and migrant workers, are intended to emphasize that a holistic, forward-thinking strategy is the hour of need. With the help of international best practice models used by nations such as Sweden, Canada, and Germany, useful inputs can be made about how Indian employee participation, labour rights, and economic prosperity can be further enhanced. Finally, labour law reforms need to reconcile the interests of employers with those of the employees while promoting economic growth, the generation of employment, as well as social justice. A strong, responsive legal framework harnessing technological change, gender equality, and green job opportunity will be central to making a fair and sustainable future labour market.

References:

1. The Growth and Economic Opportunities for Women programme -By Gillian Dowie, Arjan de Haan, Sonia Laszlo, Kate Grantham; Book Women's Economic Empowerment, Edition 1st Edition, First Published 2021.
2. Mitchell, R., Petra, M. A. H. Y., & Gahan, P. (2014). The evolution of labour law in India: an overview and commentary on regulatory objectives and development. *Asian Journal of Law and Society*, 1(2), 413-453.
3. Sudipta, A., & Kaushik, B. (2022). Indian Labour Laws are undergoing a Paradigm Transformation. *INTI Journal*, 2022. Indian Labour Laws are undergoing a Paradigm Transformation | *INTI Journal*
4. Aggarwal, A. (2023). Changing Paradigm of the Labour Laws in India: A legal Analysis. *Legal Research & Analysis*, 1(1). Changing Paradigm of the Labour Laws in India: A legal Analysis | *Legal Research & Analysis*
5. Kennedy, V. D. (1965). The sources and evolution of Indian labour relations policy. *Indian Journal of Industrial Relations*, 1(1), 15-40.
6. Sharma, A. N. (2006). Flexibility, employment and labour market reforms in India. *Economic and Political Weekly*, 2078-2085.
7. Pratap, S. (2015). *The political economy of labour law reforms in India*—part I.
8. Naila Kabeer, Book – *Women Empowerment*, Edition – 1st Edition. First Published
9. Browne, I., & Misra, J. (2003). The intersection of gender and race in the labour market. *Annual review of sociology*, 29(1), 487-513.
9. Kabeer, N. (2021). Gender equality, inclusive growth, and labour markets. *In Women's economic empowerment* (pp. 13-48). Routledge.
10. Costagliola, A. (2021). Labour participation and gender inequalities in India: Traditional gender norms in India and the decline in the Labour Force Participation Rate (LFPR). *The Indian Journal of Labour Economics*, 64(3), 531-542. Labour Participation and Gender Inequalities in India: Traditional Gender Norms in India and the Decline in the Labour Force Participation Rate (LFPR)

4

Effective Implementation of Corporate Social Responsibility: Legal and Ethical Considerations

S.A.Thameemul Ansari¹, T.A. Mohamed Ihlal²

¹Professor of English, Brainware University Kolkata

²MBA., Hindustan University, Chennai

Abstract

It has been observed that time and again several courts in India have heavily come down on the corporate houses for their apparent failure to put in place a robust mechanism to implement the provisions of Corporate Social Responsibility as outlined in various landmark judgements of the Supreme Court of India. The legal framework under which the corporate bodies are expected to operate and deliver in the best interest of society has been ignored and, in some cases, seriously violated. Environmental responsibility, ethical business practices, community engagement, employee well-being and sustainable supply chains are generally understood to be the important dimensions of Corporate Social Responsibility. Of these dimensions, the areas which are largely ignored include environmental responsibility, ethical business practices and community engagement. It is in this context, a serious academic discussion has to take place which should engage the academic, legal and corporate bodies in the direction of an initiating 'a self-regulating' mechanism within the broader legal framework to translate the stated commitment of CSR into action. This self-regulating mechanism should include not only the legal 'force' which balances the corporate interest with societal wellbeing but also ensure that greenwashing and misrepresentation in reporting the outcomes of CSR are avoided. For this exercise, the corporate houses have to work in tandem with various stakeholders in order to win the trust of the society, maintain transparency in administration of CSR policy, and to contribute what has been ordained by the law to ensure that their CSRs align with the global standards. This paper attempts to study the scope and dimensions of the self-regulating mechanism that every corporate house is expected to have in their system and a well-drafted policy to ensure the effective implementation of CSR policy in the larger interest of public.

Key Words: Corporate Social Responsibility, Self-regulating mechanism, Legal framework and global standards

♦ Introduction

“Effective implementation of Corporate Social Responsibility (CSR) depends on various factors which include, though not limited to strong leadership and commitment, clear CSR strategy and goals, stakeholder engagement, legal and ethical compliance, resource allocation, integration with core business operation, monitoring, evaluation and reporting. public awareness and communication, employee involvement and organizational culture, and partnerships and collaborations” (Aggarwal, M. 2016). Each of the above factors is related to specific conditions and contexts which influence the operational aspects of the company. Hence, in order to implement the CSR effectively, it is imperative to investigate the legal framework which has been put in place to determine the extent to which the CSRs are carried forward.

♦ Legal and Ethical Frameworks

“In India we have a well-defined legal framework for the CSR and this framework has been primarily governed by the Companies Act 2013 and its amendments.” (Aseeva, A. 2025) . The Companies Act, 2013 mandates CSR obligations for certain companies in India based on the criteria of the Net worth (500 Crore or more) , Turnover (Rs. 1000 Crore or more) and Net Profit (Rs 5 Crore or more). “This classification of companies based on their performance in terms the revenue that they generate is an instance of reasonable categorization.” (Agarwal,S.K. 2008) . The companies falling under these categories are expected to form a CSR committee at the board level and that committee is expected to recommend CSR policies, projects and budget allocations. The board of Directors are expected to ensure the CSR policy implementation and annual reporting are done properly as per the guidance.

“It is mandatory for the companies to spend at least 2% of their average net profit (before tax) of the last three financial years on CSR activities.” (Koul, R. 2020) . In case of a company failing to spend the required amount, then, it is obligatory on the company to explain the reason in its Board’s Report. “The unspent CSR funds must be transferred to a designated CSR fund as per the Schedule VII of the Act. It has to be underlined that the Schedule VII has outlined a number of CSR activities on which funds must be used” (Bharti, S. 2023) . “These activities include: eradicating hunger, poverty, and malnutrition, promoting health care and sanitation, education, including vocational skills and livelihood enhancement, gender equality and women empowerment, environmental sustainability and conservation, rural development projects, support for differently abled individuals, protection of national heritage, art and culture, disaster relief and rehabilitation and promotion of sports and Paralympic sports.” (Deo,N.2023).

At this juncture, it is important to note some of the established CSR rules and amendments. The Companies (Corporate Social Responsibility Policy) Rules , 2014 has outlined implementation guidelines which include matters related to : CSR fund utilization (unspent amounts must be transferred to government-approved CSR funds within a specific timeframe), Ongoing projects (CSR projects with a

duration of more than one year need separate reporting), Impact assessment (companies with CSR spending of Rs. 10 crore or more in the last three years must conduct impact assessment for project above Rs. 1 crore and Penalty for non-compliance (Companies failing to meet CSR obligation may face fines up to twice the unspent amount, capped at Rs. 1 crore.

“Also, in the matters related to Reporting and Disclosure Requirements, it has been made clear that companies must disclose CSR spending in the Board Report and Annual Report. Form CSR-1 must be filed for NGO registration to receive CSR funds and impact assessment reports must be published if required. The NITI Aayog and Ministry of Corporate Affairs (MCA) are the regulating authorities in order to check the aspects of compliance and reporting” (Das, J.k., & Arora, H. 2021). “In this context, it is pertinent to note that CSR expenditure is not considered a business deduction under Income Tax Act 1961” (Kaur, H. 2022). However, some CSR activities such as contributions to PM CARES fund, Swachh Bharat Kosh do qualify for income tax deductions. From the above analysis of Legal framework, it is very clear that CSR in India is legally binding for large corporation and it should ensure accountability and positive impact on social and environmental issues. “With strict compliance, reporting, and penalties, business houses must strategically plan CSR initiatives aligned with national priorities.” (Garg, K. 2024).

♦ **Reported Violations in CSR Initiatives**

Mitra, N. & Schmidpeter, R (2022) observe that despite the clear guidelines on CSR initiatives, it has been reported that companies do violate the norms frequently and these violations are viewed very seriously in the observations of courts. There are no less than six issues that have been brought out by our courts in the matters connected to CSR initiatives. These issues include :

1. Can unspent CSR funds be carried forward? (Tech Mahindra Ltd Vs Registrar of Companies. (2018)
2. Can CSR funds be used for political donations? (Suraksha Foundation Vs. Union of India (2019).
3. Can contributions to the PM CARES Fund be considered CSR? HDFC Bank Ltd Vs UOI. (2020)
4. Can penalties be imposed for non-compliance with CSR laws? (Nirma Ltd Vs Registrar of Companies. (2021)
5. Can CSR be used for product marketing? (Nestle India Ltd Vs UOI. (2022)
6. Can companies claim tax deduction on CSR spending? (Reliance Industries Ltd Vs. Income Tax Department. (2023)

When we analyze the above cases, we come to understand that issues largely related to CSR initiatives cover five broad areas. They are related to unspent CSR funds, diverting CSR funds for political donations, seeking exemption for contribution to PM CARES funds, imposition of penalties, diverting the funds for product marketing and claiming for tax deduction on CSR spending. It has been established by various courts and several other adjudicating bodies in India that :

1. CSR funds can't be carried forward to the next financial year as it has been observed in Tech Mahindra Ltd Vs Registrar of Companies Act. (2018).
2. CSR spending is legally enforceable and so non-compliance can lead to penalties as it has been established in the case of Nirma Ltd.
3. CSR funds can't be misused for political donations or marketing as per the court's ruling in Suraksha Foundation & Nestle cases.
4. CSR contribution to government relief funds are valid as per the reasoning of the court in HDFC Bank case and
5. CSR is not tax-deductible and it is expected of the companies to allocate it separately from business expenses as per the ruling in Reliance Case.

◆ **Governance Structure**

"Most of the issues related to CSR spending as reported and made available on public domain fall under the above categories. For the effective implementation of CSR policy, the companies must ensure that strict compliance with section 135 of the Companies Act 2013 related rules must be established." (Kadakia, R.S 2024). The companies must ensure first that CSR Governance Structure has to be put in place as per the recommendations of the court. In the Governance Structure, CSR committee of board members and senior executives has to be formed. "This committee is primarily responsible for the CSR policy, budget allocation and implementation strategy. Also, this committee is expected to draft a legally compliant CSR policy which defines CSR focus areas matching the Schedule VII in terms it is focus on education, healthcare and suitability goals." (Mishra, R.K & Sarkar. S. 2018). This committee is expected to oversee mandatory CSR spending and fund allocation. And finally, this committee is expected to file annual CSR reports with the Ministry of Corporate Affairs (MCA).

◆ **Management Strategy for Effective CSR Implementation**

Backer ,L.C. (2013) observes that in order to implement CSR effectively, strategic CSR planning and CSR execution and monitoring are required. Effective planning includes CSR vision and mission alignment. It is important for the companies to align CSR initiatives with corporate values and long-term goals. "Also, it is important to integrate CSR into the company's Environmental, social and Governance Strategy. In addition to this, the companies make sure that stakeholders engagement has to take place at periodic intervals."(Buhmann. K.2021) . It is advisable to engage in consultative process with the employees, communities, NGOs and government bodies. The companies can also collaborate with verified NGOs (CSR-1 Registered) for project execution. The companies can set measurable goals with clear KPIs and focus on scalable and sustainable projects. "Before selecting the project, there should be a proper needs assessment has to be done which should result in drafting a structured CSR project road map with milestone" (Chakrabarthy, B. 2011). Also, it is very critical to identify implementation partners and NGO collaboration. In terms of CSR Budget utilization and Audit, the companies should maintain detailed expense record to track CSR spending and it should conduct internal and external audits to ensure legal compliance. On the area of Monitoring

and Impact Assessment it is very important to measure CSR impact through data-driven reports or KPIs. And finally the companies are expected to publish a CSR Annual Report with spending details and project outcomes. In this report, there should be absolute transparency in CSR fund utilization and tax filings.

♦ **Risk Management and Continuous Improvement**

“The companies are expected to regularly update CSR policies to comply with new regulations and it is also recommended to conduct quarterly compliance checks with legal teams.” (Shah.S., & Ramamoorthy, V.E. 2013). Compliance risk mitigation is an important aspect which ensures effective implementation of CSR. Management Training and Employee Involvement, Technology-enabled CSR Tracking, Feedback and continuous improvement are the areas which ensure employee volunteering programs, project tracking, compliance reporting, transparency in CSR fund allocation and gathering stakeholder feedback and adjusting strategies according to ensure effective implementation of CSR policies. Hence from the above analysis, we understand that a robust CSR system which should integrate legal compliance, strategic planning and continuous monitoring is needed.

♦ **The Role of Self-regulation**

Despite all legal and ethical considerations which influence the companies to draft CSR policies and implement them as per the determined standards, it is always proved that ‘self-regulation’ is the best regulation. “We understand that Government-mandated CSR laws apply uniformly to all companies, but businesses have diverse industries, financial structures, and social impact goals.” (Porter.M.E. & Kramer.M.R. 2011). Self-regulation allows the companies to design CSR programs tailored to their own expertise. Sometimes, legal mandates can be rigid and might be based on general assumptions. But self-regulation enables faster adaptation to evolving social needs. Also, we have observed that when CSR is imposed by law, some companies do the bare minimum just to comply. But, self-regulation encourages the companies to go beyond the 2 per cent mandate and create long-term, sustainable impact. For example, Tata Group has been involved in CSR for decades even before laws mandated it. Self-regulated CSRs aligns with a company’s long term corporate values, brand image, and stakeholder expectation. It fosters a culture of social responsibility rather than mere compliance.

♦ **Self-regulated CSR Approaches**

Self-regulated CSR approaches encourage not only innovation but also efficiency. “It promotes creative and impactful solutions rather than government-mandated spending. ‘Internet Saathi’ initiative taken up by Google has provided digital literacy to rural women which evidently showcases an innovative CSR model beyond just donation” (Sharma, A., & Mandal, B.N.2020). When companies regulate their own CSR activities, funds are allocated based on real needs and impact rather than arbitrary legal requirements. It also strengthens corporate reputation and public trust which leads to higher customer loyalty and brand trust. Investors

and customers prefer companies that take proactive CSR actions rather than those which just comply with legal mandates. A self-driven CSR approach boots employee morale, productivity and retention as employees take pride in working for socially responsible companies.

“Another positive dimension for self-imposed CSR regulations is that it reduces bureaucratic burden and compliance cost.” (Muchlinski,P. 2007). Government imposed CSR regulations require extensive reporting which leads to administrative burden. Self-regulation eliminates red tape and it allows more funds to be spent on actual CSR work rather than compliance paperwork. Companies that self-regulate CSR can use global frameworks like ESG (Environmental, social, Governance) and GRI (Global Reporting Initiative) instead of just following legal norms.

♦ **Issues in Self-regulation**

“It is also true that companies can ignore CSRs and go scot-free. Critics who are against self-regulating mechanism might agree that without legal enforcement, companies may ignore CSR or fake commitments(greenwashing)” (Shelley, S. 2012) . Despite all the legal mandates in place, still companies do engage in greenwashing. Violations do happen when companies fail to meet ethical, environmental or social standards despite their legal or voluntary commitments. For example, Vedanta (India) faced allegations of environmental pollution and human rights abuses in India, particularly in Odisha and Tamil Nadu. Union Carbide Company’s gas leak led to thousands of deaths which is still regraded as one of worst industrial disasters in India. (Bhopal Gas Tragedy, India -1984). Coco-cola(India) faced accusations of depleting groundwater resources in areas like Plachimada (kerala) and Mehdiganj(UP). Communities suffered from water scarcity, local farmers reported contamination of soil and water resources. Nestle has been criticized for sourcing cocoa from farms that use child labor, particularly in West Africa. Amazan has been repeatedly accused of mistreating warehouse workers, imposing harsh working condition, and resisting unionization efforts. “Reports highlight long working hours, surveillance of employees and unsafe working conditions.”(Freeman. R.E. 2010) . Many companies have been criticized for avoiding the CSR obligation through various means. Exploiting loopholes in laws, Shell CSR Projects, Using CSR as a PR stunt, redirecting CSR funds for business gains, deliberate non-compliance and greenwashing. it is in this context we need to ask the questions of relevance and effectiveness of self-regulation.

♦ **Forces behind Self-regulating Mechanisms**

“There are three forces which work in subliminal levels to direct the companies to opt for self-regulating mechanism in terms of fulfilling their commitment of CSR.” (Carroll, A.B & Buchholtz. A.K. 2014) . These forces are : market pressure, public accountability and long-term business sustainability. Consumers, investors and employees prefer socially responsible businesses which adhere to the standards of ethics and implement CRSs through their mechanism of self-regulation. These companies increase their brand value through their constant engagement with the public towards establishing their trust by upholding CSR initiatives on their

own. The second factor is : public accountability. Social media and watchdog organization keep an eye on the corporate houses and any violation or instances of non-adherence come to the public notice within no time. These organizations expose the companies that neglect CSR. Also, the companies which ignore CSR for long time will also face the risk of losing reputation and investor confidence in them. Hence, while government regulation ensures basic compliance, self-regulation fosters real impact, innovation and efficiency. “Hence, the best CSR model would be a hybrid approach where the law sets a minimum benchmark (2% spending) whereas companies voluntarily exceed this threshold through self-driven initiatives. Thus self-regulation is the best regulation because it promotes genuine, impactful and sustainable CSR practice beyond mere legal compliance” (Deo, N, 2024) .

♦ **Self-regulated CSR Model**

In this context it is important to have a discussion on a self-regulated CSR model which has been proved to be very effective in its implementation. “Tata Group of Companies has developed model which deserves to be emulated by other companies in India. Even before section 135 of the Companies Act, 2013 came into being, Tata group had a long history of CSR involvement” (Garg, K. 2023) . According to the reports available, CSR practices have been carried out in Tata Group of Companies, most of which are self-regulated, for over 150 years with the establishment of Tata Trusts in 1892. This organization is one of India’s largest philanthropic organization which works on the areas of education, rural development and health care. Also, Tata Steel’s Community Welfare was established in 1907 which built several hospitals and housing for workers in Jamshedpur as part of Industrial social responsibility. This company has invested so much in the field of sustainable steel production without any legal pressure.

“While India law mandates 2% of net profit for CSR, Tata Group regularly spends more than required. It is to be underlined that more than 60% of Tata Sons’ profits go to philanthropy via Tata Trusts. Although no legal enforcement is needed, Tata invests billions into social good” (Kadakia, R.S. 2024) . Tata Consultancy Services (TCS) has invested phenomenal amount of money in bridging the digital divide by training underprivileged youth in IT and software skills. This has also invested in STEM education for more than one million students which is , again, beyond legal requirement. Tata Power’s Rural Electrification Project has brought solar energy to more than 50,000 villages in India, helping communities with no electricity access. Again, this too , a self-initiated activity, not mandated by law.

♦ **CSR Aligned with Core Business & Long-Term Impact**

Unlike forced CSR spending, Tata’s initiatives align with its expertise for maximum social impact. Tata Motors’ Sustainable Mobility is one such example. “This unit develops electric vehicles and green transport solutions to reduce pollution. Huge amount of money has been invested in Research and Development for eco-friendly automobile production” (Buhmann. K. 2021) . Tata Chemicals’ Water Purification Initiative, which is famously called Tata Swach, is an affordable water purifier,

which was introduced to provide clean drinking water to low-income families. This initiative was not profit-driven, but aimed at public health improvement. Tata's self-regulated CSR builds trust among customers, employees and investors. The company follows a voluntary Environmental, Social, Governance (ESG) framework, which is more comprehensive than the framework mandated by law. Unlike some other companies which only meet compliance standards, Tata Group ensures regular CSR impact assessments, detailed public disclosures of CSR spending and outcomes and Independent audits to maintain transparency.

AI enhanced CSR

"AI enhances Corporate Social Responsibility (CSR) by enabling data-driven decision-making, optimizing resource allocation, and ensuring compliance with Indian laws like the Companies Act, 2013. It helps track and measure CSR impact through sentiment analysis, sustainability metrics, and predictive analytics" (Kaur, H. 2022) . AI automates compliance reporting, enhances stakeholder engagement via chatbots, and enables fraud detection in CSR fund distribution. Additionally, AI-driven sustainability initiatives, such as smart waste management and carbon footprint reduction, improve corporate environmental responsibility. Companies like Tata Group and Infosys leverage AI for effective CSR implementation, ensuring transparency and maximizing social and environmental impact.

"AI is transforming CSR by making initiatives more strategic, measurable, and impactful. Through machine learning and big data analytics, companies can identify pressing social and environmental issues, predict future challenges, and design targeted interventions. AI-driven automation streamlines CSR reporting, ensuring transparency and compliance with regulations while reducing administrative burdens" (Das, J.K. Taneja, S., & Arora, H. 2021). Additionally, AI-powered platforms facilitate real-time monitoring of CSR projects, providing insights into their effectiveness and areas for improvement. By leveraging AI, businesses can personalize CSR efforts, foster stronger community engagement, and drive sustainable change, making corporate responsibility more efficient, data-driven, and results-oriented.

"While AI significantly enhances CSR initiatives, it also has limitations. AI-driven CSR relies heavily on data quality, and inaccurate or biased data can lead to misleading insights and ineffective strategies" (Bharti, 2023) . Moreover, AI lacks human empathy and ethical judgment, which are crucial for understanding complex social issues and engaging with communities on a deeper level. High implementation costs and the need for skilled professionals to manage AI systems can also be barriers for smaller organizations. "Additionally, excessive reliance on AI may reduce human oversight, leading to ethical concerns such as privacy violations and algorithmic biases. Thus, while AI is a powerful tool, it should complement, not replace, human-driven CSR efforts." (Aseeva, A. 2025) .

◆ Conclusion

From the above discussion it has been made convincing that Tata's Self – Regulating Model sets the Benchmark for the rest of the companies to follow. But,

can we expect the companies to exercise their option of self-regulation without any monitoring mechanism? The answer is: No. What is required is a balanced approach which requires a combination of legal frameworks, monitoring mechanism and stakeholders' engagements in order to ensure proper implementation of CSR. Legal and Regulatory Framework will work effectively when governments impose legal obligation on companies and those obligations should come from sector-specific guidelines. Also, companies should be required to publish CSR reports in their annual filings which has to be audited by independent third parties.

"Governments can offer tax deductions or rebates to encourage companies to invest in CSR initiatives" (Carroll, A.B., & Buchholtz, A.K. 2014). Public recognitions, ranking and certifications can motivate business houses to enhance their CSR efforts. Also, the companies, which fail to comply with CSR norms can face monetary fines or restrictions on business operations. Moreover, it is important to establish independent CSR regulatory bodies. The agencies appointed by the company should oversee CSR compliance and conduct impact assessment. All the CSR activities are to be reported on the websites and should get reflected in the financial reports too. It is also strongly recommended to encourage various stakeholders such as NGOs, civil societies, and local communities to monitor corporate CSR implementation. Hence, in order to ensure effective implementation of CSR practices, what is required is a combination of various factors which include not only self-regulation, but also constant monitoring by external bodies. Only when the moral forces within the organization and the regulatory forces from outside the organization correlate in order to bring pressure on the companies to adhere to the norms of CSR practices, we can have a much more meaningful system which will ensure effective implementation of CSR.

References

1. Aggarwal, M. (2016). *Ethics, Governance and Corporate Social Responsibility in India: Issues and Perspectives*
2. Agarwal, S. K. (2008). *Corporate Social Responsibility in India*. SAGE Publications India Pvt Ltd.
3. Aseeva, A. (2025). *From Corporate Social Responsibility to Corporate Social Liability: A Socio-Legal Study of Corporate Liability in Global Value Chains*. Bloomsbury Publishing India Pvt. Ltd.
4. Backer, L.C. (2013). *Corporate Social Responsibility in Weak Governance Zone*. Carolina Academic Press.
5. Bharti, S. (2023). *Corporate Social Responsibility in India: Law, Regulation and Politics*. Palgrave Macmillan
6. Buhmann, K. (2021) *Regulating Corporate Social Responsibility. A Case Study of Public-Private Regulation*. Routledge

7. Carroll, A.B., & Buchholtz, A.K. (2014). *Business and Society: Ethics, Sustainability, and Stakeholder Management*. Cengage Learning.
8. Chakrabarty, B. (2011). *Corporate Social Responsibility in India*. Routledge
9. Das, J. K., Taneja, S., & Arora, H. (Eds.). (2021). *Corporate Social Responsibility and Sustainable Development: Strategies, Practices and Business Models*. Routledge India
10. Deo, N. (2024). *Corporate Social Responsibility and Civil Society in India*. Anthem Press.
11. Freeman, R.E (2010). *Strategic Management: A Stakeholder Approach*. Cambridge University Press.
12. Garg, K. (2023). *Corporate Social Responsibility* (4th ed.). Bharat Law House Pvt. Ltd
13. Kadakia, R. S. (2024). *Corporate Social Responsibility: Law & Practice*
14. Kaur, H. (2022). *Facets of Corporate Governance and Corporate Social Responsibility in India*.
15. Koul, R. (2020). *A Study of Corporate Social Responsibility in India - A Paradigm Shift*.
16. Muchlinski, P. (2007). *Multinational Enterprises and the Law*. OUP
17. Mishra, R. K., Singh, P., & Sarkar, S. (2018). *Corporate Social Responsibility in India*
18. Mitra, N., & Schmidpeter, R. (Eds.). (2022). *Corporate Social Responsibility in India: Cases and Developments after the Legal Mandate*. Springer
19. Porter, M.E., & Kramer, M.R.(2011). *Creating Shared Value: Redefining Capitalism and the Role of Corporation in Society* . Harvard Business Review Press.
20. Shah, S., & Ramamoorthy, V. E. (2013). *Soulful Corporations: A Values-Based Perspective on Corporate Social Responsibility*.
21. Sharma, A., & Mandal, B. N. (2020). *Corporate Social Responsibility in India*.
22. Shelley, S. (2012). *Corporate Social Responsibility in Small, Medium and Large Industries: Evidence from India*.
23. United Nations Global Compact. (2000). *The Ten Principles of the UN Global Compact*. <https://www.unglobal.compact.org>



Detection of Mental Stress in Undergraduate Using Algorithms of Machine Learning Model

***Dr. Kaushik Chanda¹, Mr. Subhadip Nandi²,
Ms. Anudeepa Gon³, Mr. Soumya Roy⁴**

¹Associate Professor, Department of Computational Sciences,
Brainware University, India

^{2,3,4}Assistant Professor, Department of Computational Sciences,
Brainware University, India

Abstract

With growing acknowledgment towards stress over mental health and well-being worldwide, it has become yet another point of focus among young people. A period deemed carefree for many is now overlaid with layers of stress and exhaustion that lead them straight to the darkest negative emotions and conditions of various mental strain-- guttered feelings of being futile, acts of self-combustion, some resultant heart failure, and mental or psychic bursting. This study stresses evaluation of psychological stress in college students at critical times in their lives, one week before exams, and while immersed in internet usage, and looks at examining how stress from exams and recruitment stress, often left unnoticed, can influence internet usage habits.

Data collection from 205 students at Brainware University, Barasat, taking hyper-tense students under the stress barometer to stop the swordhand of what stress may do the rest of their lives, were assessed using Perceived Stress Score (PSS). The study examined four different types of classification methods: Linear Regression, Naïve Bayes, Random Forest, and Support Vector Machine (SVM). Out of these measures, the sensitivity, specificity and accuracy-given the data reduction method--will be used to evaluate the performance of the model. To ensure even more accuracy a 10-fold cross validation process was conducted.

There are some results from the entire study, one of them being that the maximum accuracy for Random Forest was 98%, which means psychology is very good in using it for mental stress classification. Social education plays a critical role in mental health studies, particularly since there is a paucity of understanding student stress as highlighted in the proposed study as well as an interpretation using the number of classifiers' brief.

Keywords: classification algorithms, psychological stress, stress perception score, sensitivity, specificity.

♦ Introduction

The term stress is often used interchangeably with the negative aspects of life that are experienced or life events that occur. The scientific literature about stress and anxiety offers various treatments to the topic. People are overnimbly and always in a hurry due to the ever increasing tempo of life, which further implies more interactions among other individuals hence causing stress. When one is in an environment that is causing them stress their reaction is to bring about alternatives, which in turn leads to changes in their mental operation and emotional mood. Stress levels can have an impact on natural or instinctual behaviors and orientations. An excess of such ubiquitous cessation may result in irreparable impairment [5]. Stress at times may exacerbate some other risk factor like losing adherence to proper dietary habits leading to several other diseases such as obesity, heart attack, diabetes, etc. Illnesses can also be manifested due to psychological factors such as stress linked hormone imbalances or cranial vasopressin etc. Ultimately, and alarmingly, the students are also potential victims of stress. It was in the article in British Journal of Medicine that I learned that, every two minutes a young person takes their own life, somehow. This therefore means that the children in school are not alone in trying to regain their normal states but also outside as well. This is the instinct she spoke about and that is the necessity of this method in illustrating any stressed individual to the end.

Namely the degree of intensity of a stress that would today otherwise be referred to as the stress level will be found out at the end of a survey conducted in schools. The stress levels in the students shall be studied and hopefully some respite shall be found in the near future or maybe in the long run. In the year 2015 alone there were the suicides of students totaling to 8, 934. Between 2010 and 2015 alone, 39,775 students committed suicide.

The impetus behind our paper is the aggravation of the suicide issue in the country. But when 92, people in nations from all over the world decide to end their lives, the total number of cases is 800,000 per annum. Of these 135 000 (17%) are citizens of India. So where is the plane now? Well, motivated by the other given reasons, the recommendation to go forth is regarded as paramount to the study of this specific concern. Other aspects of the psychodynamic suicide approach show the contemporary influence of factors on the dynamic process of suicide. For example, at the time that a person resolves to commit suicide, they can attribute such actions to stress, be it financial problems, relationship are not working well, or maybe there is sexual harassment. Upon considering it for some time, the person can think through various possible ways i.e. guns, drugs, or any poisonous substances or substances. In order to help prevent future suicides, it is essential that we address mental health issues.

♦ Related Work

In the last citations, stress was determined by observing the heart rate, the EMG signals, GSR hand and foot signals as well as respiration; and it was concluded that respiration is just the critical hospital factor for stress. The authors who

conducted the study and published the article defined the concept of stress and employed ECG signals to estimate stress levels [1]. The authors who conducted the research corresponds to the knowledge body [2-4], stress was evaluated with EEG and GSR in conjunction with other elements as these, EMG and SpO2. As opposed to the widespread assumption that it is possible to estimate stress based only on one or two ECG measurements, it is emphasizes that different stress assessments are used. The stress value of each the sensor data captured was used in the stress identification process. The study carried out in the article [6] used J48 algorithm, SMO, Bayesian Network algorithm to predict stress using data from 16 subjects, each of whom was exposed to distasteful situations, over four conditions of stress induction. It is clear that the study deals with stress since HRV and EEG are instruments used to locate the focus particularly [5]. More details such as HRV, ECG, heart rate are available in other tests conducted for purposes of assessment of stress levels. Moreover, in the milestone [6], there is a description of two tests and it appears that the decision tree algorithm on the dataset does not give the expectable results. At the beginning of semester stress is attributed to students which is quite the same at the end of it. The study found that even though there was not much tension during the first week, however, in the final week, students experienced desire for too much stress [7]. Previous efforts focused on the increase of the accuracy of the estimates of stress levels and its causes, and it involved the most animals of different species being the brain activity and evaluation and the self-administered questionnaires in the context of the people of rural and urban settings; Nevertheless, the less important objective should have covered more of such as the treatment and management of pagadi and then the use of proper patients for the definite suitable therapy. Thanks to neurochemistry pertaining brain activity with techniques extending to psychotherapy, termed Cognitive Neurology show the most effectiveness. There is a problem that most scientists have been facing when it comes to nano- and biotechnologies capacitance or rather how to use them especially in respect to the human brainng..

◆ Dataset and Preparation

The data for the study was collected for a total of 205 students of Brainware University, Barasat, and were analyzed on two variables i.e. - stress before exams and stress from the use of the internet. The aforementioned data regarding student stress was solicited using a Perceived Stress Scale (PSS) test, with the PSS serving as a tool for measuring psychological distress. The most relevant questions can be found in the survey were: under the rating method which contained five differing responses which are 1-never, 2- which is practically never; 3- never, 4- in a lot of cases, and 5-very often. Depending on the situation, the students ranked a frequency for every such situation.

The next step was to reflect every response under the descriptive statements and the questions. In doing so a weighted average model was decided upon with each question under consideration given a weight based on the level of involvement of

such a question within the totality of the investigation. Accordingly, the students were split up into three classes of stress—highly anxious, anxious, average [8]. Every respondent's data trimmed for pre processing was further compiled by adjusting for one student's stress data.

These questions were framed with an intention of user's feelings, and responses, towards recurring situations in their lives in the last one month. These weighted responses were useful in understanding how far their stress disturbed the students.

The use of the K-Fold Cross Validation was another techniques used to clearly understand the accuracy of the results. This method has helped in increasing the power of the analysis in providing high performance outputs and delivering adequate presentation concerning the various stress levels among the students.

♦ **Perceived Stress Scale (PSS):**

Sheldon Cohen, a psychologist by profession, invented the Perceived Stress Scale (PSS) to assess the stress level as perceived by an individual vis-a-vis the situation and how that individual copes with it. The evaluation involves how 'uncontrollable' and 'unpredictable' an individual feels his or her life is. Moreover, it is accompanied by questions about the most recent occurrences regarding the reality or within one's mind along the frontal lobe where such conditions of not living to the certain expectations are informed of people's normal day-to-day scenarios [9-11].

The questions primarily target ordinary, everyday life situations, inquiring from the participants how they feel or react to life experiences. It is mainly focused on measuring an extent to which their experiences are stressful and how it affects the participants. The finding of stress early is exactly what the PSS tends to do and offers a really good opportunity to use an inexpensive and very simple method of detecting intense stress before its effects escalate and become associated with more serious illness[12-14].

♦ **Proposed Approach**

We decided to use Machine Learning (ML) algorithms to diagnose as larm code blood pressure in the students and forecast stress in advance in order to avoid as larm code significant damage to their life. Stress tests measure students' tension in different scenarios. Task performance determines how high was the stress level. This natural composite model of stress also includes the PSS dataset gathering, pre-processing, feature extraction as in applying machine learning models of deviations from the benchmark models [15]. There are compared and assessed herein random forest cases, SVM cases, naïve bayes (NB) and KNN.

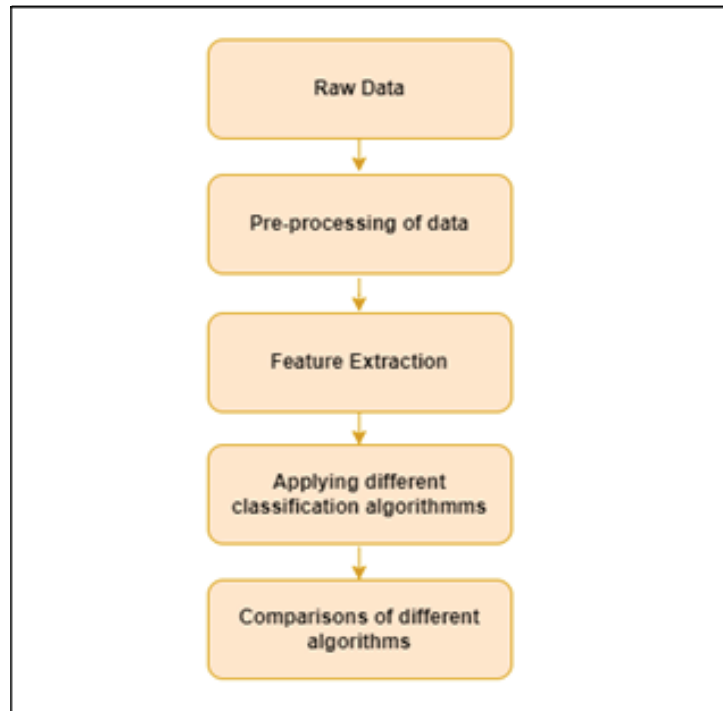


Figure 1: Overall Methodology used

♦ Description of Experimental Setup

This study was based on code written in Python as most libraries and tools useful in analysis of data and building of models are available and easy to use in this computer programming language.

5.1 Model Performance Parameters

Consider the following parameters to measure the performance of the model-N

Sensitivity (TPR)

Sensitivity is used to determine the model's effectiveness in detecting a disease in an individual. Sensitivity is the ratio of True Positives (TP), which are the people who are accurately identified, to the sum of TP and False Negatives (FN) and it is depicted in Equation (1):

$$\text{Sensitivity} = \frac{\text{TP}}{\text{TP} + \text{FN}} \quad \text{----- (1)}$$

Higher sensitivity indicates a strong model for identifying the individuals showing positive features.

Specificity (TNR)

The efficacy of the model in recognizing the individuals without the disease is gauged by specificity. It is the ratio of True Negatives (TN) to the sum of True Negatives (TN) and False Positives (FP). It is given by Equation (2):

$$\text{Specificity} = \frac{\text{TN}}{\text{TN} + \text{FP}} \quad \text{----- (2)}$$

Accuracy

An intensity of the overall validity is assessed through accuracy. It evaluates the ratio of correctly classified cases to the total number of cases do. It is given by Equation (3):

$$\text{Accuracy} = \frac{\text{TP} + \text{TN}}{\text{TP} + \text{TN} + \text{FP} + \text{FN}} \quad (3)$$

Accuracy gives an overall account on how good the model is in terms of classifying its instances correctly.

5.2 K-Fold Cross-Validation

Cross-validation is a highly robust technique that helps to find a more generalized behavior with respect to the input data. It gives a performance guarantee of the model by making better use of the data available through analysis. The dataset is divided into k equal subsets called folds, the model is then trained and validated k times, using fold proceeds as validation data during one run of the test and the remainder for training.

Instituting an out-of-sample prediction for a model built this way will reduce the problem such as that of overfitting, and one should consider how well the model generalizes to unseen data.

In the former analysis, in view of the tiny size of the distribution under examination, we flew with 10-fold cross-validation, which allowed the practitioners to divide the data into 10 equal partitions. The work was then repeated several times. Thus every fold served as validation exactly one time. In this way, the model was promoted in terms of both the efficiency and stability by way of analyzing a somewhat better representation of data [16-17].

♦ Classification algorithms

Classification algorithms are essential data mining techniques to identify, analyze and individuate the dat. These algorithms operate under principles that analyze the features of given data points and efficiently assign them to predefined classes with minimal error. The principal purpose of classification algorithms is to extract patterns and models that will represent important data classes in a given data set with adequate accuracy. Once the models are formed, they are used to predict the class label for new data points not seen during training.

On this study, we used classification algorithms to relax the components' long and indefinite stress duration. Thus, training comprised:

Many wouldn't perhaps keep track of the division of the dataset between testing and training subsets since three-fourths of the data were given to the train. In other words, one part was dedicated to training the model, and the remaining three were used to assess its performance [18].

Tested Model: The model was trained on the training data and tested against the remaining data. Its performance in terms of classification accuracy and to see how well it's held up was spectated.

The performance analysis showed that the algorithms best predict stress levels. They give the highest prediction rate for the unseen data Values through their classification algorithm every time.

6.1 Random Forest

The Random Forest algorithm integrates many decision trees to form a "forest." It can be used for making classifications as well as for regression. This algorithm selects the best features randomly provided by all features it considers during the run. In our experiment, we utilized 100 decision trees using the Gini index as an impurity measure for boosting the model performance.

6.2 Naive Bayes

Naive Bayes classifiers are a group of simple yet powerful "probabilistic classifiers" commonly used in machine learning. They are based on probabilistic observations hence are highly scalable. They are very flexible and need parameters ranging linearly with the number of features or predictors in any learning task. The simple and flexible nature of the classifier demonstrates the strong effectiveness in numerous divisions.

6.3 Support Vector Machine (SVM)

SVM can be implemented as a classifier that works by finding the optimal hyperplane that separates a dataset of data points into distinct classes. On a 2D plane, the hyperplane represents a line dividing the plane into two sections, with each class on either side. SVM is highly interrelated in cases where it is to classify new instances into their respective categories. It is a robust classification process.

6.4 K-Nearest Neighbor (k-NN)

The k-Nearest Neighbor algorithm is basically a non-parametric method and can be put into action in both classification and regression. It assigns a class to a data point which is closer to k similar neighbors. For classification, k-NN estimates which group a data point is a member of (e.g., Class A or Class B). In case of three groups also, the data will be classified as one of the three groups. The classification decision is made based on the majority class of the k closest neighbors (k is a value of one, giving you the closest neighbor class). Hence, if k=1, the data point will be assigned to the class its single nearest neighbor belongs to.

As for bigger values of k, the majority of the nearest-k neighbors are taken as the class, thereby better helping to make an informed decision.

The algorithm heavily relies on the values of k and the distance metric used to compute a distance measure.

◆ Results and Discussion

A pilot was conducted with four machine learning algorithms: Random Forest, Naïve Bayes, Support Vector Machine (SVM), and K-Nearest Neighbor (k-NN). This was measured based on the three performance parameters: specificity, sensitivity, and accuracy. Out of all the models considered, the Random Forest model has generally shown better performance with an accuracy of 85.33% and a specificity of 98%, along with a sensitivity of 74%. Following the Random Forest model, SVM performed well and as expected, with an accuracy of 75.71%, a specificity of 92%, and a sensitivity of 76%.

Table 1: Comparison of Different Algorithms

Sr. No.	Algorithm	Sensitivity (%)	Specificity (%)	Accuracy (%)
1	Random Forest	74	98	85.33
2	Naïve Bayes	55.55	85	61.52
3	SVM	76	92	75.71
4	K-NN	68	45	65.55

♦ Conclusions and Future Work

The Perceived Stress Scale (PSS) is one of the better-known systems for assessing stress levels, allowing for an initial examination of individuals dealing with higher-than-average levels of mental stress. Such early detection can help initiate timely talk therapy and intervention [19-21].

Four different classification algorithms—Random Forest, Naive Bayes, Support Vector Machine (SVM), and K-Nearest Neighbor (k-NN)—were employed in this study on the data of 205 students from Brainware University, Barsat. Evaluation of these algorithms was done on three main metrics of sensitivity, specificity, and accuracy, while in-house solutions were implemented for the small dataset. To this end, 10-fold cross-validation was adopted in order to bolster the robustness of analysis [22-24].

Our results showed that Random Forest performed the best among all four classification algorithms, applying a geometric theory of classification, which suits well under less data conditions.

Future work should be aimed at transforming methods like PSS into therapy-like techniques, producing more accurate results with less computational intensity. The enhancement of such techniques will ultimately prove beneficial for effective mental health assessment for improved mental well-being in communities.

References

1. Jung, Yuchae, and Yong Ik Yoon. "Multi-level assessment model for wellness service based on human mental stress level." *Multimedia Tools and Applications* 76.9 (2017): 11305-11317.
2. Norizam, Sulaiman. Determination and classification of human stress index using nonparametric analysis of EEG signals. Diss. Universiti Teknologi MARA, 2015.
3. <http://www.mindgarden.com/documents/PerceivedStressScale.pdf>
4. Adnan, Nadia, et al. "University students stress level and brainwave balancing index: Comparison between early and end of study semester." *Research and Development (SCOReD)*, 2012 IEEE Student Conference on. IEEE, 2012.

5. <https://www.hindustantimes.com/health-and-fitness/every-hour-one-student-commits-suicide-in-india/story-7UFFhSs6h1HNgrNO60FZ2O.html>
6. Subahni, Ahmad Rauf, Likun Xia, and Aamir Saeed Malik. "Association of mental stress with video games." *Intelligent and Advanced Systems (ICIAS)*, 2012 4th International Conference on. Vol. 1. IEEE, 2012.
7. <https://www.deccanchronicle.com/nation/in-other-news/190916/stress-depression-lead-to-suicides.html>
8. [Khosrowabadi, Reza, Chai Quek, Kai Keng Ang, Sau Wai Tung, and Michel Heijnen. "A Brain-Computer Interface for classifying EEG correlates of chronic mental stress." In *IJCNN*, pp. 757-762. 2011.
9. Subhani, Ahmad Rauf, Wajid Mumtaz, Mohamed Naufal Bin Mohamed Saad, Nidal Kamel, and Aamir Saeed Malik. "Machine learning framework for the detection of mental stress at multiple levels." *IEEE Access* 5 (2017): 13545-13556.
10. [Lederbogen, Florian, Peter Kirsch, Leila Haddad, Fabian Streit, Heike Tost, Philipp Schuch, Stefan Wüst et al. "City living and urban upbringing affect neural social stress processing in humans." *Nature* 474, no. 7352 (2011): 498.
11. Khosrowabadi, Reza, Chai Quek, Kai Keng Ang, Sau Wai Tung, and Michel Heijnen. "A Brain-Computer Interface for classifying EEG correlates of chronic mental stress." In *IJCNN*, pp. 757-762. 2011.
12. Ghaderi, A., Frounchi, J., Farnam, A.. Machine learning-based signal processing using physiological signals for stress detection. In: 2015 22nd Iranian Conference on Biomedical Engineering (ICBME). 2015, p. 93–98.
13. Liu, David, and Mark Ulrich. "Listen to Your Heart: Stress Prediction Using Consumer Heart Rate Sensors." [Online]. Retrieved from the Internet (2014)
14. Xu, Q., Nwe, T.L., Guan, C.. Cluster-based analysis for personalized stress evaluation using physiological signals. *IEEE Journal of biomedical and health informatics* 2015; 19(1):275–281.
15. Villarejo, M.V., Zapiain, B.G., Zorrilla, A.M. A stress sensor based on galvanic skin response (GSR) controlled by ZigBee. *Sensors* 2012; 12(5):6075–6101.
16. Gjoreski, M., Gjoreski, H., Lustrek, M., Gams, M.. Continuous stress detection using a wrist device: in the laboratory and real life. In: *Proceedings of the 2016 ACM International Joint Conference on Pervasive and Ubiquitous Computing: Adjunct*. ACM; 2016, p. 1185–1193.
17. Selvaraj, N. Psychological acute stress measurement using a wireless adhesive biosensor. In: 2015 37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC). 2015, p. 3137–3140.
18. Chanda, K., Roy, S., Mondal, H., & Bose, R. (2022). To Judge Depression and Mental Illness on Social Media Using Twitter. *Univers. J. Public Health*, 10, 116-129.
19. Roy, S. Security and Safety Issues in Online Community Web Sites and Physical Systems.
20. Chanda, K., Bhattacharjee, P., Roy, S., & Biswas, S. (2020, June). Intelligent data prognosis of recurrent of depression in medical diagnosis. In 2020 8th International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions)(ICRITO) (pp. 840-844). IEEE.

-
21. Ghosh, P., Kaushik, C., Kumar, R., & Roy, S. (2021). Role of Machine Learning in Diagnosis and Recovery from Depression. *Brainwave: A Multidisciplinary Journal*.
 22. Ghosh, M., Chatterjee, S., Das, D., Chanda, K., & Roy, S. (2021). An analytical study for predicting suicidal tendencies using machine learning algorithms. *Brainwaves*, 2, 137-146.
 23. CHANDA, K. (2022). Evaluating Mental Health Issues as Collected from Social Media by Machine Learning Techniques.
 24. Chanda, K., Ghosh, A., Dey, S., Bose, R., & Roy, S. (2022). Smart self-immolation prediction techniques: An analytical study for predicting suicidal tendencies using machine learning algorithms. *Smart IoT for Research and Industry*, 69-91.



Production of Bioplastics from Fruit Waste: Advancing Sustainability and Achieving SDG 12

Ujjal Dey¹, Maman Sidhanta¹, Suryadeep Kanji¹, Sandhimita Mondal²

¹Student, BSc in Biotechnology, Department of Biotechnology, Brainware University, Kolkata

²Associate Professor, Department of Biotechnology, Brainware University, Kolkata

Abstract

The rising environmental load resulting from plastic wastes calls for the creation of biodegradable substitutes for traditional petroleum-based plastics. This research considers the production of bioplastics from waste banana peels recovered from the canteen at the university using glycerol as a plasticizer to facilitate flexibility. Banana peels were treated by washing, boiling, drying, and grinding into paste form, adding a 5% aqueous acetic acid solution and plasticizers to yield the bioplastic mixture. The produced bioplastics were analyzed for alcohol and water solubility as well as for chemical composition via Fourier Transform Infrared Spectroscopy (FTIR). Water solubility tests indicated that 29% of the bioplastic material was soluble in water, which points towards partial water resistance and possible biodegradability in natural conditions. Alcohol solubility tests indicated that 42% of the bioplastic material was soluble in alcohol, which points towards moderate solvent resistance. FTIR analysis revealed significant functional groups such as hydroxyl (3227 cm^{-1}), alkyl (2930 cm^{-1}), carbonyl (1731 cm^{-1}), and ether or alcohol (1034 cm^{-1}) groups, verifying the existence of alcohols, esters, and hydrocarbons. These results confirm the successful addition of waste-based materials to the bioplastic matrix. Glycerol addition increased moisture content, improving flexibility but possibly degrading mechanical strength and shelf life. Biodegradability verified by solubility tests indicates that banana peel bioplastics provide a green substitute for conventional plastics, cutting plastic pollution and enabling a circular economy. Still, issues involving mechanical strength, water resistance, and industrial production at scale must be overcome for commercialization to be feasible. Additional research is necessary to streamline material properties and increase the usage of banana peel bioplastics in packaging and other industries. This research points to the potential of agricultural waste valorisation in the sustainable production of plastics, encouraging environmental sustainability and minimization of waste.

Keywords: Banana peel, waste, bioplastic, FTIR

♦ Introduction

Plastics are found in every walk of life; these are being utilized for multiple applications as plastics are inexpensive, available, and non-biodegradable (Shafqat et al., 2021). There is wide use of plastics in agriculture, packaging, pharmaceutical, textile, and construction. Plastic waste continues to accumulate in landfills, roadside collections, and marine systems, and is a critical source of environmental threat (Dube & Okuthe, 2023).

Banana ranks as the world's second largest fruit crop production, accounting for 16% of fruit output. Production was approximately 119 million tons worldwide in 2019, led by India with 31.5 million tons. Such huge production leaves about 3.5 million tons of banana peel (BP) waste each year, which comprises 30–40% of the weight. BP has a composition of 60–70% carbohydrates, 2–3% protein, 4–5% fiber, 4–5% lipids, and 20% water. Dry basis comprises cellulose (7.6–9.6%), pectin (10–21%), hemicellulose (6.4–9.4%), and lignin (6–12%). BP, on a timescale of two years, degrades to release greenhouse gases that contribute to climate change (Gawade, 2024). Plastics are extensively used, yet a large majority end up contaminating the environment for centuries. Packaging, particularly food packaging, accounts for the maximum consumption of fossil fuel-derived plastics and thereby contributes largely to plastic waste. With dwindling oil reserves, finding sustainable substitutes to replace traditional plastics is more important than ever (Ncube et al., 2020).

Biodegradable food packaging is inevitable considering the environmental and health impacts of nondegradable materials. Bioplastics derived from waste banana peels provide a green alternative by tapping their starch content for packaging purposes such as bags, wraps, and containers (Ghanbarzadeh et al., 2015).

The 2030 Agenda for Sustainable Development, which was endorsed by the UN in 2015, contains 17 SDGs to be attained by 2030. SDG 12 (Sustainable Consumption and Production) speaks to food waste minimization. Converting waste banana peel to bioplastics is a waste valorisation approach that enhances SDG 12 through the minimization of environmental footprint and advancing a circular economy (Prokic et al., 2022).

Bioplastics are manufactured by two primary methods: solution casting and liquid polymer. Solution casting was employed in this research, in which the polymer is dissolved in a solvent to create a concentrated solution, which is then filled into a mould and allowed to dry. Important parameters considered are thickness, solubility, water absorption, and biodegradability (Maria Abel et al., 2023).

Banana peel bioplastics are a substitute source of sustainable plastics since they incorporate natural fibres from peels waste. This minimizes environmental effects, landfilling buildup, and soil corruption. Banana peel bioplastics are renewable, biodegradable, and can be utilized to facilitate circular economy by converting agricultural waste into precious material. The objective is to produce sustainable bioplastics that minimize plastic pollution and wastage and encourage recycling into precious compounds.

♦ **Materials and method:**

Waste banana peels are collected from our university canteen.

Bioplastic production: Banana peel bioplastic (BPP) was prepared by washing banana peels, cutting them into small pieces, and boiling them in water for 30 minutes. The water was discarded, and the peels were dried before being blended into a paste. This was followed by the addition of the paste with a 5% aqueous acetic acid solution, plasticizers (glycerol, and their 1:1 combination), and varying amounts of water to prepare the bioplastic mixture using the modified method.

♦ **Characterization of Bioplastics**

Water solubility:

Bioplastics produced from banana peels will be an adequate substitute for traditional plastics, since they are eco-friendly; they eliminate waste and are biodegradable. The bio plastics are nontoxic and biodegradable in addition to being more environmentally friendly, thus an adequate substitute for the petroleum-derived plastics. Challenges with respect to water solubility, mechanical properties, and commercial scalability need to be overcome. Continued development and research can streamline material properties and improve wider applications of banana peel bioplastics. Alcohol Solubility is the solubility test that checks the degree at which the substance dissolves in alcohol, thus facilitating its compatibility and solubility behaviour in alcoholic solutions. (Shafqat et al., 2021)

$$\text{Solubility in Water (\%)} = \frac{(W_1 - W_2)}{W_1} \times 100$$

FT-IR study

FT-IR (Fourier Transform Infrared) method was used to study the chemical structure and determine functional groups in the bioplastic samples. The study was conducted on a Bruker Fourier Transform Infrared Spectrophotometer with an ATR (Attenuated Total Reflectance) accessory for direct measurement of the sample. FTIR spectra were collected over a wavenumber range of 4000–650 cm⁻¹ with a resolution of 2 cm⁻¹ to obtain detailed structural information. A sample of each was put on the ATR crystal, and light was transmitted through the sample to determine the absorbance and transmittance for various wavenumbers. Prior to measurement, the spectrophotometer was calibrated with a background scan to remove noise and environmental interference. The samples were scanned a minimum of three times to guarantee reproducibility and consistency of the data. The spectra collected were processed using Bruker OPUS software to determine the characteristic peaks for different functional groups, including hydroxyl (O-H), carbonyl (C=O), and alkyl (C-H) groups. The resultant spectral information was graphically plotted to determine the chemical structure and composition of the bioplastic samples.

The peaks were compared with reference spectra to validate the presence of particular functional groups and determine the impact of plasticizers and fillers

on the bioplastic matrix. The study gave information about the nature of bonding, molecular interactions, and general chemical stability of the bioplastic material (Shafqat et al., 2021).

Statistical analysis: All parameters were tested three times to ensure accuracy and consistency.

◆ **Results:**

Bioplastic Production: Bioplastic samples were prepared by changing plasticizer combinations and amounts for the production of Bioplastics.

Water solubility test: A 29% solubility bioplastic is merely stating that 29% of the bioplastic material dissolves or breaks down when exposed to water. This is a sign that the bioplastic is soluble in water to a certain degree and is a partial sign of biodegradability. The lower the solubility, the lower the solubility of the bioplastic in water and may be more time-consuming in degrading in the natural world than bioplastics with larger values of solubility.

Alcohol solubility test: 42% alcohol solubility of bioplastic means that 42% of the bioplastic substance is capable of dissolving or degrading when exposed to alcohol. This reveals that the bioplastic is quite intolerant to alcohol and soluble in alcohol solvents to some extent. The alcohol solubility might give some indication about the chemical composition and stability of the bioplastic, indicating towards the behaviour of the bioplastic when it is placed within alcohol or similar solvents. FTIR Analysis: Spectra of the bioplastic, showing that there is an array of functional groups within the range of the peaks at 3227 cm^{-1} , 2930 cm^{-1} , 1731 cm^{-1} , and 1034 cm^{-1} . O-H (hydroxyl) stretching vibrations that correspond to peaks at 3227 cm^{-1} would be for alcohols or phenolic functional groups. They could be resulting from plasticizers, for instance, glycerol, or natural polymers. The 2930 cm^{-1} band is due to alkyl C-H stretching (CH_2 and CH_3) showing that the polymer contains hydrocarbon chains. The 1731 cm^{-1} band is characteristic for C=O (carbonyl) stretching, which shows that the polymer can have ester or carboxyl groups, something one would normally find in naturally occurring polymers. The 1034 cm^{-1} band is due to C-O (ether or alcohol) stretching. Such a peak indicates oxygen-containing groups, like alcohols, ethers, or esters. Together, the peaks indicate the bioplastic is a mixture of alcohols, esters, and hydrocarbons, which are responsible for its biodegradability, flex, and plasticizer interaction.

◆ **Discussion:**

Banana, which is starch rich in amylose and amylopectin, was utilized for bioplastic manufacturing. Hydrochloric acid helps in amylopectin hydrolysis to assist in the process of film formation, whereas sodium hydroxide promotes plasticity and prevents brittleness by suppressing crystalline structure development. The bioplastic was identified by FTIR analysis for identifying chemical interaction and biomolecules. FTIR analysis revealed a range of $400\text{--}4000\text{ cm}^{-1}$ indicating the existence of functional groups within the bioplastic (Talukdar et al., 2025).

The bioplastic production from canteen waste using glycerol was found to enhance moisture content, which increased flexibility. This can be taken to imply that water

molecules infiltrate into the structure of the bioplastic, interact with the polymer matrix, and progressively induce breakdown and dissolution of this structure. This is a general property that biodegradable polymers could exhibit: such polymers have a natural composition, hence they are water-soluble since some of the natural components can readily be hydrolysed (Department of Soil and Water conservation Engineering, AEC&RI, TNAU, Coimbatore-641003 & Arthi, 2024). Nevertheless, the increased moisture content may undermine the mechanical properties and shelf life of the bioplastic, rendering it susceptible to degradation in humid environments (Kumar Chandra et al., 2024). Water solubility tests established the bio plastic's biodegradable nature, as water molecules dissolve the polymer structure. Such solubility promotes bioplastics as an environmentally friendly alternative to traditional plastics, minimizing long-term environmental pollution (Kharb & Saharan, 2022). Alcohol solubility tests established the bio plastic's solvent resistance, promoting its stability and durability.

The water solubility test in our research confirmed that the bioplastic had a solubility of 29%, meaning 29% of the material was dissolved upon contact with water. This indicates that the bioplastic is half soluble and biodegradable, where less solubility means more water resistance and slower degradation in the natural environment. Solubility and water resistance of bioplastics depend on starch content and plasticizer type. It has been observed that water uptake is increased by increasing starch content since starch is a hydrophilic substance. Plasticizers like glycerol and sorbitol minimize water uptake by breaking intermolecular interaction and increasing flexibility. Within plasticized samples, glycerol-plasticized samples had the maximum water uptake because glycerol has a high tendency to attract water molecules, which was followed by glycerol-sorbitol mixtures and sorbitol. Hence, the resulting solubility of 29% in this study might be due to the plasticizer type and ratio. If glycerol was the major plasticizer, the added hydrophilicity would account for the greater solubility, while sorbitol or a mixture of glycerol and sorbitol would improve water resistance and delay biodegradation. Therefore, the variation of plasticizer composition offers a method to manipulate the water resistance and biodegradability of bioplastics according to target uses (Shafqat et al., 2021).

The alcohol solubility test in our work revealed that 42% of the bioplastic dissolved with alcohol, manifesting moderate alcohol-based solvent resistance. This could imply that there is partial compatibility of the bioplastic's chemical structure with alcohol, with implications for how it might interact and remain stable in alcohol-concentrated solutions. Alcohol solubility also depends on plasticizer type and quantity. Investigations have revealed that starch-based bioplastics were more soluble in alcohol in the presence of plasticizers such as glycerol, which makes the polymer more flexible and lowers intermolecular interactions, thus improving solubility. Sorbitol samples, on the other hand, exhibited less alcohol solubility because of sorbitol's poor solubility in alcohol at room temperature. Additional addition of glycerol and sorbitol yielded intermediate solubility. The addition of fillers like powdered potato peels and wood dust further reduced alcohol solubility, as these fillers primarily contain starch and cellulose, which are insoluble in

alcohol. Therefore, the observed 42% alcohol solubility in our study could be attributed to the plasticizer composition and the absence of insoluble fillers, which collectively influence the bioplastic's chemical structure and solubility behaviour (Hernando et al., 2024).

The FTIR spectrum of bioplastics in our research showed the existence of different functional groups at 3227 cm^{-1} , 2930 cm^{-1} , 1731 cm^{-1} , and 1034 cm^{-1} , representing the existence of hydroxyl (O-H), alkyl (C-H), carbonyl (C=O), and ether or alcohol (C-O) groups, respectively. These functional groups indicate that the bioplastic is made up of alcohols, esters, and hydrocarbons, which make it biodegradable and flexible. Likewise, earlier research on red and green banana-derived bioplastics revealed similar FTIR profiles. Red banana-based bioplastic displayed hydroxyl stretching at 3273 cm^{-1} , C-H stretching at 2917 cm^{-1} , and carbonyl stretching at 2852 cm^{-1} (hemicellulose), as well as C-O stretching at 1408 cm^{-1} (lignin) and C-OR stretching at 1030 cm^{-1} . Green banana-derived bioplastic showed similar peaks, with hydroxyl stretching at 3276 cm^{-1} , C-H stretching at 2917 cm^{-1} , carbonyl stretching at 2849 cm^{-1} , and C-H bonding at 1555 cm^{-1} . The FTIR similarities between sources indicate that banana-derived bioplastics have a common structural skeleton, supporting the viability of banana peel waste as a consistent and sustainable raw material for bioplastic production (Ariffin et al., 2024).

FTIR analysis confirmed the successful introduction of waste-derived materials, thus establishing bio plastics as a good substitute for petroleum-based plastics (Hardi et al., 2024).

Conclusion: The research effectively proved the development of bioplastics from fruit waste, furthering sustainability and meeting the targets of SDG 12 by encouraging responsible consumption and production. The bioplastics developed possessed promising features with regard to solubility and chemical composition. The water solubility test indicated that the bioplastic was 29% soluble in water, pointing towards partial biodegradability and moderate water resistance. This implies that the bioplastic is degradable in natural settings but could resist quick breakdown under high-moisture situations. The alcohol solubility test indicated 42% solubility, which reflects moderate alcohol resistance and points towards the structural flexibility and chemical stability of the bioplastic in alcohol-based environments. FTIR analysis identified the existence of the main functional groups such as hydroxyl (O-H) stretching at 3227 cm^{-1} , C-H stretching at 2930 cm^{-1} , carbonyl (C=O) stretching at 1731 cm^{-1} , and C-O stretching at 1034 cm^{-1} . The presence of these functional groups implies that the bioplastic is made up of a complicated mixture of alcohols, esters, and hydrocarbons, which contribute to its mechanical strength, flexibility, and biodegradability. The findings emphasize the promise of fruit waste as a sustainable raw material for the manufacture of bioplastics, mitigating reliance on petroleum-based plastics and providing a green alternative for packaging and other uses. This study emphasizes the importance of using agricultural waste to achieve environmental sustainability.

Acknowledgements: The authors express their gratitude to the Honourable Chancellor of Brainware University for providing necessary infrastructure and facilities, as well as for supporting the seed grant project (BWU/PRJ/SMG/23-24/003).

References

1. Ariffin, I. A., Marsi, N., Huzaisham, N. A., M. Rus, A. Z., & Said, A. M. (2024). Fourier-transform infrared spectroscopy, energy-dispersive X-ray, and physical characteristics of biodegradable plastics of banana peel (*Musa Paradisiaca*) mixed tapioca starch. *Journal of Mechanical Engineering and Sciences*, 10127–10139. <https://doi.org/10.15282/jmes.18.3.2024.3.0800>
2. Department of Soil and Water conservation Engineering, AEC&RI, TNAU, Coimbatore-641003, & Arthi, Dr. T. (2024). Bioplastic- Futuristic Approach. *INTERANTIONAL JOURNAL OF SCIENTIFIC RESEARCH IN ENGINEERING AND MANAGEMENT*, 08(11), 1–5. <https://doi.org/10.55041/IJSREM39256>
3. Dube, E., & Okuthe, G. E. (2023). Plastics and Micro/Nano-Plastics (MNPs) in the Environment: Occurrence, Impact, and Toxicity. *International Journal of Environmental Research and Public Health*, 20(17), 6667. <https://doi.org/10.3390/ijerph20176667>
4. Gawade, J. (2024). In recent years, the interest of researchers in agricultural waste has increased, and instead of being ignored, the waste has become attractive to study and benefit from. Banana peels have attracted the attention of researchers due to their bioactive chem. *International Journal of Therapeutic Innovation*, 2(6), 240–246. <https://doi.org/10.55522/ijti.v2i6.0055>
5. Ghanbarzadeh, B., Oleyaei, S. A., & Almasi, H. (2015). Nanostructured Materials Utilized in Biopolymer-based Plastics for Food Packaging Applications. *Critical Reviews in Food Science and Nutrition*, 55(12), 1699–1723. <https://doi.org/10.1080/10408398.2012.731023>
6. Hardi, G. W., Dewi, B. K., Toruan, S. A. L., Nurjanah, S., Fitriana, S. A., & Yunita, L. (2024). Synthesis of Cellulose Straw and Rice Husk as Raw Materials for Bioplastic Production. *Hydrogen: Jurnal Kependidikan Kimia*, 12(6), 1419. <https://doi.org/10.33394/hjkk.v12i6.13795>
7. Hernando, H., M., Julianti, E., Nuryawan, A., Amaturrahim, S. A., Piliang, A. F. R., Yanhar, M. R., Goei, R., Soykeabkaew, N., Saputra, A. M. A., & Gea, S. (2024). *Investigating the Impact of Glycerol on the Properties of Oil Palm Trunk Starch Bioplastics Enhanced with Citric-Acid Epoxidized Palm Oil Oligomers*. <https://doi.org/10.2139/ssrn.4826965>
8. Kharb, J., & Saharan, R. (2022). Sustainable Biodegradable Plastics and their Applications: A Mini Review. *IOP Conference Series: Materials Science and Engineering*, 1248(1), 012008. <https://doi.org/10.1088/1757-899X/1248/1/012008>

9. Kumar Chandra, D., Kumar, A., & Mahapatra, C. (2024). Ecofriendly bioplastics from biowaste: Antimicrobial and functional enhancements for sustainable packaging. *European Polymer Journal*, 221, 113557. <https://doi.org/10.1016/j.eurpolymj.2024.113557>
10. Maria Abel, D., De Castro Ruas, J., De Castro Ruas, A., & Kok, T. (2023). Characterization Properties of Banana Peel as a Promising Alternative for Bioplastic. *E3S Web of Conferences*, 374, 00008. <https://doi.org/10.1051/e3sconf/202337400008>
11. Ncube, L. K., Ude, A. U., Ogunmuyiwa, E. N., Zulkifli, R., & Beas, I. N. (2020). Environmental Impact of Food Packaging Materials: A Review of Contemporary Development from Conventional Plastics to Polylactic Acid Based Materials. *Materials*, 13(21), 4994. <https://doi.org/10.3390/ma13214994>
12. Prokic, D., Stepanov, J., Curcic, Lj., Stojic, N., & Pucarevic, M. (2022). The role of circular economy in food waste management in fulfilling the United Nations' sustainable development goals. *Acta Universitatis Sapientiae, Alimentaria*, 15(1), 51–66. <https://doi.org/10.2478/ausal-2022-0005>
13. Shafqat, A., Al-Zaqri, N., Tahir, A., & Alsalmeh, A. (2021). Synthesis and characterization of starch based bioplastics using varying plant-based ingredients, plasticizers and natural fillers. *Saudi Journal of Biological Sciences*, 28(3), 1739–1749. <https://doi.org/10.1016/j.sjbs.2020.12.015>
14. Talukdar, N., Boro, R. C., Purkayastha, M. D., Nath, T., Rathi, S., & Sarmah, K. (2025). Exploring banana peels as a renewable source for bioplastic development. *International Journal of Advanced Biochemistry Research*, 9(1), 22–30. <https://doi.org/10.33545/26174693.2025.v9.i1a.3407>

15. Legends to figures

Figure 1: Flow chart of the production of Bio plastic

Figure 2: FTIR study

Table 1: Water and alcohol solubility percentage of bio plastics

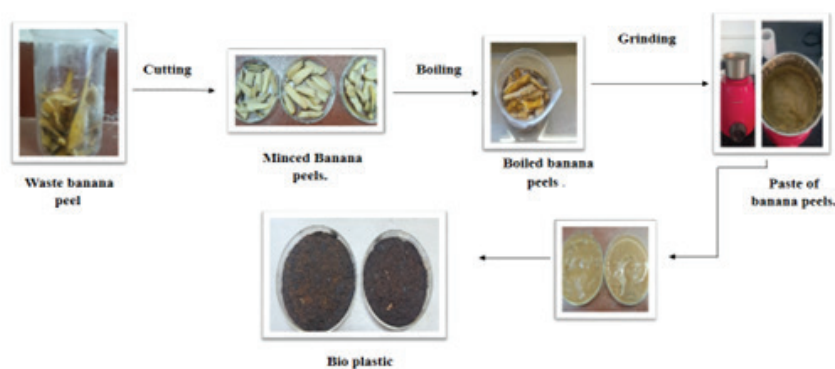


Figure 1

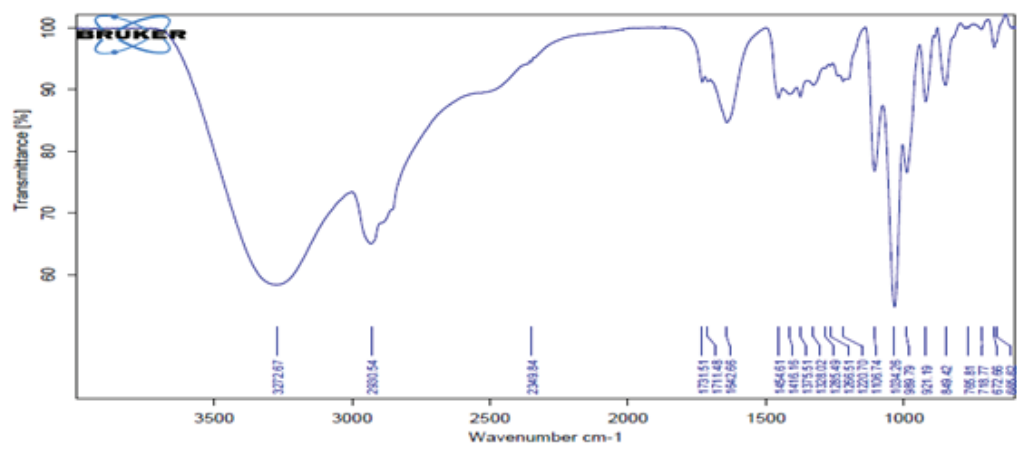


Figure 2

Water Solubility	29%
Alcohol solubility	42%

Table 1



Innovative Green Entrepreneurship And Eco Friendly Start-ups

¹**Dr. Jaswinder Kaur,** ²**Jaspreet Singh,** ²**Rahul**

¹Associate Professor, Department of Commerce, Guru Nanak Khalsa College, Yamunanagar

²Assistant Professor, Department of Commerce, Guru Nanak Khalsa College, Yamunanagar

Abstract

Political agreement over the need to separate environmental effects from economic growth is emerging. An important factor in the shift to a green economy is radical innovation. Although startups are important players in the creation and launch of radical sustainable innovation, little is known about the unique opportunities and constraints faced by green start-ups. In this conceptual paper, we integrate research and theory on innovation, entrepreneurship, and sustainable business practices to investigate why and how various green start-ups may face particular financing opportunities and challenges during the development of their goods and services. We expand on the existing typologies and create a new typology of green start-ups since they are too general to adequately describe the financial opportunities and problems of green start-ups. This typology will make it possible to do additional empirical research on the unique opportunities and difficulties faced by these start-ups in their quest for funding.

Keywords: strategy, green products and services, finance, typology, green start-ups, sustainable innovation, and sustainable entrepreneurship.

♦ Introduction of Study

In recent years, the green entrepreneurship industry has experienced remarkable growth. This is mostly because consumers are becoming more conscious of and demanding ecologically friendly goods and services. The green economy is a developing sector with many prospects for investors and entrepreneurs interested in renewable energy, conservation, recycling, sustainable energy, and sustainability consultancy. The idea also pertains to societal duty. Among the major issues that still confront our planet are pollution, deforestation, climate change, and water scarcity.

♦ **Green entrepreneurship Development in Indian Market:**

Discussions regarding the various facets of this new class of entrepreneurs in low-income communities are being sparked by the Indian market circumstances around the rise of green entrepreneurs (CS Sharma Roshni (2020). Because green entrepreneurship has high entrance requirements and encourages young entrepreneurs to look for innovative business ideas, it provides answers for youth unemployment and sustainability and tactics. According to reports, small-scale green enterprises that serve rural residents are established (Kaswan& Rathi, 2020).

Both good and negative effects of green entrepreneurship research can be shown in areas such waste management, product modification, effluent disposal, use of renewable resources, fierce rivalry, growing market share, climate change, etc. (Sujaya et al., 2019).

♦ **Sustainable Business Development in Indian Market:**

The term "greening" refers to the process of achieving ecological or environmental sustainability. There is a wealth of literature on the definitions and interpretations of the terms sustainability and sustainable development (Pearce & Barbier 2000). In every important metric, the United Nations Sustainable Development Goals (SDGs) have not only stalled but even declined. Over 420 million people have been forced farther below the global poverty line, and the number of people living in extreme poverty has risen by 7%. In developing nations, millions of workers have lost their jobs; according to ILO estimates, 255 million full-time equivalent jobs were lost in 2020. The 42.5 million Small and Medium Enterprises (SMEs) in India employ around 40% of the nation's workforce, according to the Confederation of Indian Industry (CII). When combined, they account for about 30% of the nation's GDP.

♦ **Importance of Green Business in India:**

After a very successful 2021, India's green bond issuance is expected to establish a new milestone in 2022. Given that the world's third-largest carbon dioxide emitter will require up to \$10 trillion to achieve carbon neutrality by 2070, analysts predict that corporate and bank issuers in India will likely engage more actively in the climate-related debt market. Additionally, more issuers will look to the offshore market, which has a larger and more diverse pool of investors that care about the climate. According to the U.K.-based green bond tracking organization Climate Bonds Initiative, India issued \$6.11 billion in green bonds in the first 11 months of 2021. Since the nation's first green bonds were issued in 2015, this year was the best.

♦ **Green and Sustainable Business Models:**

For businesses to be environmentally friendly and sustainable, green and sustainable business models are essential. According to Roome and Louche (2016), green business models can involve both innovative approaches to value creation and capture as well as the value destruction of current business models. In order to meet sustainability standards, companies must create novel concepts and business

plans rather than merely patching up existing, unsustainable solutions (Bocken et al. 2014). Businesses are creating a rebound effect if they increase their energy efficiency while also increasing production and sales due to increased affordability. Green businesses should concentrate on producing more robust and repairable goods so that they may generate income from sources other than product sales.

♦ **Key Issues in the Green Entrepreneurship Development:**

The primary concern pertains to the Eco-label startups' label awareness in order to support the growth of Green Start-ups. Business executives continue to place a high priority on immediate and short-term profits across all industries. In India, the government has supported financial aid when needed and launched numerous initiatives for green startups. Insufficient knowledge of green products in the manufacturing field, economical, and the development of new products is uncommon in this business setting. The best way to get this goods in front of customers is through advertisements.

♦ **Objectives of the Study:**

- To be aware of the obstacles and difficulties green entrepreneurs encounter in maintaining their business growth
- To understand the challenges faced by green startup and Indian enterprises in marketing their green business practices.
- To assess the Indian market's awareness of green entrepreneurs and startups in order to enhance sustainable enterprises.
- To identify government initiatives for new businesses and startups in the green entrepreneurship space.
- To become knowledgeable about sustainable business practices and green business strategies.

♦ **Advantages of Green Entrepreneurship:**

- **Obtaining the Green Label:** In several Indian market sectors, using solar energy rather than power savings can lessen global warming.
- **Lower Costs:** Using LCD monitors rather than CRT monitors will result in significant power savings due to their lower power consumption. You may reduce your electricity use by at least 75% by switching out your outdated incandescent or fluorescent light bulbs for more energy-efficient alternatives.
- **Public Relations:** From a business standpoint with the entrepreneurs, the public-green entrepreneurs partnership is a fantastic endeavor.
- The government and other non-profit organizations are providing grants and funding to these green entrepreneurs.
- **Conserving Energy:** This new, popular program already has applications for turning off lights and raising awareness.
- **Reducing and Recycling Materials:** You may cut down on paper use by 50% by printing on both sides of a sheet of paper before discarding it. For businesses with large office The requirement for power and cabling will be decreased by combining networks and using wireless networks.

- **Customer Reactions:** Using green practices can help your business draw in a lot more customers. Companies that certain consumer groups feel are falling behind in their transition to environmentally friendly business practices are being boycotted. Companies that make environmental issues a priority can draw in devoted clients and contribute to environmental preservation.

♦ **Characteristics of Green Entrepreneurship:**

A few traits to highlight for green entrepreneurship in the Indian market are as follows.

- Regulate policies and rules in order to maintain a sustainable business.
- To continue paying employees who work for the development of green businesses a fair compensation.

The company's branding should grow together with the policy advancements, and the business objectives should be linked with the benefits of the policy and for the benefit of the employees.

Top 5 Trends in Green Entrepreneurship

Innovation & Renewable Energy: For a while, the commercial sector was significantly impacted by renewable energy sources including solar, wind, and geothermal, which resulted in sustainable practices throughout the entire

- **Zero Waste:** Regardless matter whether it's energy, resources, goods, or food, waste is the antithesis of sustainable conduct.

More greenhouse gases are produced by food waste, and these gases have a greater potential to cause global warming than carbon dioxide. Supermarkets are progressively reconsidering their business strategies to reduce food waste as part of the New Entrepreneurial Idea. They are even going so far as to build zero-waste stores and recipe-based delivery services.

Energy-Efficient Housewares: Energy efficiency and sustainable business practices are having an impact on the residential sector, particularly on homeowner choices and house improvements. Customers are choosing renewable resources since construction companies and home service providers are offering green choices.

- **Operation Green:** By installing recycling bins and urging clients and staff to embrace paperless transactions, corporate and tech firms can reduce the carbon footprint of their operations.
- **Long-Term Advertising:** Eco-friendly advertising techniques and approaches are gaining traction.

♦ **Government Initiatives and Startups for Green Entrepreneurship:**

ZUNPULSE One of the top home-tech brands, Zunpulse, is reaching Indian families to help people save energy by using electrical equipment wisely while also offering comfort and convenience. The company is riding the growth curve of advanced home technology. The brand offers a variety of smart products, such as smart lightbulbs, smart air purifiers, smart water purifiers, smart AC remote controls, and devices for the outside of a home, such as smart doorbells and locks.

BON V TECHNOLOGY **BON V Technology**, an Odisha-based company, created the country's first AI-powered electric aircraft. Cargo is transported to extremely remote locations by AI aircraft RM001. It was created especially for cargo transportation, disaster supply package delivery, and rescue operations in steep areas.

Log9 Materials: Another sustainable Indian firm that was a part of VivaTech was Log9 Materials. Leaders in the energy sector like Petronas and investors like Sequoia and Exfinity Ventures have supported this battery technologies startup. This business has opened its first facility in India to create its RapidX battery packs, and it has developed a number of ground-breaking advances.

Recity: Although plastic is a major environmental issue, it may also be recycled to create an intriguing business without endangering the environment. Recity, a trash management company, operates within this framework. Users can now track and trace the origin of their recycled packaging thanks to tools created by this firm.

Taste: One billion people worldwide need a suitable place to live at the moment; 3D printing used in the building sector could offer them reasonably priced housing options. This is the industry in which Tvasta operates: compared to conventional residences, homes constructed using Tvasta technology are quicker and less expensive to construct. When compared to a typical home, the labor cost decreases to a fifth. Additionally, these homes may be "printed" in less than a week, creating a

Eco Buddy: produces eco-friendly goods with the goal of persuading consumers to use fewer nonbiodegradable items in their daily lives. The company provides alternatives for everyday necessities like cotton grocery bags, bamboo toothbrushes, and eco-friendly laundry and dishwashing detergents.

Beco is an additional illustration of a consumer goods start-up that produces eco-friendly substitutes for single-use plastic and paper goods.

Bare Necessities: employs a cradle-to-cradle strategy for every product, utilizing locally sourced, all-natural ingredients that don't negatively affect the environment or human health. It is a waste-free business.intending to alter India's trash narrative.

Sutrakaar Creations is an initiative started by Neerja Palisetty that provides a zero-waste option for recycling paper trash. Many unemployed women now have a source of income thanks to the start-up's environmentally friendly method of recycling paper into textiles.

♦ **Research Methodology:**

This study uses secondary data and is descriptive in nature. Various journal publications, newspapers, journals, agency reports, and the designated websites were the sources of the secondary data.

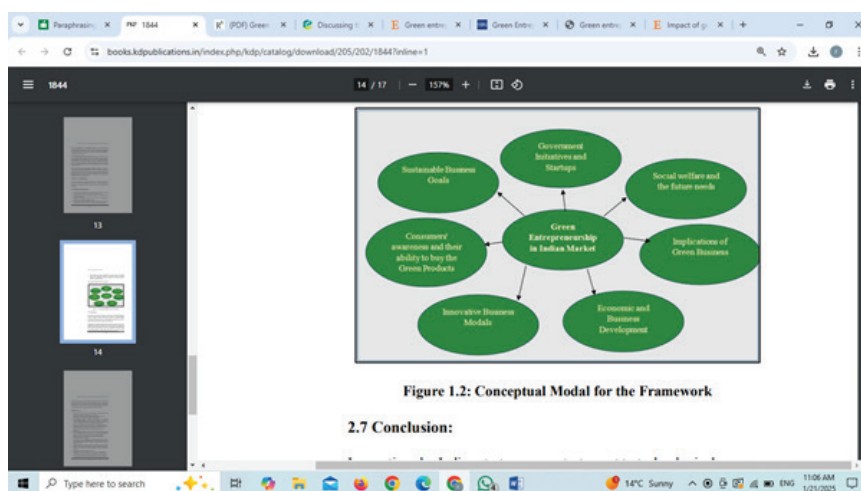
♦ **Findings and Suggestions:**

- In recent years, there have been more startups, green business development activities, and heightened awareness.

- Both developed and developing nations are now more cognizant of green initiatives.
- In order to maintain the objectives of the firm, a methodical approach to entrepreneurial development must be followed.
- Redefining business models has the potential to raise consumer awareness and enhance the purchasing power of consumers.

Although green startups have emerged in nearly every Indian area, including marketing, energy, construction, and the automotive sector, there is still a need for more awareness in order to purchase the green goods available in the Indian market.

◆ **Conceptual Modal for the Framework:**



◆ **Conclusion:**

Indian start-ups' innovations are evidence of both the advancement of technology and the advantages of conducting business with an eye toward the environment. A thriving environment has been established for start-ups to test and produce solutions tailored for India thanks to the global climate, government assistance, and private funding.

At the same time, India's fast expansion over the past few decades—particularly in the areas of infrastructure, urbanization, and mobility—has negatively altered the environment's equilibrium. The nation must make significant progress in becoming more ecologically friendly. Being environmentally friendly means changing lives and conserving resources by taking the required actions and putting forth intentional effort.

References

1. Bhargava, P. (2015, June 8). Green Business: Opportunities and challenges. Retrieved September 15, 2022, from <https://www.indiatoday.in/environment/story/green-businessopportunities-and-challenges-256285-2015-06-08>
2. CS Roshni Sharma. (2020). ANALYSIS OF GREEN ENTREPRENEURSHIP PRACTICES IN INDIA. International Journal of Advanced Research in Commerce, Management & Social Science (IJARCMSS), 03(04), pp 300-304. Retrieved from <https://www.inspirajournals.com/uploads/Issues/205855617.pdf>
3. Freedman, M. (2022, August 5). 23 Green Business Ideas for EcoMinded Entrepreneurs. Retrieved September 15, 2022, from <https://www.businessnewsdaily.com/5102-green-businessideas.html>
4. Green Entrepreneurship in India. (2021). Green Entrepreneurship in India. INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH AND TECHNOLOGY, 01(06). Retrieved from <https://ijmrtjournal.com/wp-content/uploads/2021/05/GreenEntrepreneurship-Article.pdf>
5. H., Sujaya and S., Meghana and Aithal, Sreeramana. (2019). Challenges Associated with Running A Green Business in India and Other Developing Countries. Munich Personal RePEc Archive. Retrieved from https://mpra.ub.uni-muenchen.de/95163/1/MPRA_paper_95163.pdf
6. Haldar, S. (2019). Green entrepreneurship in theory and practice: insights from India. International Journal of Green Economics, 13(2), 99. <https://doi.org/10.1504/ijge.2019.103232>
7. Hossain, M. (2021, October 24). Green Entrepreneurship – Everything in One Article. Retrieved September 15, 2022, from <https://businessdrilldown.com/greenentrepreneurship/#:%7E:text=%20Advantages%20of%20Green%20Entrepreneurship%20%201%>

8

The Shift Towards Privatized Healthcare In India

Dr. Dipanwita Chattopadhyay

Assistant Professor, Dept. of Hospital Management
Brainware University, Kolkata

Abstract

India's vision is highlighted by the growth of the healthcare industry through privatisation, the consequences of which have been diabolical. For the past few years public health advocates have enjoined for more government expenditure on public health and less dependence upon profit-driven health care. This study entrusts on the facets that elicits the privatisation of the healthcare sector in India. This review is a scoping study which is based on published documents including research publications, government reports, policies, articles and reports. The public healthcare sector remains vital for the entire population even though India sees an upward trend in privatisation. Focusing on the main objective to provide Health for All, the government must work on a platform to strengthen the public health sector. This paper pivots the involvement of private sectors in healthcare and is based on secondary data.

Keywords: Healthcare, India, Policies, Population, Privatisation, Public Health

♦ Introduction

After independence, India adopted a conventional economy that was not open to the outside world. With time, India merged with the global economy. India went through some major changes with respect to reforms in 1991 which led to the privatisation in India which also had certain consequences like stagnation and slow growth in the economy¹. The meaning of Privatisation is very broad in economics which ranges from the introduction of private capital to transition of a private economy to selling government owned assets. Since, the definition of privatisation is so varied, we shall look upon three main features². The ownership measures which describe how the ownership switches to private owners from all public ventures, the denationalization could be complete or partial. Secondly, Organizational measures describe how the measures can be taken to curtail the control of the state in public companies³. Third is the Operational measures which explain how the measures

are taken when public ventures, organizations and companies run into huge losses. Early in the 1990s and late in the 1980s, privatisation was a global trend to change the way that losses are made and efficient governmental sector. In developing and post-socialist countries, the process of transferring business ownership from the government to private individuals is known as privatization^{4,5}. Denationalization and destatization are other names for this. One of the tiffs for the privatisation is the estimated increase in efficiency that can result from the profit maximization that the private firms make⁶. India's economy is a hybrid of the public and private sectors who perform various activities in compliance with legislation, but the ineptitude and inefficiency in the public sector. The 1991 New Industrial Policy confined many redesigned measures like the sale of units that are losing money, strategic sales and private partnerships⁷. Hence, privatization aligned with the mixed economy's aims and the operational aspects of public sector units. The importance of privatisation was the enhancement and concentration of public sector businesses in areas of priority⁸. The 1991 policy of industries enabled the government to adopt strategic sales, disinvestment and loss-making unit sales to the private sector. Forfeited and strategic sales involved the ownership transfer to a private enterprise, hence it implied full privatisation⁹.

The process of converting a business or industry from the public to the private sector and this growing trend in developed and developing countries is known as privatization. The public sector is the area of the economy that is managed by government organizations¹⁰. Privatisation involves either removing of the barriers or restrictions that may prevent businesses and private individuals from participating in an industrial scope or sale of government held assets. Advocates of privatisation uphold that the private sector competitions foster efficient applications, lower prices, better quality products, less corruption and good services in the field of healthcare, law and education¹¹. The Privatisation term also imply several denotations within the trade and finances. For an instance, if an organization or an individual buy or purchases all the stocks in a public company, the process will be described as privatisation as the purchase will make it private effectively.

♦ **Methods**

Our study follows an exploring review of published documents. Contents from various journals, books, directories, libraries have been used as databases and search engines. Besides, other governmental and non-governmental documentations are reviewed as secondary data sources. Documents that are native to Indian Culture have also been included in this study.

♦ **Process and Plans For Privatisation:**

India's public healthcare is financed by state government budgets, local governments and Union Government. The GOI has recently established certain schemes like Ayushman Bharat or PM-JAY, financed by taxes¹². These programs allow low-income people to receive secondary and tertiary care with cashless benefits at private facilities. Conversely, private healthcare costs are funded by a mix of out-of-

pocket expenses, other sources and private health insurances. The government also provides financial assistance, which include non-interference on private entities, tax benefits and foreign investor's ownership in healthcare¹³. World Bank and WHO have been advocating for Public Private Partnerships as a method of ameliorating healthcare service delivery to the entire population¹⁴. PPP models of healthcare are expected to permit a rise in the contribution of private sector against healthcare spending and to unleash the health system's potential¹⁵. It is anticipated that the healthcare providers, entrepreneurs and the Indian economy will profit from a healthcare system that is driven by the market.

♦ **Development Towards Privatisation:**

India has been successful in achieving considerable development in its health indicators. Improvement has been seen in life expectancies, infant and maternal mortality have dropped and most of the National Health Programmes coverage has improved¹⁶. However, this progress is irregular as there are massive disparities in large states and the performances in some states are awfully low¹⁷.

There are certain prerequisites of India's Privatisation in Healthcare. There are major state-wide diversions, though India has reduced infant & maternal mortality rates and improved life expectancy. There is a shortage of culpability in the healthcare sector, which harms the overall development of India. Public health sector's efficiency has been truncated and it is considered as one of the ailing units and the capability to regulate the monitoring of public health system is too much¹⁸. At the state level, there is a famine of managerial expertise which implicates a tripping ramification down the line. In addition to these, there are multiple benefits of privatisation of healthcare. Private hospitals offer better quality of healthcare services and provides elasticity in timings with respect to schedules and treatment procedures of patients, as the patients are given proper time for treatment from doctors and the doctor-patient ratio is less than the government hospitals¹⁹. Highly populated countries often profit from the healthcare privatisation as the government sometimes fail to manage the necessities in all communities. The private venture has a wider disposition and sphere of activity which enable them to try something new to enhance healthcare service. As a result, there is a constant burden from the stakeholders but there is a lack of political interference as compared to government hospitals²⁰.

Health Expenditure in the yearly budget is as follows:

CATEGORY OF HEALTH EXPENDITURE	2019-2020 ACTUALS	2020-2021 BUDGET	2020-2021 REVISED	2020-2021 BUDGET
AYUSH	1784.16	2122.08	2322.08	2970.30
Health Research	1860.71	2100.00	4062.30	2663.00
Health and FW	62397.08	65011.80	78866.00	71268.77
Total Health	66041.95	69233.88	85250.38	76902.07
PMSSY	4683.48	6020.00	7517.25	7000.00
NRHM	29986.82	27039.00	28366.00	30100.00
NUHM	850.06	950.00	950.00	1000.00
PMJAY	3200.00	6400.00	3100.00	6400.00

30 years ago, India opened up the markets for private participation netted the benefits on multiple dimensions. The general pattern shows that the value for money or the value delivered for prices charged has risen in areas that are dominated by private sectors, thus boasting a fair degree of intensity with respect to a neck-to-neck competition²¹. Two important arenas- education and healthcare have gone the private way even though there has been the withering of state provisions. Given their special need for oversight, none of them can operate on a laissez-faire model. Besides, our trend of service privatisation cannot be relied upon in such economic hustle. Healthcare, an optimum welfare assurer ought to have the government designated as a predominant provider²².

There are certain challenges which are related to the privatisation of healthcare. Firstly, privatisation increases the aperture between rich and poor, which encourages the survival of the richest. Lack of regulation and control of private players lead to the exploitation of the customers both physically and financially²³. Secondly, the government sectors and other public hospitals provide free endowed services thereby moving most of the people away from private hospitals. Lastly, the patients who are not medically insured suffer from huge bills which in turn become the biggest challenge to deal with. Though these challenges are difficult to strive, they come hand in hand with certain measures. The measures stated hereafter have been taken from various management policies that were formulated after the evoke of certain problems²⁴. To enable the privatisation in healthcare, Government should make some guidelines regarding the areas of involvement, provision of services and quality of services provided. Associative or multidisciplinary approaches with the public health experts as leaders could help in the establishment of a better healthcare environment in India. A health advisory committee with experts should be created from the faculty of State Health Departments, Public Health,

Health Administration, NGOs and Business Management. Block-wise analysis, computerization of the health service and a separate public health cadre should be created at district level²⁵.

Goal of the private sectors should be efficiency and effectiveness in healthcare and not merely profit-making for the provision of quality services²⁶. If the structures are set properly, privatisation is beneficial, else, the purpose of healthcare will be defeated. To ensure equal representation of public and private sectors, the governing body should include members from the private sector too.

♦ **Impact of Privatisation:**

The private sector in India is participated in a variety of activities like health financing, provision of healthcare services, management of healthcare facilities, administration and manufacturing of health products²⁷. These activities are conducted by a number of businesses, both national and international, television stars, NGOs, non-profit entities, consultants and general practitioners. People often prefer the private sector due to insufficiency and consumer dissatisfaction of the public sector, better organization of private sector, better drug supply, better response, enhanced equity and access performance, user-friendliness and greater patient satisfaction²⁸. However, as stated earlier there are several grievances even on the shortcomings of the private sector. These include low quality of equipment, inadequate service, increased expenses for treatment, lack of qualified personnel, excessive testing and medication prescriptions, commission-based services, over servicing, technology-overuse, splitting of fees, negligence, lack of business ethics and dearth in the service quality²⁹.

♦ **Conclusions and Policy Implications :**

Due to a variety of social, economic, and political factors, the Indian government has made consistent attempts to commercialize healthcare. This has also been implicated by economic reforms and the public-private partnerships. Expanding middle class and rising need for high-quality medical care with some other operational practices add up to the attribution. Country's private healthcare sector remains inadequate as it is confronted with challenges which range from lack of business ethics, high billing to limited accessibility. Though India has already spectated partial privatisation, research recommends that this has led to additional burden of costs and social inequalities. The public platforms remain crucial in its financial role and also contributes to universal coverage. Government intervention is required to mitigate the detrimental effects of privatisation.

♦ **Acknowledgements :**

The authors deeply acknowledge the profound suggestions of the reviewers which helped to bring the script at its present form.

References

1. Rahman R, Alsharqi O. What drove the health system reforms in the Kingdom of Saudi Arabia? An analysis. *Int J Health Plann Manage*. 2019;34:100-110.
2. Ko M, Derosé KP, Needleman J, Ponce NA. Whose social capital matters? The case of U.S. urban public hospital closures and conversions to private ownership. *Soc Sci Med*. 2014;114:188-196.
3. Uplekar M. Private health care. *Soc Sci Med*. 2000;51:897-904.
4. Maarse H. The privatisation of health care in Europe: an eight-country analysis. *J Health Polit Policy Law*. 2006;31:981-1014.
5. Mercille J, Murphy E. What is privatisation? A political economy framework. *Environ Plan A*. 2017;49:1040-1059.
6. Tu J. Health care transformation in China—the privatisation and deprivatisation of health care in a Chinese county. *J Camb Stud*. 2013;8:33-44.
7. Bueuran M, Raballand G, Kapoor K. *Political Economy Studies: Are They Actionable? Some Lessons from Zambia*. Washington, DC: The World Bank; 2011.
8. Munn Z, Peters MDJ, Stern C, Tufanaru C, McArthur A, Aromataris E. Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. *BMC Med Res Methodol*. 2018;18:143.
9. Rahman R, Caulley D. The methodology of a study of the regulatory practices in the private health care sector of Bangladesh. *Qual Res J*. 2006;6:67.
10. Houser J. *Nursing Research*. Sudbury, MA: Jones & Bartlett Learning; 2011.
11. Lethbridge L. *Health Care Reforms and the Rise of Global Multinational Health Care Companies*. London, England: Public Services International Research Unit (PSIRU); 2015.
12. Alnaif M. Physicians' perception of health insurance in Saudi Arabia. *Saudi Med J*. 2006;27:693-699.
13. Landry MD, Taylor JS. The Saudi healthcare system: a view from the minaret. *World Health Popul*. 2012;13:65-67.
14. Al-Mazrou Y, Al-Ghaith T, Yazbeck A, Rabie T. How labor laws can transform health systems: the case of Saudi Arabia. *Health Syst Reform*. 2017;3:26-33.
15. Alkhamis A, Hassan A, Cosgrove P. Financing healthcare in Gulf Cooperation Council countries: a focus on Saudi Arabia. *Int J Health Plann Manage*. 2014;29:e64-e82.
16. Barakah DM, Alsaleh SA. The cooperative insurance in Saudi Arabia: a nucleus to health reform policy. Paper presented at: 2011 International Conference on Information and Finance, vol. 21; November 4-6, 2011; Kuala Lumpur, Malaysia Singapore: IACSIT Press; 2011.
17. Buse K, Waxman A. Public-private health partnership: a strategy for WHO. *B World Health Organ*. 2001;79:748-754.

18. KSA. Saudi Arabian Private Sector Participation Law Saudi Arabia Cabinet Decision No. 213/1418, Saudi Arabia Cabinet Decision No. 169/1419, through Saudi Arabia Cabinet Decision No. 308/1437, Saudi Arabia Cabinet Decision No. 355/1438, Saudi Arabia Cabinet Decision No. 665/1438. Riyadh National Centre for Privatisation; 2019.
19. Roehrich JK, Lewis MA, George G. Are public-private partnerships a healthy option? A systematic literature review. *Soc Sci Med.* 2014;113:110-119.
20. Colliers International. *Kingdom of Saudi Arabia Healthcare Overview* 2018. Dubai: Colliers International; 2018.
21. Goldberg G, Rosenthal M, eds. *Diminishing Welfare: A Cross-National Study of Social Provision.* Westport, CT: Greenwood Publishing Group, Inc.; 2002.
22. Hillestad SG, Berkowitz EN. *Health Care Market Strategy: From Planning to Action.* Burlington, Massachusutts: Jones & Bartlett Learning; 2018.
23. Alshahrani S, Alsadiq A. *Economic Growth and Government Spending in Saudi Arabia: An Empirical Investigation.* Washington, DC: International Monetary Fund; 2014.
24. IMF. *Country Information: Saudi Arabia.* Washington, DC: International Monetary Fund; 2016.
25. KSA. Towards Saudi Arabia's sustainable tomorrow: first voluntary national review 2018 - 1439. Paper presented at: UN High-Level Political Forum 2018 "Transformation Towards Sustainable and Resilient Societies"; July 9-18, 2018; New York, NY.
26. Trading Economics. Government budget by country. Published 2017. Accessed August 7, 2017.
27. Allurentis. *Saudi Arabia – 2016|2017 Discovering Business.* Sale, UK: Allurentis Limited; 2016.
28. Gengler L, Lambert L. Renegotiating the ruling Bargain: selling fiscal reform in the GCC. *Middle East J.* 2016;70:321-329.
29. Al Otaibi A. *An Assessment of the Role of Organisational Culture in Health Care Provision in Saudi Arabia.* Manchester, UK: Faculty of Humanities, Division of Innovation, Management and Policy, Manchester Business School, University of Manchester; 2010.



The Ethical Compass of Enterprise : Economic Judgement and the Law of Leadership

Dr. Santanu Ray Chaudhuri

Associate Professor, Department of Commerce
Brainware University, Barasat

Abstract

In the dynamic and evolving world of economics, leadership is not merely a tool for achieving success but a profound responsibility intertwined with ethical considerations. As entrepreneurs navigate the complex economic landscape, they are guided not only by economic essentials but also by ethical judgment, legal compliance, and societal values. The challenge lies in complying and balancing the economic success with integrity, fairness, and justice. This paper explores the nodes of ethics, economic decision-making, and law in modern leadership, highlighting the role of ethical leadership in fostering sustainable organizational success and social wellbeing. In this line, the discussion argues that effective leadership today requires more than compliance with legal standards; it necessitates a commitment to social responsibility, stakeholder interests, and long-term societal well-being. Ethical leadership, informed by legal frameworks and economic judgments, is vital in creating a just business environment that benefits both organizations and society. The present discussion tries to integrate moral reasoning with strategic decision-making, ensuring that business practices not only maximize financial growth but also promote ethical, legal, and social sustainability.

Keywords: Leadership, Ethics, Economic Decision-Making, Corporate Social Responsibility, Legal Compliance, Ethical Leadership

♦ Prelude: Critical Ethical Perspectives of Decision Making

In the multifaceted and ever-transforming landscape of the economics paradigm, leadership is not merely a protagonist but a profound responsibility. As entrepreneurial decision-makers navigate the vast terrain of economic choices, they are guided not only by financial necessities but also by a deeper ethical compass. The subtle balance between profitability, ethical conduct, and legal accountability defines the true essence of leadership in modern enterprise. The crux of the odyssey lies a fundamental question: how do leaders weigh their choices in the contemporary

modern world where economic perspectives are often conflicting with ethical considerations? This is where the intersection of ethics, economic judgment, and law comes into play—each influencing and shaping the course of modern business conduct. The challenge is not just about lashing success, but doing so in a manner that indorses integrity, justice, and social contract that business has with society. The present chapter tries to explore these intricate dynamics — where decisions must transcend mere legality and yield, aiming for a sustainable archetypal of leadership that inspires trust, fairness, and long-term growth in which economic judgment is guided by both ethics and the firm underpinning of law -- ensuring that leadership is not just about what is achieved, but how it is achieved.

Ethics, a foundation of philosophical inquiry, involves the study of moral principles that govern human behaviour. In the realm of English literature, the terms morality and ethics are oftentimes employed interchangeably, despite having sprung from distinct linguistic origins – the Latin *moralitas* and the Greek *ethikos* (Boatright, 1997). Traditionally, ethics is concerned with the concepts of right and wrong, good and bad, and how individuals ought to act. In philosophical terms, ethics deals with normative theories that guide human conduct and the justification for these norms. Ethics, when intertwined with logic, epistemology, and metaphysics, constitutes a venerable intellectual domain that traces its origins to Ancient Greece. This domain may take on a descriptive or regulatory form. Descriptive ethics seeks to examine the prevailing norms and behavioural standards within a specific social group, or endeavours to comprehend the processes of ethical reasoning and decision-making. In contrast, regulatory ethics engages in a more profound theoretical investigation of moral principles, grounded in argumentation and the foundational tenets of morality. Prominent schools of ethical thought, such as utilitarianism, deontology, and virtue ethics, all propose different standards for what constitutes Ethical and moral behaviour. Prominent schools of ethical thought, such as *utilitarianism*, *deontology*, and *virtue ethics*, offer distinct frameworks for addressing moral dilemmas. *Utilitarianism*, as proposed by thinkers like Jeremy Bentham and John Stuart Mill, asserts that the morality of an action should be judged based on its consequences, specifically its ability to maximize overall happiness or well-being (Bentham, 1789; Mill, 1863). Deontology, championed by Immanuel Kant, emphasizes adherence to moral duties and rules, regardless of the outcomes. For Kant, actions are morally right if they follow categorical essentials, which are principles those are universally obligatory (Kant, 1785). In contrast, *virtue ethics*, grounded in the teachings of Aristotle, stresses the importance of cultivating moral virtues and fostering good character traits, rather than simply adhering to rules or calculating consequences (Aristotle, 350 BCE).

Bentham's concept of the greatest happiness principle (Bentham, 1789) posits that an action is morally right if it promotes the greatest good for the greatest number. Mill, while agreeing with Bentham's general utilitarian principles, emphasized the quality of happiness, introducing a distinction between higher and lower pleasures and arguing that intellectual pleasures are more valuable than physical ones. In the 20th and 21st centuries, utilitarianism has been further refined to address

concerns related to its potential for injustice. Critics argue that utilitarianism can justify actions that sacrifice the well-being of minorities if those actions increase the overall happiness of society. John Rawls, in his influential work *A Theory of Justice* (1971), critiqued utilitarianism's focus on aggregate happiness, suggesting instead that justice should prioritize fairness and the protection of individual rights. Recent arguments, such as Kagan's (2018) *The Limits of Utilitarianism*, explore these critiques and the challenges of balancing the collective good with individual rights. Singer's (2011) *Practical Ethics* continues to be central in modern debates about the application of utilitarianism to issues such as animal rights, global poverty, and bioethics. Recent scholar like Brad Hooker (2000) in his paper *Ideal Code, Real World* argues that rule utilitarianism can avoid some of the pitfalls of act utilitarianism, particularly in promoting long-term societal happiness while safeguarding individual freedoms.

In his *Groundwork for the Metaphysics of Morals* (1785), Immanuel Kant focuses on moral duties and the adherence to universal rules, regardless of the consequences. Kant's philosophy is grounded in the *categorical domineering*, a moral law that requires individuals to act according to maxims that could be universally applied without contradiction. For Kant, an action is morally right if it respects the inherent dignity of each individual and is performed out of sense of duty, not based on its potential outcomes. In this way, deontology contrasts sharply with utilitarianism by rejecting the calculation of consequences as the determining factor in moral judgments. However, Kantian deontology has also faced criticism, particularly for its rigidity.

Critics like J.S. Mill (1863) in *Utilitarianism* argue that Kant's theory fails to consider the complexity of real-world situations where the consequences of actions should weigh heavily in moral considerations. Recent philosophical discussions have continued to grapple with these critiques. For instance, Christine Korsgaard (2009), in *The Sources of Normativity*, has argued that Kant's emphasis on duty can be reconciled with the human need for practical reasoning in decision-making. She explores how moral duties could be grounded in practical reason, thereby addressing some criticisms that Kantian ethics is too detached from real-world concerns. Further developments have sought to combine deontological principles with aspects of consequentialism. W. D. Ross (1930) introduced the concept of *prima facie* duties, which allow for moral flexibility while maintaining a framework of duty-based ethics. Modern scholars such as Thomas Scanlon (1998) in *What We Owe to Each Other* explore *contractualism*, a theory that builds on Kantian ethics but takes into account the mutual agreements that individuals would make in a fair, just society. Scanlon argues that morality involves principles that no one could reasonably reject, thus endeavouring to conduit the gap between deontology and the ethical considerations of consequentialism.

Virtue ethics, another trait, most notably articulated by Aristotle in his *Nicomachean Ethics* (350 BCE), emphasizes the cultivation of good character traits and virtues such as courage, temperance, and wisdom. Rather than focusing on rules or consequences, virtue ethics asks what kind of person one ought to be and how one

can develop moral virtues that enable one to live a flourishing life (*eudaimonia*). This theory stresses the importance of moral development and personal growth as the foundation for ethical behaviour. The virtue ethics framework has seen a resurgence in recent philosophical discourse, particularly through the work of Alasdair MacIntyre (1981) in *After Virtue*, where he critiques modern ethical theories for their disintegration and loss of a sense of community and moral tradition. According to MacIntyre, the cultivation of virtue requires a commitment to a particular social tradition that gives meaning to moral action. This view has influenced many contemporary approaches to ethics, which stress the importance of cultural and communal practices in the development of moral character.

♦ **Enterprise Decision Making in Economics**

Economics, traditionally seen as a study of resource allocation, production, and distribution, has evolved into a discipline that also incorporates normative questions about fairness, justice, and well-being. Economic decision-making often revolves around trade-offs and the assessment of outcomes. Ethical considerations in economics are crucial, as economic *decisions of enterprises* impact the welfare of individuals and societies. Economic theories such as classical economics, welfare economics, and behavioural economics contend with how resources should be distributed and what constitutes a just economic system. At its core, economics tries to make decisions regarding what, how and for whom to be produced, that is to say, the distributive aspects of value addition. The responses to these decisions are deeply influenced by the ethical principles underlying them. Classicists like Adam Smith, David Ricardo, and John Stuart Mill, largely promoted the idea that individual self-interest, when guided by market forces, would result in beneficial outcomes for society as a whole, an idea often referred to as the *invisible hand* (Smith, 1776). This notion, however, is not without its ethical concerns, particularly regarding the unequal distribution of wealth and the potential for exploitation in an unregulated market system. Welfare economists such as John Rawls focus on fairness and the equitable distribution of resources that increasingly intertwined with ethical questions. Economics, in its contemporary form, deals with the consequences of actions, the distribution of wealth, and the justice of economic systems—issues that directly intersect with ethics.

In a broader sense, the nexus between ethics and economic decision-making is illuminated through the lenses of Utilitarianism and Virtue ethics, both of which seek happiness as their ultimate goal, yet diverge in method. Utilitarianism champions personal gain, while Virtue ethics exalts moral integrity and the sacredness of interpersonal relations within society. In contrast to Deontological theories, which emphasize individual autonomy and universal principles, Virtue ethics pivots on the contextual fabric and prevailing social values. It weaves together the pursuit of optimal outcomes with ethical principles, acknowledging the potent influence of emotion. Thus, Virtue ethics offers a more comprehensive paradigm, intertwining personal conduct with societal duty, and remains highly pertinent to contemporary economic discourse (Cramer et al., 2005; Wentura and Degner, 2010).

Over time, however, economists such as John Maynard Keynes and Amartya Sen have shifted the focus from mere wealth accumulation to broader questions of well-being and social justice. Keynes emphasized the role of the state in ensuring economic stability and full employment, particularly during times of economic crisis (Keynes, 1936). Sen, on the other hand, introduced the capability approach, which argues that economic policies should aim not only at increasing income but at expanding individuals' capabilities and freedoms to lead the lives they value (Sen, 1999). This shift reflects an increasing recognition that economic policies should be evaluated not just in terms of efficiency, but also in terms of equity and justice. The assumptions of Neoclassical economics regarding human rationality in decision-making have long been the subject of critique. For instance, Frank Knight in his seminal work *Ethics of Competition and Other Essays* (1935), draws a distinction between the so-called economic man and the social man. He contends that human motives for behaviour are predominantly shaped by the ethical values that dominate the pertinent social group (Knight, 1935).

The question of what constitutes a just economic system remains at the forefront of economic and ethical debates. Should the goal of economic policy be to maximize overall wealth, or should it prioritize reducing inequality and providing for the disadvantaged? These questions often lead to the conflict between efficiency—maximizing total economic output—and equity—ensuring a fair distribution of resources and opportunities.

♦ **Conflicting Jurisprudential Perspectives in the Ethical and Economic Dimensions of Decision-Making**

Legal philosophy, or jurisprudence, represents the theoretical study of law and its fundamental principles, interrogating its essence, its sources of authority, and its intricate relationship with morality. In its pursuit of an understanding of the law, it navigates complex terrain, not only asking how law functions but also why it exists and how it ought to be applied. As it intersects with economic theory, legal philosophy invites rigorous debate about the role of law in safeguarding fairness, justice, and efficiency in an ever-evolving social landscape. The dynamic interplay between law and economics manifests most notably in pivotal areas such as property rights, contracts, taxation, and the regulation of markets. It is here that tensions arise—tensions between efficiency, which demands the maximization of resources, and justice, which insists on fairness, equity, and the protection of individual rights.

The concept of justice occupies a central space in legal philosophy and serves as a foundational consideration when law engages with economic thought. Justice, particularly in the context of decision-making of wealth distribution, taxation, and market regulation, has profound implications for shaping public policies and determining the degree of inequality permissible within a society. As one of the most influential voices in the field of justice, John Rawls's theory, articulated in his seminal work *A Theory of Justice* (1971), remains paramount. Rawls contends that justice should be understood as fairness, a concept deeply rooted in the equitable distribution of goods and opportunities. His famous difference principle asserts that

societal inequalities are only justified if they benefit the least advantaged members of society. This principle aligns closely with progressive taxation, social welfare programs, and policies designed to ameliorate inequality, positioning Rawlsian theory as a cornerstone of contemporary discussions on justice in economic decision making.

Rawls's later writings further develop the applicability of his theory to real-world economic systems. At the heart of his philosophy lies the original position, a hypothetical state where individuals, behind a *veil of ignorance* (unaware of their own social status, talents, or wealth), would agree on the principles that should govern their society. This powerful thought experiment seeks to ensure impartiality in the determination of justice, emphasizing that decision-makers must consider the well-being of society's most vulnerable members. Rawls's framework has had a transformative effect on economic policies, especially in addressing the challenges of inequality, with his emphasis on fairness influencing debates surrounding taxation, public goods, and the redistribution of wealth (Rawls, 1999).

However, Rawls's vision has faced significant critique, particularly from libertarian scholars such as Robert Nozick. In his *Anarchy, State, and Utopia* (1974), Nozick presents a direct challenge to Rawls's *redistributive model*, advocating instead for a theory of justice based on individual rights and minimal state intervention. Nozick's entitlement theory argues that as long as individuals acquire property justly—through legitimate acquisition, transfer, or rectification of injustices—then any distribution of wealth is fair, regardless of its inequality. Nozick's theory, with its emphasis on individual autonomy and property rights, offers a stark contrast to Rawlsian vision of societal redistribution, and it has significantly shaped libertarian views on taxation and government regulation, framing economic policy debates in terms of individual liberty versus collective welfare.

In recent decades, scholars such as Thomas Piketty have revitalized concerns regarding wealth inequality and the flaws of capitalist systems in addressing these disparities. In *Capital in the Twenty-First Century* (2014), Piketty critiques the concentration of wealth and income within capitalist economies, warning of the dangers of widening inequality. Piketty's analysis calls for a re-examination of economic policies and a renewed focus on progressive taxation and wealth redistribution, ideas resonating with Rawls's difference principle. Piketty's work serves as a modern response to the criticisms of Rawls and Nozick, emphasizing the need for a legal framework that balances economic efficiency with the pursuit of greater social justice and equality.

In contrast to justice theories that marry law with ethical considerations, legal positivism offers a more detached and systematic approach to the law. Prominent theorists such as John Austin (1832) and H.L.A. Hart (1961) argue that law is a construct of *sovereign authority*, a system of rules that is independent of moral or ethical evaluations. For legal positivists, the legitimacy of law lies not in its moral content but in its formal enactment by recognized authorities. This distinction allows for a neutral, objective application of law, where rules are enforced based on their legitimacy, not their ethical righteousness. In the realm of economic

transactions, legal positivism serves as a guiding framework for analyzing laws related to contracts, property rights, and market regulation without delving into questions of fairness or morality.

Hart, particularly in *The Concept of Law* (1961), introduced a nuanced understanding of legal systems, highlighting the importance of both primary rules (which impose duties and obligations) and secondary rules (which govern the creation, modification, and enforcement of primary rules). This theoretical framework provides a foundation for understanding how law operates in economic contexts without invoking moral judgments. The neutrality of legal positivism allows for the development of a robust legal infrastructure that supports economic activities by creating enforceable rules to regulate markets, protect property, and facilitate transactions. This approach is especially pertinent in the globalized world, where legal frameworks often span multiple jurisdictions and are applied without necessitating moral consensus among disparate legal systems.

However, legal positivism's separation of law and morality is not without its critics. Scholars like *Lon Fuller* (1969) challenge this distinction by asserting that law inherently involves moral considerations. In *The Morality of Law*, Fuller argues that legal systems must reflect certain moral principles, such as clarity, consistency, and fairness, to function effectively. He maintains that these internal moral values are intrinsic to the law's legitimacy and that a legal system devoid of such principles risks producing unjust outcomes. Fuller's critique reminds us that while law may be formally neutral, its application must still adhere to fundamental moral standards to ensure it serves the public good.

The ongoing tension between efficiency and equity remains a core debate in both legal and economic theory. While economic theory prioritizes efficiency—optimizing resources to achieve the greatest utility—legal systems must also contend with the demands of justice, equity, and fairness. This balance is most apparent in the regulation of markets, taxation, and property rights, where legal systems strive to promote efficiency without sacrificing principles of fairness. The law and economics movement, which applies economic reasoning to legal analysis, underscores this tension. For example, Coase's Theorem (1960) posits that, in the absence of transaction costs, private parties can negotiate solutions to externalities like pollution. However, this assumption does not account for the potential harm done to vulnerable communities, highlighting the need for a more balanced approach that takes fairness into account.

In response, thinkers like Amartya Sen (2009) argue that law must extend beyond the narrow focus on efficiency to address issues of inequality and human capabilities. Sen's *capabilities approach* asserts that the law should aim not only to maximize efficiency but to ensure that individuals have the opportunities and freedoms necessary to lead fulfilling lives. This perspective offers a more holistic view of justice, one that bridges the gap between economic efficiency and social equity, ultimately guiding the development of legal systems that serve both economic and ethical imperatives.

Thus, the intersection of legal philosophy and economic theory remains a fertile ground for intellectual exploration, as scholars continue to grapple with the balance between efficiency, justice, and morality. As the global landscape shifts and new economic challenges emerge, the law's role in promoting both fairness and efficiency will continue to be a pivotal area of inquiry, one that demands careful consideration of both philosophical principles and practical concerns.

The ongoing debate between efficiency and justice in legal philosophy has important implications for economic policy decision. For example, progressive taxation, minimum wage laws, and social welfare programs all seek to balance economic efficiency with fairness by redistributing wealth and providing a safety net for the disadvantaged. These policies raise questions about the appropriate role of the state in regulating markets and ensuring that economic outcomes are just.

♦ **Contemporary Ethical Perspectives in Law of Leadership and Enterprise Decision Making: Emergence of Behavioural Economics**

In the ever-shifting landscape of contemporary ethical thought, while the philosophical traits of *utilitarianism*, *deontology*, and *virtue ethics* obstinately persevere as the principal frameworks of moral analysis, an emerging wave of novel ethical paradigms seeks to address the increasingly intricate and globalized challenges of present period. These novel theories are not merely for fulfilment of academic interests, nonetheless represent imperative and multi-layered responses to societal transformations, embodying an elegant reconsideration of the ethical terrain.

The Law of *Leadership* refers to the principles, rules, and ethical boundaries that guide the actions and decisions of leaders within an organization or enterprise. It involves not only the formal legal frameworks, such as regulatory compliance and corporate governance, but also the informal, ethical boundaries that govern responsible leadership. Effective leadership in modern times is not just about power or authority; it is about navigating complex legal landscapes while maintaining integrity, transparency, and social responsibility. Leaders must balance the imperatives of law, ethics, and organizational success to create a sustainable and just business environment. A significant aspect of the Law of Leadership is the adherence to legal principles that govern corporate behaviour, including financial regulations, labour laws, and environmental standards. However, the Law of Leadership extends beyond legal compliance to encompass ethical leadership. Scholars such as Brown and Treviño (2006) have emphasized that ethical leadership involves influencing others to do the right thing, even when no one is watching, and it is integral to creating a trustworthy, transparent corporate culture.

In addition, contemporary scholars have recognized that leadership cannot operate in isolation from the legal context. The law provides the framework within which business leaders make decisions, but it also serves as a reflection of societal values and ethics. As noted by Bass (1990), transformational leadership is closely tied to the ability of leaders to inspire followers toward ethical and socially responsible behaviour while ensuring that organizational goals are met. The concept of

"legal ethics" in leadership, as explored by Treviño, den Nieuwenboer, and Kish-Gephart (2014), highlights those leaders are ethically accountable not only to their organizations but also to the broader community and the law. Moreover, the Law of Leadership necessitates the consideration of corporate social responsibility (CSR). Modern leadership recognizes that adherence to the law is necessary, but not sufficient. Leaders are increasingly expected to act in ways that advance societal good, maintain ethical standards, and align with the values of various stakeholders, including employees, consumers, and communities (Carroll, 2015). This notion is reflected in the rise of "ethical leadership," which emphasizes guiding organizations through complex moral and legal dilemmas in a manner that respects both the letter and spirit of the law.

In that stroke, Martha Nussbaum (2001) in *Upheavals of Thought* extends Aristotelian virtue ethics to address modern concerns about justice, particularly in relation to human capabilities and dignity. Nussbaum's capabilities approach, a framework developed in collaboration with Amartya Sen, emphasizes the importance of enabling individuals to function fully in society. This approach integrates virtue ethics with an understanding of the structural conditions necessary for human flourishing, thus highlighting the intersection of individual moral development with social and economic justice. In a more applied sense, virtue ethics has also been used in contemporary debates about business ethics. Rebecca L. Walker (2011), in her article *Virtue Ethics and Business: Towards an Ethical Framework for Corporate Responsibility*, explores how cultivating virtues such as honesty and integrity can be applied in business practices, pushing the discussion beyond mere compliance with laws or profit maximization to the broader development of ethical business practices.

The ethical dimensions of business decisions are not mere postscripts, but are intrinsic to the long-term sustainability and legitimacy of leadership (Werhane, 2018). Leadership that integrates ethics into economic decision-making is not only beneficial for reputation but is increasingly seen as a strategic asset that fosters trust and loyalty among economic agents and stakeholders (Kassinis&Vafeas, 2018). Ethical leadership, therefore, represents a dynamic interplay between values, behaviour, and organizational outcomes, the legal landscape further complicates this equation, providing a framework that both restricts and guides decision-making. As scholars such as Heath (2016) have argued, while legal compliance is fundamental, it cannot be the singular guiding principle for business leaders. Economic judgment, though often dictated by market forces, must be tempered by an ethical consideration of its wider social impact, ensuring that decisions align not just with the letter of the law but also with its spirit. The importance of aligning these spheres is emphasized in the growing body of research on Corporate Social Responsibility (CSR), where firms are seen as not only profit-driven entities but as active contributors to social good (Fombrun, 2019). In this context, leadership becomes a moral endeavour, requiring leaders to not only respond to the demands of stakeholders but also anticipate the broader ethical implications of their decisions.

The critical interplay between these diverse ethical perspectives underscores the profound complexity inherent in decision-making. It reveals that no single ethical theory can alone provide a complete framework for navigating the moral warren of modern life. Rather, it is through the synthesis and tautness of these perspectives—utilitarian, deontological, virtuous, care-based, and postmodern—that is the most dynamic and contextually sensitive responses to the ethical challenges of our interconnected world. In this sense, ethical decision-making is not about choosing one path over another, but rather engaging in a fluid, ongoing negotiation between competing moral imperatives. As society grapples with issues ranging from climate change to global inequality, these evolving frameworks offer critical tools for understanding and addressing the moral challenges of new kinds.

In that way, one of the most notable recent developments in economics is the rise of behavioural economics, which integrates insights from psychology into traditional economic models. Behavioural economics challenges the assumption of rational decision-making in classical economics and recognizes that human behaviour is often influenced by biases, emotions, and social norms. This approach has significant implications for legal frameworks, as it calls for more nuanced and human-cantered policies. For instance, the concept of "nudging," popularized by economists Richard Thaler and Cass Sunstein, suggests that legal frameworks can be designed to guide individuals toward making better decisions without restricting their freedom of choice. This concept has been applied in various domains, including public health, financial planning, and environmental policy. Thus, Behavioural economics provides a robust framework for ethical enterprise decision-making and leadership by integrating psychological insights into economic theory. It challenges the notion of pure rationality, recognizing that cognitive biases and social preferences influence choices. In ethical decision-making, this understanding encourages leaders to consider the broader societal impact of their actions, fostering fairness and long-term value creation. By acknowledging human imperfections, behavioural economics aligns with the law of leadership, emphasizing the need for transparent, empathetic, and socially responsible governance of modern era. The modern leaders who apply these principles are better equipped to make decisions that benefit both organizations and the communities as a whole, although very challenging to apply in many circumstances.

◆ **Concluding Remarks**

The reconciliation of legal philosophy and economic principles is a complex and ongoing challenge, especially in a rapidly developing and diverse country. The intersection of ethics, law, and economics requires careful consideration of the trade-offs between efficiency, equity, and justice. Legal frameworks, both at the national and international levels, play a critical role in shaping the economic landscape.

Recent developments in economic decision making under the aegis of laws of leadership, including the rise of behavioural economics reflect a growing recognition of the importance of ethics in economic decision-making by the enterprises in the form of CSR. However, debates over inequality, globalization, and corporate

responsibility continue to challenge policymakers and legal scholars alike. Ultimately, the successful reconciliation of legal and economic principles will depend on the ability to craft policies that promote both economic efficiency and social justice, ensuring that the benefits of growth are shared equitably and that ethical considerations remain at the heart of economic decision-making.

The ethical dimensions of economic decision-making in the age of globalization are complex and multifaceted. As globalization continues to shape economic landscapes, policymakers and scholars must balance economic efficiency with social justice, human dignity, and sustainability. By drawing on ethical frameworks such as utilitarianism, Rawlsian justice, and the capabilities approach, economic decision-makers can better navigate the moral challenges posed by global inequalities, poverty, labour rights, and environmental concerns. Recent research in economics and ethics has highlighted the urgent need for global governance structures that promote equitable economic policies, ensure fair trade, and address climate change. As these issues continue to evolve, interdisciplinary approaches that integrate ethics with economic theory will be crucial for creating a more just and sustainable global economic system.

References

1. Aristotle. (350 BCE). *Nicomachean ethics* (W. D. Ross, Trans.).
2. Austin, J. (1832). *The province of jurisprudence determined*.
3. Bentham, J. (1789). *An introduction to the principles of morals and legislation*.
4. Caney, S. (2014). *Justice and the distribution of global carbon*. Oxford University Press.
5. Chan, A., & Pun, N. (2010). *The labour process in global production*. Cambridge University Press.
6. Coase, R. H. (1960). The problem of social cost. *Journal of Law and Economics*, 3, 1-44.
7. Fuller, L. (1969). *The morality of law*. Yale University Press.
8. Gilligan, C. (1982). *In a different voice: Psychological theory and women's development*. Harvard University Press.
9. Hart, H. L. A. (1961). *The concept of law*. Oxford University Press.
10. Kagan, S. (2018). *The limits of utilitarianism*. Oxford University Press.
11. Kant, I. (1785). *Groundwork for the metaphysics of morals*.
12. Nozick, R. (1974). *Anarchy, state, and utopia*. Basic Books.
13. Nussbaum, M. (2001). *Upheavals of thought: The intelligence of emotions*. Cambridge University Press.
14. Piketty, T. (2014). *Capital in the twenty-first century*. Harvard University Press.
15. Rawls, J. (1971). *A theory of justice*. Harvard University Press.

-
16. Rawls, J. (1999). *The law of peoples*. Harvard University Press.
 17. Sen, A. (1999). *Development as freedom*. Oxford University Press.
 18. Sen, A. (2009). *The idea of justice*. Harvard University Press.
 19. Stiglitz, J. (2002). *Globalization and its discontents*. W.W. Norton & Company.
 20. Thaler, R. H., & Sunstein, C. R. (2008). *Nudge: Improving decisions about health, wealth, and happiness*. Yale University Press.
 21. The Constitution of India. (1950). Ministry of Law and Justice, Government of India.

10

Tracing the Efficacy of the Rights of Persons with Disabilities Act 2016: A Study in Mizoram

LawmsangpuiaRalte

Ph. D Scholar, Department of Sociology,
Mizoram University, lawmsangpuiaralte46@gmail.com

Abstract

Disability is a long-standing issue in society. It has a profound impact in all spheres of life including the personal, social, economic and political aspects of individuals. Women with disabilities have experienced double the discrimination, neglect and exploitation to an extended point, as compared to men with disabilities. Mizoram has one of the lowest number of women with disabilities in northeast India but the problems faced by these women is still the same, if not more than the other women with disabilities in northeast. The Rights of Persons with Disabilities (RPwD) Act 2016 was introduced in the country to lessen the sufferings of persons with disabilities and under this Act, the promotion of their rights and welfare are encouraged. This Act also ensures their inclusive development. However, the effectiveness of this Act is questionable as the enforcement is still weak in many parts of the country, including Mizoram state. This paper focuses on the effectiveness of the implementation of RPwD Act 2016 in Mizoram, from the perspectives of women with disabilities in the state and the study concludes by stating the need to have strong government and policy makers at every level for the successful implementation of the Act.

Key Words: Critical analysis, Disability, Mizoram, RPwD Act 2016, Women with disabilities.

♦ Introduction

Disability is a condition which affects the individual at the medical, social, technical and health levels. The conditions of disability lead to a marginalized place in society, culture, economics and politics. The hardships associated with disability are centuries old and persons with disabilities have constantly fell into a state of stigmatization and inferiority complex, which in turn denied them of their chances for holistic development in society. In present day, disability has been constructed and studied with a more humanist attitude, especially in the field of academics. The study of disability has started to point out problems associated with disabilities

stating that persons with disabilities are not the problem but rather, the problem lies in the creation of “normalcy” by society which in turn leads to the creation of “problems” centred around persons with disabilities (Niemann, 2005).

The term “disability” is a word which is largely associated with negativities. It can be acquired right from the onset of birth or can be acquired at later stages in life due to old age and accidents. The Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act 1995, has laid down seven types of disabilities namely-blindness, hearing impairment, leprosy-cured persons, locomotor disability, low-vision, mental illness and mental retardation. The Act also defined disability stating that it refers to a person who has more than 40 per cent disability in conditions such as blindness, low vision, persons with intellectual disabilities and mental illness, hearing impaired and leprosy cured as certified by medical authorities (Altman, 2014).

Women with disabilities are the worst sufferers of disability by facing double the hardships as compared to men. Their rights are often violated and many times, their rights are being denied to them.

♦ **Focus on women with disabilities**

Women with disabilities’ lives are burdened by the onset of impairments which in turn, lead them to experience barriers in society. The focus on women with disabilities has swerving ideologies and shifting paradigms at the level of feminists, gender specialists, and academic sociologists. However, the common concern among all of them is to study the nature and nuances of problems encountered especially by women with disabilities, and to address the issues (Obol, 2020).

A specific focus on women with disabilities by gender studies points straight to the double discrimination faced by them. This double discrimination is exerted in the form of sexism and their disability, while women of color are subjected to even face third layer of discrimination in the form of their skin color. The main points highlighted in gender studies concerning women with disabilities are the lower income, lower employment, and educational opportunities, and also the higher rate of poverty as compared to their male counterparts (Porter, 2014).

Academic sociologists started incorporating the study of disability after the writings of *The Politics of Disablement* (Oliver, 1990) in which the influence of disability made its way into sociological discourse after being objects associated with stigma for decades. Disability evolved into a starting point, a basis, and a means of basing theories about the world because most mainstream sociological theories have neglected or marginalized disability, it was and is still a very strong step to make. Therefore, it is imperative that sociology critically examine its ontological assumptions.

The policy measures adopted for women with disabilities in many countries are often not enough which led them to fall prey to several people and led them face various forms of discrimination and their inclusive development being blocked. They have faced violations of their human rights quite a few often and the horrific experiences they encounter cannot be understood at a local level which calls for a global scale

analysis. Women with disabilities often face social exclusion unsurprisingly and 'they are surrounded with stigmas and are left out of several family and community activities which left them to feel unwanted, isolated and even ashamed of themselves.

♦ **Women with disabilities in Mizoram**

Mizoram is the 23rd state in India which houses 15,160 persons with disabilities where 8,198 are men and 6,962 are women according to the census of 2011. Mizoram has one of the lowest population of women with disabilities in northeast India. There are 11 districts in Mizoram in which Aizawl and Lunglei are the two districts having the highest overall number of populations. For this study, only Aizawl and Lunglei districts are earmarked for the selection of respondents as these two districts contain 80 per cent of the population of women with disabilities in the state.

For data collection, the researcher uses interview and observation method among 163 women with disabilities from Aizawl and Lunglei who were selected using simple random sampling. These methods were used to gain deeper understandings of the cases being studied. The results were displayed in the form of tables in which frequency is written followed by percentages which were written in the form of brackets. The main objective is to analyze the conditions and status of the respondents in terms of discrimination, education, employment, and healthcare in society. In this sense, The Rights of Persons with Disabilities (RPwD) Act 2016 came into context and the researcher singled out two sections from this Act to know whether women with disabilities in Mizoram enjoy the rights stated by this Act.

Legal introspection of Rights of Persons with Disabilities (RPwD) Act 2016

On 1st October, 2007, India witnessed a remarkable feat as it signed and ratified The United Nations Convention on the Rights of People with Disabilities (UNCRPD) which came into force on 3rd May, 2008. The UNCRPD serves as the heart of the disability rights movement and has been regarded as a landmark international treaty that laid down the fundamental rights of persons with disabilities. It has also requested all the signatories of the convention to amend their existing laws to comply with UNCRPD's principles. The UNCRPD has viewed disability as a result of clashes between impairments with that of societal attitude and ignorance leading to roadblocks for persons with disabilities. This has prevented their chances to freely interact equally with others in society.

The outcome of the signatories for India was the introduction of the Rights of Persons with Disabilities (RPwD) Act 2016 after passing many rounds of scrutiny in the Parliament. It was finally passed by the two houses of Parliament in the year 2016 and it replaced the previous Persons with Disabilities Act, 1995. It further received the Presidential assent and was finally notified on 28th December, 2016 and immediately came into full force from 19th April, 2017 onwards. This Act was meant to be a game-changer in the country and aimed to end the centuries-old discrimination and neglect faced by persons with disabilities in all spheres of society such as education, employment and accessibility. The country also witnessed paradigm shift in which the perspectives of disability have changed from charity-

based to human-rights perspective. High hope was placed on the Act to empowered the disabled communities and to impart awareness on the issues of disability and to inculcate feelings of acceptance among the general public.

The Rights of Persons with Disabilities (RPwD) Act 2016 has stated 21 types of disability and it assures that all the persons with disabilities in India assures the provision of “right to equality, life with dignity, and respect for his or her own integrity equally with others” by the government.

The RPwD Act 2016 has ensured that the government should take appropriate measures towards the upliftment of women and children with disabilities and to ensure that they enjoy their rights equally with others in society. According to this Act, the government should take full matter to safeguard all persons with disabilities from experiencing abuse, exploitation and violence of all types. This has been stated in Section 3 (1) of the RPwD Act 2016. The state governments and local authorities are tasked with the role of promotion, protection and ensuring education to all persons with disabilities in society along with others, which is highlighted in Section 16 (i) of the RPwD Act 2016. In a similar instance, the government should provide adequate support and facilities for persons with disabilities so that they could avail to specific training in vocational training centres and have further scope for self-employment.

♦ **Neglect and discrimination among women with disabilities**

Among the women with disabilities in Mizoram, the case of violent treatment and abuse have not been reported to local authorities till date. However, in terms of neglect and discrimination, the case is different.

Neglect means the state of being uncared for while discrimination means the unjust treatment of different categories of people, especially on the grounds of ethnicity, age, sex, or disability. From the works of literature and various findings, it is shown that women with disabilities face discrimination and neglect and are often depicted as facing double layers of discrimination due to their gender and disability.

Given the fewer opportunities presented for these women in various fields, it is important to find out their opinions and experiences of being neglected and discriminated against in society. Hence, the study focuses on finding out whether women with disabilities face any type of discrimination and neglect in Mizoram as being neglected and discriminated against proves to be a roadblock towards inclusive development. Development is absent and can lag if the women themselves are still being neglected and are burdened by a plethora of discrimination.

Table 1: Opinion on neglect faced in society

District	Issue of neglect					
	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Total
Lunglei	6 (3.7%)	13 (8%)	1 (0.6%)	0 (0%)	0 (0%)	20 (12.3%)
Aizawl	23 (14.1%)	49 (30.1%)	27 (16.6%)	23 (14.1%)	21 (12.9%)	143 (87.7%)
Total	29 (17.8%)	62 (38%)	28 (17.2%)	23 (14.1%)	21 (12.9%)	163 (100%)

Source: Field Survey

In the above table, it is depicted that in Lunglei, 6 (3.7%) women have strongly agreed that they are being neglected in society while the other 13 (8%) have agreed that they faced neglect in society. There is only 1 (0.6%) woman who neither agrees nor disagrees with being neglected in society.

In Aizawl, 23 (14.1%) women have strongly agreed that they are being neglected in society and 49 (30.1%) women have also agreed that they faced neglect. As many as 27 (16.6%) women neither agree nor disagree with facing neglect. As many as 23 (14.1%) have stated that they disagree with being neglected and an additional 21 (12.9%) women have strongly disagreed with facing neglect in society.

Overall, women who agreed on being neglected represented a higher proportion as opposed to women who disagreed with being neglected. 29 (17.8%) women have said that they strongly agreed to being neglected in society while as many as 62 (38%) women agreed to facing neglect in society. 28 (17.2%) women neither agreed nor disagreed with being neglected in society while 23 (14.1%) women have disagreed to face neglect in society. 21 (12.9%) women also strongly disagreed with facing neglect in society. Negligence in any field is often followed by discrimination and stigma which proved to be another roadblock for women with disabilities towards their inclusive development.

Table 2: Problem of discrimination

District	Opinion on the problems of discrimination					
	Strongly agree	Agree	Medium	Disagree	Strongly disagree	Total
Lunglei	12(7.4%)	7 (4.3%)	1 (0.6%)	0 (0%)	0 (0%)	20 (12.3%)
Aizawl	18 (11%)	45 (27.6%)	22 (13.5%)	29 (17.8%)	29 (17.8%)	143 (87.7%)
Total	30(18.4%)	52 (31.9%)	23 (14.1%)	29 (17.8%)	29 (17.8%)	163 (100%)

Source: Field Survey

In the above data, it is evident that 12 (7.4%) women from Lunglei strongly agree to still face discrimination in society while 7 (4.3%) also agree that they are still being discriminated. Only 1 (0.6%) woman neither agrees nor disagrees with being discriminated. However, in Aizawl, 18 (11%) women strongly agreed that they are still being discriminated and as many as 45 (27.6%) agree that they are being discriminated. In terms of women who neither agree nor disagree to facing discrimination, there are as many as 22 (13.5%) women with disabilities. 29 (17.8%) women have disagreed with being discriminated and another 29 (17.8%) women have also strongly disagreed that they face any kind of discrimination in Mizoram.

The overall data shows that women who faced discrimination are still on the higher side as there are still 30 (18.4%) and 52 (31.9%) women who strongly agree and agree that they are being discriminated against in society. 23 (14.1%) women have said that they neither agree nor disagree with being discriminated against in society. 29 (17.8%) women have disagreed with being discriminated while another 29 (17.8%) have also strongly disagreed with being discriminated against in society. Women with disabilities have also reported being discriminated against and neglected in the field of health care sectors, which is another important area of study that blocks their overall development.

♦ Educational aspects

The act of learning something new or transferring knowledge is known as education. Education involves getting children ready for adulthood. The process of education begins right when a child is born. At first, it started as an informal process as the child watches and imitates others around them. Then, the process becomes more formal as the child gets older in which the education becomes more formal through pre-school and play dates. This education process then becomes academic lessons and is much more than learning simple facts. Education is a means to socialize humans into society and is an important socialization method. All cultural expectations and norms are taught through education by teachers through textbooks and classmates. The respondents in this study are asked about their educational status and the education level of the respondents is divided into primary, upper primary, high school, pre-degree, graduate, post-graduate, Ph.D., technical, and no education.

Table 3: Education backgrounds

	Educational background of women respondents								
District	Primary	Upper Primary	High School	Pre-Degree	Graduate	Post-Graduate	Ph. D	No Education	Total
Lunglei	1 5 (9.2%)	0 (0%) 17	3 (1.8%)	1 (0.6%)	0 (0%)	0 (0%)	0 (0%)	1 (0.6%)	20 (12.3%)
Aizawl	55 (33.7%)	(10.4%)	19 (11.7%)	10 (6.1%)	13 (8%)	6 (3.7%)	1 (0.6%)	22 (13.5%)	143 (87.7%)
Total	70 (42.9%)	17 (10.4%)	22 (13.5%)	11 (6.7%)	13 (8%)	6 (3.7%)	1 (0.6%)	23 (14.1%)	163 (100%)

Source: Field Survey

The educational level of the respondents is depicted in the above table. It is evident that in Lunglei, most of the women, i.e., 15 (9.2%) have reached only the primary level of education, while there are 3 (1.8%) women who have reached the high school level of education. There is only 1 (0.6%) woman who has reached the pre-degree level of education and there is 1 (0.6%) woman who did not receive any education at all.

The situation is somewhat similar in Aizawl as there are 55 (33.7%) women who have reached only the primary level of education and there are 17 (10.4%) women who have reached the upper primary level of education. 19 (11.7%) women have achieved a high school level of education and 10 (6.1%) women have reached pre-degree level of education. In terms of graduate women, there are 13 (8%) women who have graduated at their bachelor's level, and 6 (3.7%) women are post-graduate. There is 1 (0.6%) woman who currently pursuing her Ph. D from Assam and as many as 22 (13.5%) women did not receive any formal education at all. These women did not go to any conventional schools and educational institutions but they had received informal education in the form of reading and writing from their caregivers.

Among the women, 70 respondents have attained only a primary level of education which accounts for as many as 42.9% of the entire respondents. In Lunglei, as many as 75% of these women have achieved only a primary level of education while in Aizawl, the number is a bit lower at 38.47% but the category still forms the highest number in the district as compared to other categories of education. 17 (10.4%) of the women have an upper primary level of education and 22 (13.5%) of the respondents have reached high school level. 11 (6.7%) of the women have a pre-degree which is equivalent to a higher secondary level of education in modern days. In terms of graduates, there are 13 (8.0%) women who are graduates in this study and 6 (3.7%) women who have post-graduate degrees. There are no graduate and post-graduate women from Lunglei district. Among the women, there is only one woman who is currently pursuing a Ph. D which accounts for 0.6% of the entire women respondents. As many as 23 women or 14.1% of the respondents did not receive any type of education in their lifetime because their disability prohibits them from receiving formal school education. It is noted that these women are not illiterate despite receiving no education but have received basic alphabet and number of lessons taught to them by their caregivers.

The data revealed that access to formal education tends to be quite formidable for women with disabilities due to multiple reasons as most of the respondents have attained only a primary level of education followed by women who had not received any kind of formal education at all. Disability has formed a major obstacle to the promotion of the educational career of the respondents. The majority of them have either dropped out after primary level or have not gained entry into formal education. So, it is crucial to provide special education with a syllabus that is customized based on their respective ability.

◆ Conclusion

By focusing on only two sections of the RPwD Act 2016, it appears that the effectiveness of the Act in the context of Mizoram is yet to be seen. The lack of taking measures and implementing the laws by the state government is one of the main

reasons for the failure of the Act in the field of neglect, discrimination and education amongst women with disabilities in Mizoram. Hence, this points straight to the state authorities who are task with the duty of invigilating strict provisions and allow the rightful implementation of RPwD Act 2016 which would let the women with disabilities enjoy the efficacy of the Act.

References

1. Altman, B. M. (2014). Definitions, concepts, and measures of disability. *Annals of Epidemiology*, 24 (1). <https://doi.org/10.1016/j.annepidem.2013.05.018>.
2. Niemann, S. (2005). 'Persons with disabilities', in M. Burke, J. Chauvin & J. Miranti (eds.), *Religious and spiritual issues in counselling: Applications across diverse populations*. Brunner-Routledge.
3. Obol, A. R. (2020). Women and girls with disabilities must not be excluded. <https://www.womensrefugeecommission.org/blog/women-girls-with-disabilities-must-not-be-excluded/>.
4. Oliver, M. (1990). *The politics of disablement*. Palgrave Macmillan.
5. Porter, J. (2014). *Understanding and responding to the experience of disability*. Routledge.
6. The Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act. (1995). Definition of disability.
7. https://www.indiacode.nic.in/handle/123456789/8866?view_type=browse.
8. The Rights of Persons with Disabilities (RPwD) Act. (2016).

11

Trade Liberalization And Legal Reforms In Post-1991 India : Evaluating The Productivity and Efficiency Dynamics of the Manufacturing Industry

Dr. Sanchita De

Associate Professor, Dept. of Basic Science & Humanities
Institute of Engineering & Management, Kolkata,
University of Engineering and Management Kolkata

Abstract

The legal reforms and trade liberalization in 1991 shifted the economic landscape of India markedly with a profound impact on its manufacturing sector. This study analyses productivity and efficiency changes in various manufacturing industries during post-reform period. Legal constraints greatly reduced efficiency in the pre-reform period because of high tariffs, industrial licensing and strict labour legislations. The primary aim of trade liberalisation was to create a competitive environment for industry. This analysis includes 820 Indian manufacturing firms from nine industries obtained from the Centre for Monitoring Indian Economy (CMIE) Prowess Database for the years 1995 to 2016. Data Envelopment Analysis (DEA) was employed to estimate productivity change and technical efficiency in various manufacturing sectors. The empirical analysis reveals that level of efficiency was fluctuating over the study period and differed by industry. While some industries, like leather and food products, performed better than expected, others such as chemicals and transport performed poorly. Of note is the finding that there was some increase in productivity and efficiency, but it was not balanced across all firms and industries. Inefficient capital utilization by most of the industries indicates the necessity for further structural supply-side reforms.

Keywords: Trade Liberalization, Manufacturing Efficiency, Total Factor Productivity, Economic Reforms, Technical Efficiency

♦ Introduction

The 1991 economic reforms introduced in India exposed domestic firms to the rigors of international competition. The Government of India abolished trade barriers through legal amendments to existing trade laws and enacted new policies to establish a liberalized regulatory framework. The impact of trade liberalization on the productivity and efficiency of domestic manufacturing firms remains a subject of extensive debate.

According to the traditional infant industry argument, the abolition of protective legal provisions leads to the collapse of many domestic firms. Conversely, others

state that trade liberalization forces domestic manufacturing firms to comply with modern legal standards and improve their efficiency, productivity and competitiveness, allowing them to withstand foreign competition by enhancing their level of performance.

In the pre-reform period, a complex web of legal regulations, which were enforced through rigid bureaucratic controls, gave rise to the infamous 'permit-license Raj.' This system severely obstructed productivity growth and technical efficiency of manufacturing sector of Indian economy. Different legal instruments such as the Industrial Development and Regulation Act (IDRA), the Monopolies and Restrictive Trade Practices Act (MRTP) and various other restrictive labor laws restricted industrial growth. Numerous policies like the reservation of a large number of products for the small-scale industrial sector, high customs tariffs that distorted the allocation of resources and constrained the competitiveness of Indian firms in international markets. The capacity expansion constraints legally prohibited the manufacturing firms to achieve their optimal size. The complex legal procedures related to the establishment and closure of businesses collectively discouraged the technical efficiency of the firms and reduced productivity growth. The trade taxes, excise duties and legal restrictions imposed by domestic economy on regional trade further contributed to market distortions, intensifying the extent of inefficiencies.

The onset of the reform process gradually led to the dismantling of this obstructive legal and regulatory framework, resulting in the liberalization of both domestic and international trade. Many significant legal amendments were introduced, incorporating the removal of industrial licensing for most of the sectors, the weakening of MRTP Act provisions and the reforms to labor laws aimed at decreasing rigidities. Simultaneously, there was a pressing need for Indian manufacturing industries to achieve higher levels of efficiency so that they could be able to survive in the market after facing tough foreign competition, aligning with global legal standard.

Over years, the Government of India executed several financial, infrastructural and legal measures to enable the enhancement of domestic industrial efficiency as well as productivity. These comprised of the rationalization of excise duties, liberalization of tax laws and tax rates, reduction in interest rates and legislative reforms to address infrastructural problems in major sectors of the country such as power, transport and telecommunications.

The motivation for pursuing liberalization policies has been to stimulate growth, boost up productivity and improve the efficiency of India's manufacturing industry while ensuring compliance with international legal norms.

Therefore, an important question arises: What is the performance position of the Indian manufacturing firms during the post-reform era? This question constitutes the primary objective to undertake this study.

Trade liberalization and legal reforms which were initiated in 1991 in India have significantly enhanced the productivity and efficiency of Indian manufacturing sector. Various studies have assessed this effect across different industries, throwing light on the complexities of these economic transformation. Driffield and Kambhampati (2003) discovered that efficiency saw an uptick in five out of six

manufacturing sectors after reforms were implemented. On the flip side, Kumar and Arora (2012) pointed out a drop in technical efficiency within the sugar industry. Saravanakumar and Kim (2012) remarked that while heavy industries reaped the benefits of technological advancements, light industries didn't enjoy the same level of improvement. Pattanayak and Thangavelu (2005) noted an overall boost in total factor productivity (TFP) in Indian manufacturing. However, Parameswaran (2004) found that even with technological progress, capital goods industries faced a decline in technical efficiency. Bhaumik and Kumbhakar (2010) highlighted a rise in factor input productivity but mentioned that technical efficiency played a minor role in the growth of gross value added. Sidu (2007) reported impressive TFP growth in Indian industries from 1973 to 2003. In contrast, Sarma and Reddy (2006) found that the textile industry's TFP growth rate lagged in the post-liberalization era. Das (2004) estimated a modest TFP growth rate of 0.08% per year for Indian manufacturing, while Golder et al. (2004) observed a decline in TFP growth after 1991. Datta (2002) noted a 3% annual TFP growth in the cotton mill sector, whereas Goldar and Kumari (2002) indicated that post-reform TFP suffered due to delays in investment returns. Historical studies shed more light on long-term trends. Ahluwalia (1990) stressed the importance of productivity as a key driver of growth. The Central Statistical Organization (1981) reported sluggish TFP growth in Indian manufacturing. Kaur and Kiran (2008) noted a slowdown in the growth of the manufacturing sector following liberalization. In summary, while some industries enjoyed gains in efficiency and productivity, others faced stagnation or decline, revealing a mixed bag of progress across different sectors. The studies on Indian manufacturing industries (Bhandari and Maiti, 2012; Mazumdar and Rajeev, 2009; Parameswaran, 2004) suggest that the manufacturing industries are not homogeneous in nature. There are lots of heterogeneity among industries and or firm level both with respect to performances as well as characteristics. Since the characteristics are different among industries and or firms while studying the performance of growth, efficiency and productivity, we shall not carry out the aggregate analysis rather we shall consider the following nine industry groups based on (Centre For Monitoring Indian Economy) CMIE Prowess Database: Chemical & chemical products industry, Food Products, beverages & tobacco industry, Leather & related products industry, Machinery industry, Metal & metal products industry, Mineral-Based Manufacturing Industry, Paper & paper products industry, Textile & Apparel Manufacturing Industry and Transport & transport equipment industry, subject to availability of data.

♦ Data & Methodology

Table 1: Sample Structure

Manufacturing Industry	Percentage (%)
Chemical Industry	27.20
Food Product Industry	4.15
Leather Industry	1.34
Machinery Industry	18.29
Metal Industry	13.90
Mineral-Based Manufacturing Industry	5.62
Paper & Allied Products Industry	3.05
Textile & Apparel Manufacturing Industry	15.24
Transport Industry	11.22
Total	100

The study defines a production model with one output and five inputs. Output is total sales deflated by Wholesale Price Index for manufacturing (base: 1993-94 = 100). Inputs include: (i) Raw materials, (ii) Energy and water, (iii) Labour, (iv) Land and (v) Capital, all deflated by appropriate WPIs.

Data regarding different determinants of productivity and efficiency has also been collected from the source called Centre for Monitoring Indian Economy (CMIE) Prowess Database for the time period March, 1995 – March, 2016. This article has examined the performance of Indian manufacturing firms for first 25 years after reforms. Number of Manufacturing Firms incorporated is 820. Productivity and efficiency are measured by using Data Envelopment Analysis (DEA).

♦ Estimated Results

The estimated results of efficiency and productivity will be mentioned below:

Table 2: Mean Input Oriented Technical Efficiency of the Manufacturing Firms

Year	Chemical Industry	Food Products Industry	Leather Industry	Machinery Industry	Metal Industry	Mineral-Based Manufacturing Industry	Paper & Allied Products Industry	Textile & Apparel Manufacturing Industry	Transport Industry	Grand Mean
1995 (Year1)	0.744	0.794	0.886	0.895	0.73	0.94	0.931	0.756	0.933	0.845
1996	0.820	0.863	0.91	0.903	0.882	0.941	0.954	0.887	0.938	0.900
1997	0.765	0.877	0.955	0.905	0.927	0.965	0.892	0.877	0.935	0.900
1998	0.763	0.831	0.919	0.936	0.932	0.932	0.88	0.91	0.944	0.894
1999	0.836	0.851	0.917	0.905	0.936	0.966	0.876	0.908	0.927	0.902
2000	0.910	0.841	0.967	0.933	0.922	0.96	0.891	0.92	0.927	0.919
2001	0.904	0.827	0.954	0.879	0.928	0.977	0.846	0.784	0.924	0.891
2002	0.868	0.792	0.939	0.895	0.917	0.981	0.872	0.856	0.898	0.891
2003	0.870	0.797	0.924	0.857	0.875	0.949	0.842	0.882	0.891	0.876
2004	0.748	0.822	0.99	0.866	0.899	0.85	0.840	0.897	0.908	0.869
2005	0.807	0.842	0.968	0.904	0.911	0.826	0.898	0.888	0.923	0.885
2006	0.838	0.864	0.886	0.919	0.927	0.731	0.893	0.918	0.925	0.878
2007	0.870	0.85	0.928	0.918	0.89	0.767	0.873	0.894	0.934	0.880
2008	0.853	0.849	0.918	0.920	0.781	0.848	0.894	0.891	0.946	0.878
2009	0.864	0.834	0.918	0.907	0.843	0.868	0.909	0.883	0.957	0.887
2010	0.865	0.844	0.914	0.894	0.906	0.883	0.907	0.866	0.935	0.890
2011	0.826	0.784	0.970	0.902	0.882	0.899	0.852	0.861	0.930	0.878
2012	0.873	0.759	0.979	0.882	0.867	0.853	0.864	0.861	0.923	0.873
2013	0.905	0.81	0.976	0.879	0.858	0.921	0.878	0.881	0.937	0.894
2014	0.851	0.806	0.963	0.869	0.888	0.912	0.900	0.893	0.879	0.885
2015	0.737	0.822	0.955	0.893	0.852	0.903	0.899	0.844	0.909	0.868
2016 (Year22)	0.783	0.795	0.945	0.854	0.896	0.888	0.918	0.795	0.939	0.868

Source: Compiled by the Author

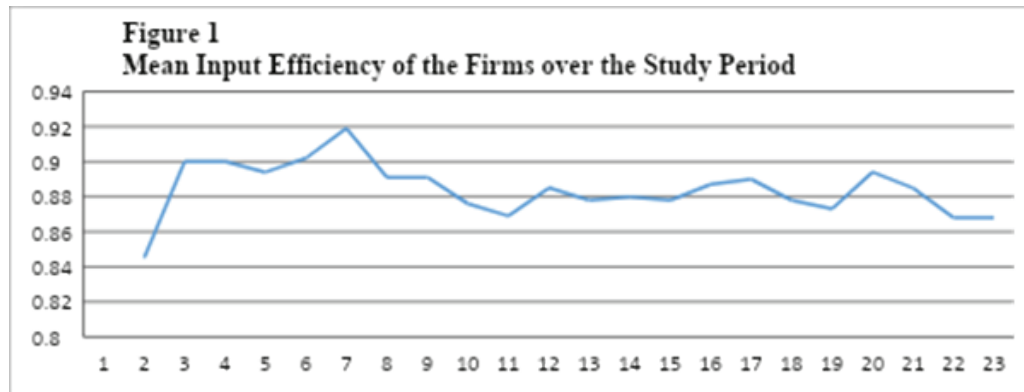


Table 2 shows that the mean input efficiency of the sample manufacturing firms is fluctuating over the study period. It is maximum (0.919) in 2000 and minimum (0.845) in 1995. The mean input efficiency score was not one for any of the years. The mean input efficiency has been raised from 0.845 in 1995 to 0.868 in 2016.

Table 3: Percentage of Input-Efficient Manufacturing Firms

Manufacturing Industry	% of Efficient firms
Chemical Industry	12%
Food Product Industry	26%
Leather Industry	64%
Machinery Industry	17%
Metal Industry	21%
Mineral-Based Manufacturing Industry	32%
Paper & Allied Products Industry	55%
Textile & Apparel Manufacturing Industry	17%
Transport Industry	23%
Grand Mean	30%

Source: Compiled by the Author

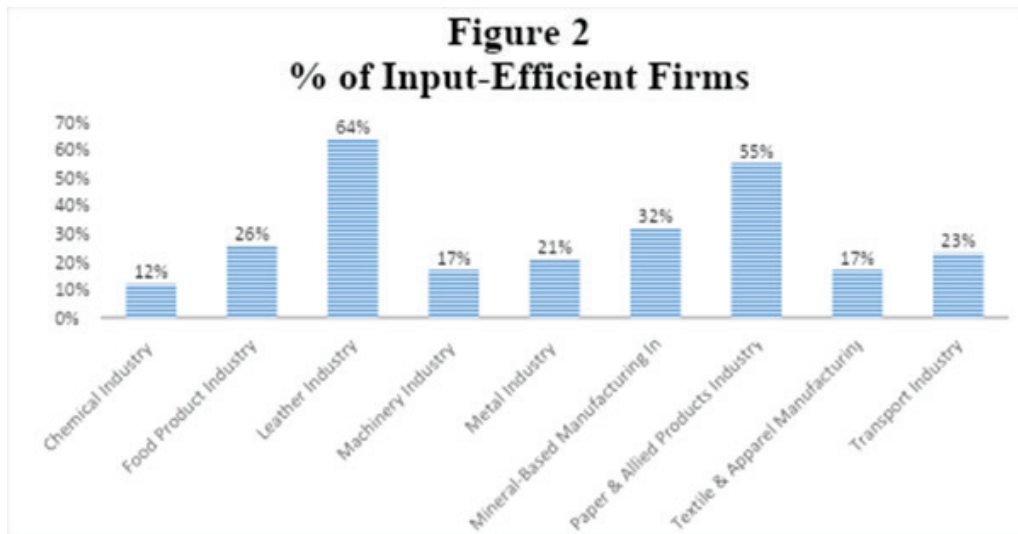


Table 3 shows that 30% of the total sample firms were producing efficiently on an average. This means that their efficiency score is equal to 1 and others are producing below the production frontier. Figure 2 shows that the highest 64% of sample firms in leather industry are input-efficient whereas the lowest 12% of sample firms under chemical industry are input-efficient.

Table 4: Mean Input Slacks

Manufacturing Industry	Raw materials input	Energy & water input	Labour Input	Land Input	Capital Input
Chemical Industry	30.484	74.884	18.236	14.213	327.526
Food Product Industry	29.305	16.262	33.376	2.58	99.141
Leather Industry	13.495	2.147	3.583	0.07	14.943
Machinery Industry	43.77	13.639	31.647	2.843	85.947
Metal Industry	35.744	40.303	23.943	2.127	152.883
Mineral-Based Manufacturing Industry	64.504	6.169	26.421	2.205	147.236
Paper & Allied Products Industry	20.465	16.917	9.616	1.063	48.272
Textile & Apparel Manufacturing Industry	12.034	22.136	18.682	1.128	73.325
Transport Industry	14.98	21.925	72.874	9.242	305.842
Total	29.420	23.820	26.486	3.941	139.457

Source: Compiled by the Author

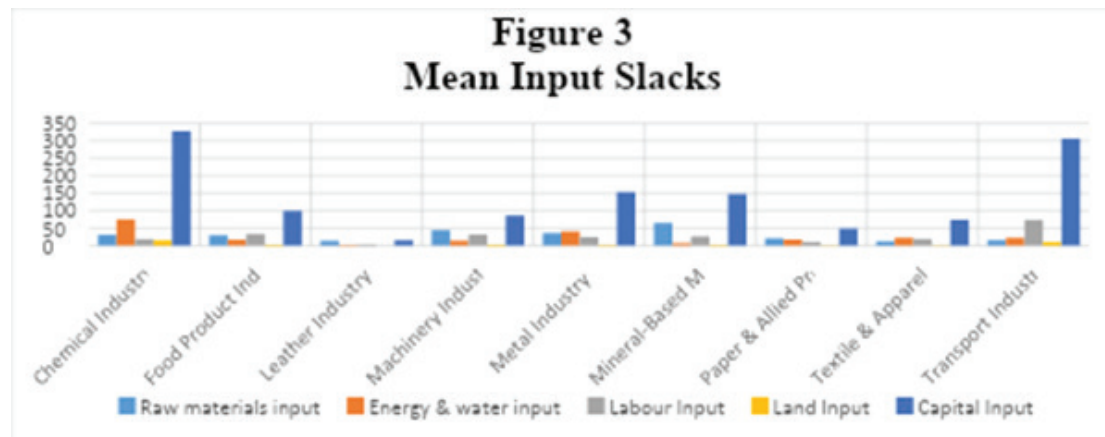


Table 4 represents that the same amount of output can be produced by reducing raw materials input 29.420%, energy & water input by 23.820%, labour by 26.486%, land by 3.941% and capital by 139.457% for the sample manufacturing firms all industries taken together on an average. Thus, the above empirical result is an instance of inefficient utilization of scarce resources by the Indian manufacturing over the study period. Among all factors employed in production, capital is being most inefficiently utilized by all the considered nine industry groups. Among all these industry groups, chemical industry is utilizing capital, energy & water input and land most inefficiently, mineral-based manufacturing industry is employing raw materials input most inefficiently. Transport industry is using labour most inefficiently.

Table 5: Mean Output Oriented Technical Efficiency

Year	Chemical Industry	Food Products Industry	Leather Industry	Machinery Industry	Metal Industry	Mineral-Based Manufacturing Industry	Paper & Allied Products Industry	Textile & Apparel Manufacturing Industry	Transport Industry	Grand Mean
1985	0.764	0.828	0.886	0.917	0.709	0.951	0.928	0.746	0.938	0.852
1986	0.798	0.879	0.918	0.909	0.895	0.94	0.948	0.887	0.944	0.901
1987	0.755	0.981	0.959	0.918	0.938	0.945	0.894	0.868	0.935	0.901
1988	0.743	0.871	0.925	0.936	0.942	0.925	0.898	0.981	0.948	0.903
1989	0.839	0.893	0.928	0.918	0.947	0.963	0.877	0.986	0.921	0.909
2000	0.919	0.893	0.952	0.941	0.935	0.949	0.871	0.919	0.938	0.924
2001	0.918	0.886	0.925	0.898	0.934	0.971	0.858	0.766	0.931	0.903
2002	0.867	0.817	0.953	0.911	0.928	0.973	0.887	0.841	0.918	0.901
2003	0.886	0.839	0.93	0.858	0.893	0.954	0.888	0.881	0.914	0.898
2004	0.814	0.867	0.959	0.903	0.914	0.848	0.877	0.981	0.934	0.894
2005	0.807	0.874	0.991	0.936	0.931	0.838	0.928	0.877	0.948	0.902
2006	0.843	0.877	0.926	0.948	0.947	0.716	0.918	0.916	0.923	0.898
2007	0.881	0.874	0.981	0.938	0.909	0.748	0.908	0.883	0.934	0.894
2008	0.867	0.873	0.968	0.948	0.885	0.841	0.923	0.878	0.957	0.895
2009	0.877	0.882	0.925	0.882	0.832	0.911	0.922	0.872	0.982	0.894
2010	0.863	0.881	0.922	0.915	0.919	0.926	0.948	0.882	0.952	0.909
2011	0.828	0.882	0.97	0.913	0.904	0.908	0.894	0.882	0.953	0.897
2012	0.886	0.845	0.977	0.914	0.904	0.838	0.901	0.856	0.951	0.897
2013	0.924	0.891	0.976	0.926	0.889	0.933	0.919	0.871	0.952	0.928
2014	0.866	0.887	0.966	0.846	0.905	0.922	0.899	0.882	0.885	0.896
2015	0.729	0.892	0.97	0.928	0.889	0.896	0.888	0.841	0.915	0.882
2016	0.719	0.832	0.959	0.886	0.932	0.896	0.907	0.743	0.958	0.874

Source: Compiled by the Author

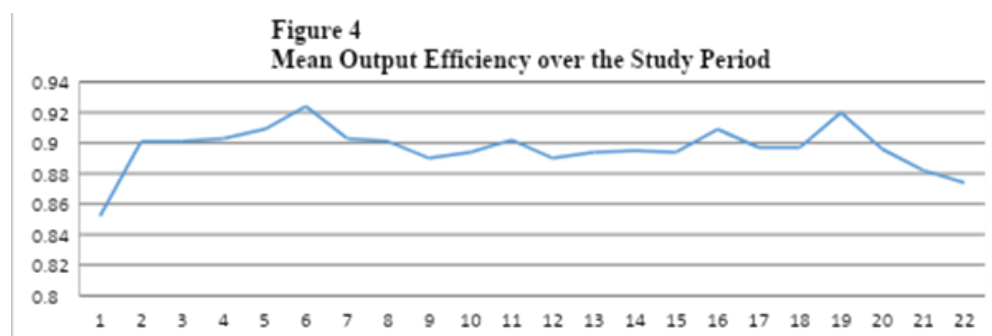


Table 5 shows that the mean output efficiency was highest (i.e. 0.924) in 2000 and lowest (i.e. 0.852) in 1995 for the sample manufacturing firms. The mean output efficiency score was not one for any of the years. The mean output efficiency has been increased from 0.852 in 1995 to 0.874 in 2016.

Table 6: Percentage of Output-Efficient Manufacturing Firms

Manufacturing Industry	% of Efficient firms
Chemical Industry	14%
Food Product Industry	28%
Leather Industry	64%
Machinery Industry	18%
Metal Industry	23%
Mineral-Based Manufacturing Industry	32%
Paper & Allied Products Industry	55%
Textile & Apparel Manufacturing Industry	18%
Transport Industry	23%
Grand Mean	31%

Source: Compiled by the Author

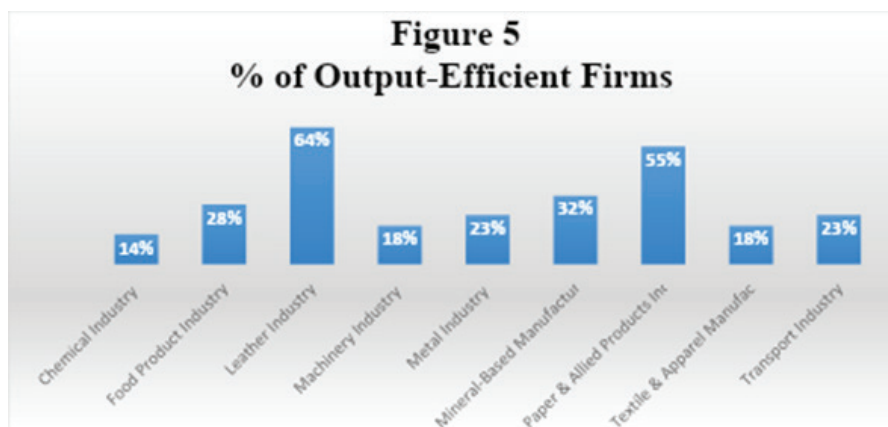


Table 6 shows that about 31% of sample manufacturing firms are output efficient on an average. They are having the efficiency score of one. Figure 5 shows that the highest 64% of sample firms of leather industries are output-efficient whereas the lowest 14% of sample firms in chemical industry are output-efficient.

Table 7: Malmquist Index Summary of Annual Means

Year (Year1: 1995-1996) to (Year 21: 2015-2016)	Efficiency- Change	Technical- Change	Scale- Change	MPI (TFPG)
Year 1	1.16	0.88	1.10	0.99
Year 2	0.98	0.94	0.99	0.93
Year 3	0.96	0.95	1.00	0.91
Year 4	1.02	0.96	1.02	0.98
Year 5	1.02	0.98	1.02	0.98
Year 6	0.99	1.01	0.98	0.99
Year 7	1.00	0.98	0.99	0.98
Year 8	0.94	0.97	0.98	0.90
Year 9	1.03	0.96	1.01	0.98
Year 10	1.05	0.95	1.02	0.99
Year 11	1.01	0.96	0.98	0.96
Year 12	0.94	1.05	1.01	0.98
Year 13	0.95	0.99	0.99	0.93
Year 14	1.03	0.90	1.01	0.92
Year 15	1.04	0.90	1.01	0.92
Year 16	0.99	0.96	0.99	0.95
Year 17	0.97	0.99	1.00	0.95
Year 18	1.05	0.94	1.03	0.98
Year 19	0.94	0.99	0.97	0.93
Year 20	0.96	1.04	0.97	0.99
Year 21	0.99	0.99	0.99	0.96
Mean	1.00	0.97	1.01	0.96

Source: Calculation of the Author

Figure 6
Efficiency Change

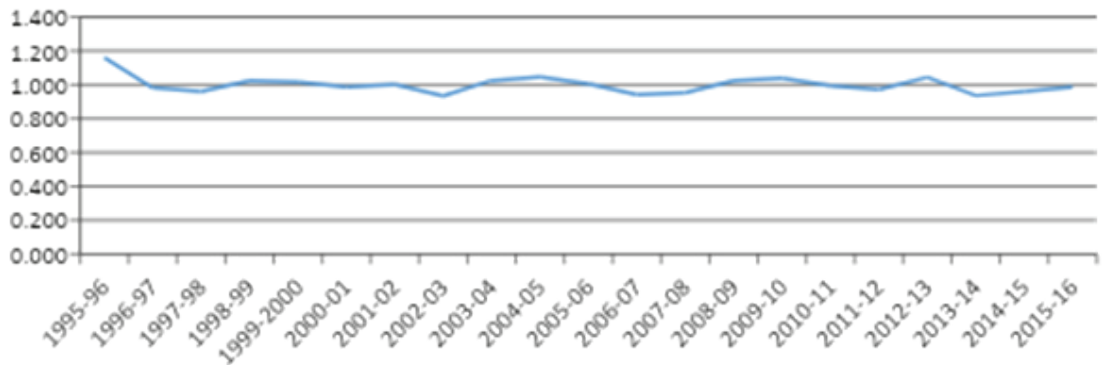


Figure 7
Technical Change

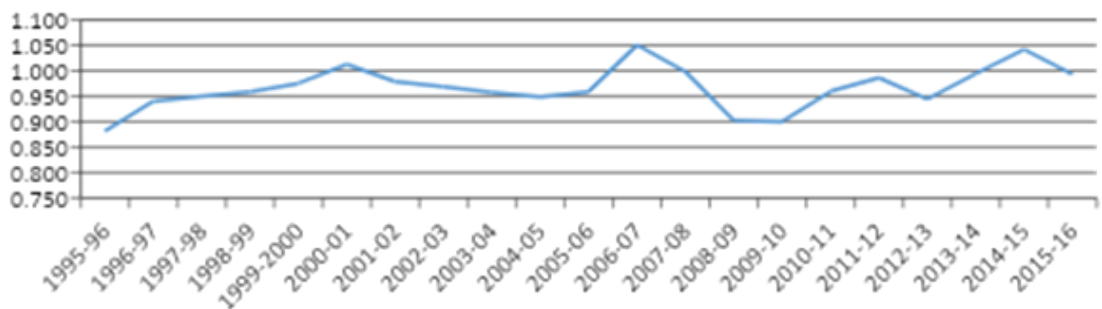
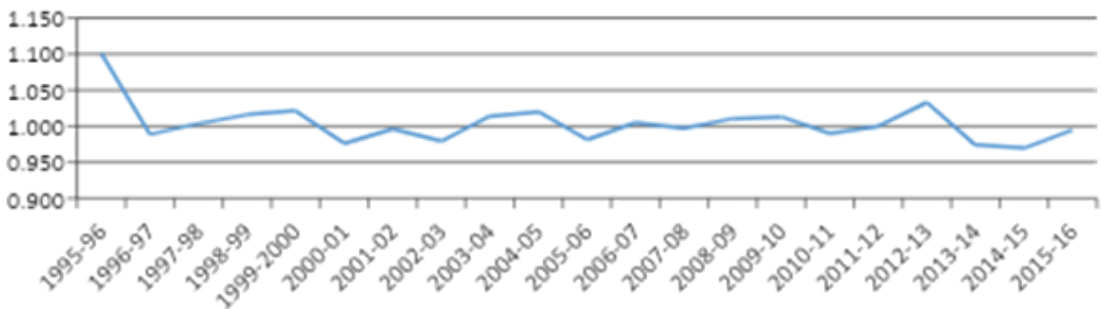


Figure 8
Scale Change



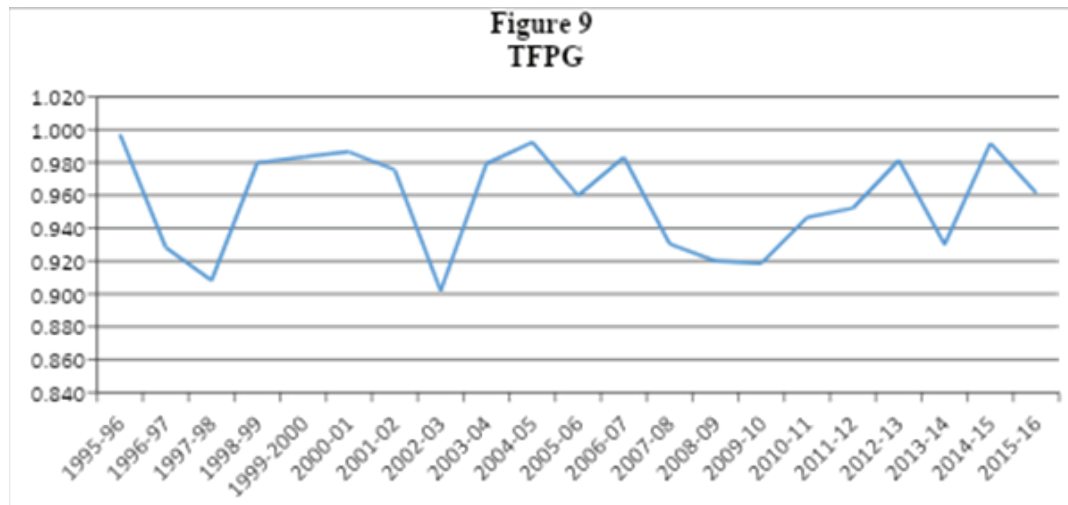


Table 7 shows that efficiency change remains stagnant, peaking at 1.16 in 1995-96 and dropping to 0.99 in 2015-16. Technical change follows a fluctuating trend, declining by 3.3%. Scale change has experienced a slight rise by 0.4%. Total factor productivity growth decreases by 4.2%, driven by stagnant efficiency change and the fall in technical change, outweighing the marginal increase in scale change.

Table 8: The Malmquist Productivity Index (Annual Average)

MPI	Range	Grand mean (GRM)	Standard Deviation	% of firms below or equal to the GRM	% of firms above the GRM	Coefficient of Variation
Manufacturing Industry						
Chemical Industry	(0.63 - 1.07)	0.95	0.05	42.60	57.40	0.05
Food Product Industry	(0.77 - 1.03)	0.94	0.06	29.41	70.59	0.06
Leather Industry	(0.92 - 1.10)	0.97	0.05	72.73	27.27	0.05
Machinery Industry	(0.73 - 1.14)	0.95	0.05	36	64	0.05
Metal Industry	(0.74 - 1.05)	0.96	0.05	39.47	60.53	0.05
Mineral-Based Manufacturing Industry	(0.76 - 1.18)	0.95	0.07	39.13	60.87	0.07
Paper & Allied Products Industry	(0.82 - 1.07)	0.95	0.06	20	80	0.06
Textile & Apparel Manufacturing Industry	(0.63 - 1.05)	0.96	0.05	42.40	57.60	0.05
Transport Industry	(0.69 to 1.09)	0.96	0.05	40.22	59.78	0.05

Source: Calculations of the Author

Table 8 reveals that The Malmquist Productivity Index (MPI) varies across industries. The MPI of chemical industry ranges from 0.63 to 1.07, with a GRM of 0.95 and 57.40% firms operating above it. Food products (0.77–1.03) have a GRM of 0.94, with 70.59% firm above GRM. Leather (0.92–1.10) is having a GRM of 0.97, with 72.73% firm below it. Machinery (0.73–1.14) has a GRM of 0.95, with 64% above. Metal (0.74–1.05) also has 60.53% above its GRM (0.96). Paper (0.82–1.07) has 80% above its GRM (0.95). Mineral-Based Manufacturing and leather have a majority below their GRM, while other industries have most firms above.

Table 9: Classification of Firms based on Annual Average MPI (in %)

Manufacturing Industry	Range of Average MPI		
	< 0.900	(0.900-1.000)	> 1.000
Chemical Industry	7%	83%	10%
Food Product Industry	18%	76%	6%
Leather Industry	00%	82%	18%
Machinery Industry	7%	82%	11%
Metal Industry	7%	84%	9%
Mineral-Based Manufacturing Industry	13%	76%	11%
Paper & Allied Products Industry	20%	68%	12%
Textile & Apparel Manufacturing Industry	6%	83%	11%
Transport Industry	5%	88%	7%
Grand Mean	9%	80%	11%

Source: Calculations of the Author

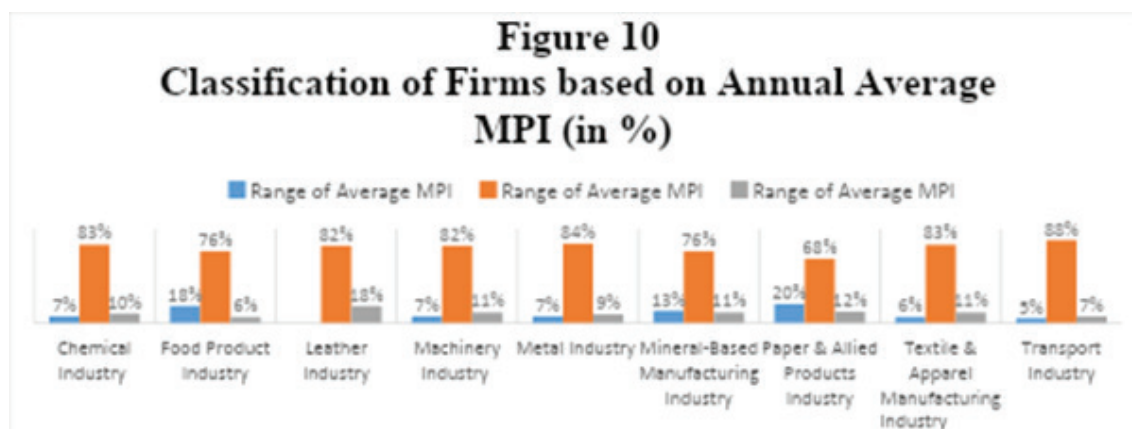


Table 9 suggests that 80% firms have mean MPI ranging between (0.90 - 1.00). About 11% firms have mean MPI more than 1.000. Around 9% firms experience mean MPI lesser than 0.900. The highest 18% of leather firms are having MPI higher than one and the lowest 6% of food products firms are having MPI higher than one.

Table 10: Decomposition of Total Factor Productivity Growth

Manufacturing Industry	Mean rate of Growth of Efficiency Change	Mean rate of Growth of Technical Change	Mean rate of Growth of Scale Change	Mean rate of Growth of TFP
Chemical Industry	33.71%	4.62%	5.35%	29.89%
Food Product Industry	261.27%	2.49%	2.95%	276.04%
Leather Industry	5.4%	7.13%	3.34%	20.29%
Machinery Industry	178.51%	4.77%	5.77%	191.55%
Metal Industry	132.1%	8.09%	6.69%	121.21%
Mineral-Based Manufacturing Industry	47.22%	8.16%	4.29%	73.16%
Paper & Allied Products Industry	271.98%	2.56%	43.79%	287.53%
Textile & Apparel Manufacturing Industry	86.02%	6.61%	5.96%	82.68%
Transport Industry	46.26%	2.71%	17.55%	44.79%
Mean	118.05%	5.24%	10.63%	125.24%

Source: Calculations of the Author

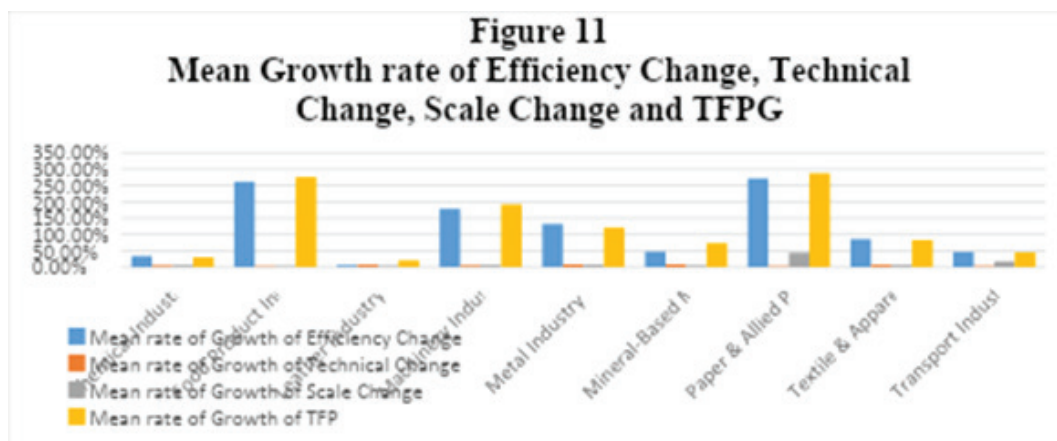


Table 10 shows that the growth rate of efficiency change has the highest contribution towards total factor productivity growth for all industry-groups other than leather industry. The growth rate of efficiency change, technical change, scale change and total factor productivity change are 118.05%, 5.24%, 10.63% and 125.24% respectively over the study period. This result suggests that efficiency change is the highest contributor of TFPG, indicating that the efficient utilisation of inputs leading to higher amount of output production which results in sustainable growth. Figure 11 graphically represents the mean growth rate of efficiency change, technical change, scale change and TFPG (TFP Change) of each and every industry-groups.

◆ Conclusion

The analysis of the present study provides a comprehensive assessment of the effect of trade liberalization and legal reforms on the growth performance of Indian manufacturing firms in post-1991 period. The analysis of 820 manufacturing firms across nine Indian industries highpoints the intricacies of industrial transformation following 1991 economic reforms.

The pre-reform period was mainly ruled by excessive regulatory controls which brought about inefficiencies in resource allocation, limited the technological progress and restricted the expansion of industrial growth. The elimination of industrial licensing, reduction of tariff restrictions and easing of restrictive labour laws were the key reform measures targeted to increase industrial productivity. However, the effect of these reforms has been uneven across different industries. The empirical findings suggest that trade liberalization improved efficiency in certain sectors, but the overall progress was erratic. Approximately 30% of firms functioned at full efficiency level, with leather and food products industries exhibiting higher efficiency levels, while chemical and transport industries struggled. The inefficiency in capital utilization across industries implies that firms faced challenges in optimizing resource allocation.

The technical efficiency scores show a fluctuating trend, with no industry acquiring sustained long-term efficiency gain. The fall in TFPG by 4.2% over the study period indicates that the advantages of trade liberalization were offset by challenges like infrastructural bottlenecks, policy uncertainty and limited technological adoption. While efficiency change contributed significantly to TFPG, technical change remained stagnant, preventing sustained growth in manufacturing productivity.

All these findings highlight the requirement for targeted industrial policies to address issue of sector-specific inefficiencies. Govt. adopted policies should focus on incentivizing technological adoption, improving input utilization and enhancing total factor productivity. Further regulatory adjustments and infrastructure investments are necessary to translate liberalization policies into sustained efficiency improvements.

Overall, while trade liberalization has made significant contribution to structural changes in Indian manufacturing, the findings of the current study suggest

that policy revision is much needed to maximize growth potential of Indian manufacturing sector. Future research should explore firm-level strategies to further examine the long-term effects of trade liberalization on Indian manufacturing industries.

References

1. Ahluwalia, I.J. (1990), "Productivity trends in Indian industry: concern for the nineties", *Productivity*, 31(1).
2. Bhandari, A.K. & Maiti, P. (2012), "Efficiency of Indian leather firms: some results obtained using the conventional methods", *J Prod Anal* 37: 73-93.
3. Bhaumik, S.K. & Kumbhakar, S.C. (2010), "Is the post-reform growth of the Indian manufacturing: sector efficiency driven? Empirical evidence from panel-level data", *Journal of Asian Economics*, 21: 219-232.
4. Central Statistical Organisation (CSO). (1981). *Annual Survey of Industries 1980-81*. Ministry of Statistics and Programme Implementation, Government of India.
5. Das, D. K. (2004), "Manufacturing Productivity under Varying Trade Regimes, 1980- 2000", *Economic and Political Weekly*, 39(5): 423-433.
6. Datta, S.K. (2002), "An analysis of productivity trends in the Indian cotton mill industry", *Indian economic journal*, 49(2).
7. Driffield, N.L. & Kambhampati, U.S. (2003), "Trade Liberalization and the Efficiency of Firms in Indian Manufacturing", *Review of Development Economics*, 7(3): 419-430.
8. Goldar, B. & Kumari, A. (2002), "Import liberalization and productivity growth in Indian manufacturing industries in the 1990's", Working paper, Institute of Economic Growth.
9. Goldar, B., Renganathan, V.S., & Banga, R. (2004), "Ownership and efficiency in engineering firms: 1990-91 to 1999-2000", *Economic and Political Weekly*, 39(5): 441-447.
10. Kaur, M. and Kiran, R. (2008), "Indian Manufacturing Sector: Growth and Productivity under the New Policy Regime", *International Review of Business Research Papers*, 4(2): 136-150.
11. Kumar, S. & Arora, N. (2012), "Evaluation of Technical Efficiency in Indian Sugar Industry: An Application of Full Cumulative Data Envelopment Analysis", *Eurasian Journal of Business and Economics*, 5(9), 57-78.
12. Mazumdar, M. & Rajeev, M. (2009), "Comparing the Efficiency and Productivity of the Indian Pharmaceutical Firms: A Malmquist-Meta-Frontier Approach", *Journal of the Indian Economic Association*, 8(2): 159-181.
13. Parameswaran, R. (2004), "Importance-performance analysis for improving quality of campus food service", *International Journal of Quality & Reliability Management*, 21(8): 876-896.

-
14. Pattnayak, S.S. & Thangavelu, S.M. (2005), "Economic reforms and productivity growth in Indian manufacturing industries: an interaction of technical change and scale economies", *Economic Modeling*, 22: 601-615.
 15. Saravanakumar, M. & Kim, T. (2012), "The impact of economic reforms on efficiency improvement and technological progress in Indian manufacturing", *Journal of Developing Areas*. 46(1): 315-329.
 16. Sarma, I. R. S., & Reddy, V. K. (2006). Productivity in Indian Textile Industry: Trends and Determinants. *The IUP Journal of Applied Economics*, 5(1), 80-88.
 17. Sidu, H. (2007), "Total factor productivity: a sectoral analysis of Indian industry" *Productivity* Vol. 48.

12

Legal Challenges In Cross- Border Telemedicine and Its Impact on Healthcare Accesibility in India

Ayan Banerjee

Assistant Professor, Department of Hospital Management
Brainware University, Kolkata

Abstract

This paper examines the systemic barriers obstructing telemedicine adoption in India, focusing on regulatory fragmentation, infrastructural inequities, and data privacy conflicts that disproportionately exclude rural populations from digital healthcare access.

Scope: The study spans **1) Geographic disparities**, with 66.52% of India's rural population reliant on 27% of doctors, **2) Infrastructural gaps**, where 24% of villages lack internet access and 5G rollout remains urban-centric, and **3) Cross-border constraints**, such as absent SAARC mutual recognition agreements blocking cross-border care. Temporal analysis covers post-COVID telemedicine growth (e.g., 300% surge in Apollo's consultations) and projects a US\$15,114.5 million market by 2030.

Objectives: The research **1) evaluate infrastructural exclusion** through case studies (e.g., Star Health's 2024 breach impacting 31 million patients, and **2) propose reforms** to democratize telemedicine access, including a "One Nation, One License" system, SAARC-wide agreements, and solar-powered rural connectivity.

Key Arguments:

- 1. Regulatory Misalignment:** India's physical-care licensing regime ignores digital realities, criminalizing cross-border telemedicine. GDPR's strict consent rules clash with DPDP's emergency exemptions, risking non-compliance for rural providers.
- 2. Infrastructural Neglect:** Urban-focused 5G expansion (92.5% rural 4G vs. 5% 5G penetration) and prohibitive app development costs (Rs.25 lakh– Rs. 1.65 crore) exclude low-resource clinics.
- 3. Human Cost:** 25% of rural patients travel overnight for care, while unimplemented laws (e.g., DISHA) and cybersecurity gaps expose 9 million health records to breaches annually.

Keywords: Telemedicine Regulation, Rural Healthcare Access, Data Privacy Compliance, Cross-Border Healthcare, Digital Infrastructure Equity

1. Introduction

In 2030, the telemedicine market of India is expected to show a major increase where the amount of money could be expected to be US\$ 15,114.5 million. This is due to the outstanding 20.7% compound annual growth rate (CAGR) from 2024 to 2030, which this industry would have had. (India Telemedicine Market Size & Outlook, 2030, 2024). While urban Indians book online consultations with ease, rural patients and doctors face a maze of licensing rules, data privacy clashes, and liability risks that block cross-border care.

India's healthcare crisis is a tale of two realities. Over 66.52% of the population lives in rural areas, but 66.91% of health workers work in cities, leaving villages critically underserved (Ugargol et al., 2023). 1,023 km away from East Champaran, Bihar, a silent child with dark black eye-shadow named Ruksana travelled to get a medical treatment. reflecting the healthcare crisis in India with 48% rural and 25% urban overnight trips for medical purposes (Scroll.in, 2016). In cross-border telemedicine, an Indian physician may access a foreign patient's medical history based on a referral from a foreign doctor. This way, the medical advice which the Indian doctor provides either to the patient directly (only if the patient's country permits it) or through medical referral, aids in setting the best treatment plan for the patient (Desai et al., 2025).

A doctor from Singapore, who is offering online medical services to a person in India, which should then be done the right way, that is: the Singapore physician needs to observe both his country's medical protocols and India's telemedicine rules for legal and safe telemedicine (Academy of Medicine, Singapore, 2015).

This paper unravels these challenges and their human cost. Why can't a renowned oncologist in Mumbai advise a patient in Dhaka? How do privacy laws meant to protect data end up harming patients? And what can India learn from global models like the EU's cross-border healthcare directive? Through case studies, policy analysis, and grassroots examples, we explore solutions—from a "One Nation, One License" system to SAARC-wide telemedicine agreements—that could turn legal barriers into bridges for equitable healthcare.

2. Legal Challenges

2.1 Licensing Barriers: Trapped by Borders

India's licensing system for doctors is a relic of the pre-digital era, creating hurdles for telemedicine. In India, telemedicine consultation has been available since the year 2000, although the issue of its legality is still unclear due to the absence of a statutory base. The State Medical Councils, including Karnataka's, are said to have imposed a ban on teleconsultation, with Karnataka cautioning doctors about possible licence cancellation for the provision of online consultations (Shukla & Upadhyay, 2020).

Cross-border licensing is even more restrictive. India lacks mutual recognition agreements (MRAs) with neighboring SAARC countries, meaning an Indian doctor consulting a patient in Nepal or Bangladesh risks penalties.

2.2 Data Privacy Conflicts: GDPR vs. Grassroots Realities

Data privacy laws, such as Europe's "General Data Protection Regulation" (GDPR), are designed to protect patients by ensuring they are fully aware of how their health data is used. GDPR requires explicit patient consent for data processing to provide full transparency from healthcare organizations, but this requirement can pose challenges in emergency situations where immediate access to data is crucial (Metomic, n.d.).

India's own health data law, the Digital Information Security in Healthcare Act (DISHA), remains unimplemented since 2018. Without DISHA, patient data shared with foreign hospitals lacks legal safeguards. In 2019, a cumulative 41.2 million healthcare records were exposed, stolen, or illegally revealed in 505 data breaches (Seh et al., 2020). The cost of a data breach remained unchanged and the average cost was \$3.92 million, whereas breaches in the healthcare sector were significantly higher (Data Breach 2024 | IBM, n.d.).

2.3 Infrastructure and Cost Barriers: "The Rural Digital Divide:

India's rural-urban digital divide cripples telemedicine adoption. merely 24% of Indian villages have the ability to access the internet whereas 66% is the percentage of urban areas that have online connectivity (Malhotra, 2024). Rapid metropolitan expansion and the increasing need for higher profits attract telecom companies to predominantly urban settings, where the innovation of 5G networks has become widespread. The rural areas of the country, on the other hand, suffer from the consequence of inferior signals, a lack of connectivity, and poor teleconsultation services which prevent people from gaining access to healthcare services (Telecom Regulatory Authority of India, 2019).

Compliance costs further marginalize small clinics. Healthcare gets no respite from the regulatory grenades dropped by compliance with GDPR. The financial and personal costs of compliance are much higher due to the stringent laws that demand adherence to both the GDPR and the respective industry standards mostly dealing with personal data requiring encryption, tokenization, and hashing. So, the GDPR expenses are increasing all the time (ZCySec&ZCySec, 2024). While in India, 4G network coverage reaches 92.5% of the rural population, the 5G network coverage is in its infancy yet, which severely hampers the availability of telemedicine services in rural areas (Ministry of Communications, 2023).

3. Statistical Evidence and Compliance Gaps in Telemedicine Adoption

3.1 Licensing Data: Delays and Disparities

eSanjeevani has been successful in giving primary care medicine to almost 14,000 doctors via telemedicine, and at the same time, 17,000 medical workers are giving their services remotely through eSanjeevani Health and Wellness Centre; nonetheless, the involvement of doctors is quite small when the demand for tele-based consultation is growing drastically (Ministry of Health and Family Welfare, 2021).

3.2 Privacy Compliance: Costly Gaps

India's healthcare sector faces challenges in adhering to global data protection laws. India is getting close to the GDPR as they plan to introduce The "Digital Personal Data Protection Act" (DPDP) in 2023. The aforementioned rule strictly demands direct permission to process sensitive personal health data, Despite that, the obstacles in execution and sticking to the protocols are still evident (Katiyar, 2024). Apollo Hospitals was brought under the scanner due to the data-sharing practices, especially how it affects patient privacy and safety. In 2022 the Indian healthcare industry registered 9 million cyber-attacks (Seshadri et al., 2024). In September 2024, Star Health was involved in the data breach, which leaked the sensitive health information of 31 million Indian people to hackers who illegally accessed the company's server. Thus, the US HIPAA-modifications, especially involving breach notification rules and mandatory security measures, propose a higher cybersecurity standard for healthcare entities than the proposed health data privacy rules in India (Pandey, 2025).

3.3 Rural Access Metrics: The Over Cost Burden

In 2025, a staggering 25% of rural India's population was posed to overall normal health care with the only 27% of doctors providing services to rural areas than 73% of those in the urban centers (Nagaraja et al., 2024). Rural Indian healthcare is being developed with the parameter of over 70% of the population who frequently travel long distances for medical care (Ashokan, 2024).

Cross-border digital health adopted constantly encounters problems which are signified by the need for currency exchange, complexity of insurance, and reimbursement issues in many health care systems, especially as some of them do not cover virtual appointments in their entirety; This makes it crucial to expand telemedicine-friendly insurance policies (Josh, 2025).

The rough or approximate development expense to be incurred on a telemedicine app, which covers almost between 25 lakh and 1.65 crore (using the global range of \$30,000 to \$200,000), may become quite challenging in terms of ensuring its GDPR compliance in a rural area of India, especially for low-profit-margin telemedicine services. The associated highest cost of the development, compatibility with EHR systems, privacy compliance, and post-launch sustainability become a real drawback for those healthcare providers and startups not backed by large financial walls that strive to keep such platforms falls in the most rural and poverty-constrained areas (Ally, 2024).

4. Policy Recommendations

4.1 Licensing Reforms: Breaking the State Barrier

India's telemedicine potential is throttled by outdated licensing laws. "One Nation, One License" System is a project suggested by the National Medical Commission (NMC) that is tuned towards the provision of doctors with a unique license to practice throughout the nation, thus facilitating their

activities in the telemedicine arena (Coveryouadmin, 2024). For example, a surgeon in Kolkata could consult patients in Ladakh without navigating 10+ state approvals.

Regionally, India must push for a SAARC Telemedicine License under SAARC's 2022 health agreement. This would let Indian doctors consult patients in Nepal, Bangladesh, and Sri Lanka without redundant approvals. The telemedicine services in India are also being provided to the hospitals in Nepal, the other problem is the setting up of the telemedicine center in Colombo by Wipro where the Indian specialists will handle back reporting. The SAARC telemedicine network has already established connections with the hospitals in Bhutan, Afghanistan, and Nepal with the help of Indian super-specialty hospitals such as AllMS, PGIMER, and CARE Hospital (Khatun et al., 2011).

4.2 Data Privacy Harmonization: Bridging GDPR and DPDP

The Digital Personal Data Protection Act (DPDP) of India compels the hospitals to acquire the consent of patients even before they can procure their information for treatment. Nevertheless, in situations of urgency like when a patient is unconscious, and the doctor decides to do a prompt surgery, the information can be accessed without the consent of the patient. Even in such a case, the safety of patient's data will be assured (Burman & Carnegie Endowment for International Peace, 2023).

At a late-night telemedicine consultation, a physician rapidly reviews a child's medical history to prescribe life-saving asthma medication, allowing parents to bypass consent, as it is the case of an urgent health emergency in DPDP 2025 (Katiyar, 2025).

To this end, with enormous telemedicine use, dealing with data privacy becomes even more critical, primarily in those places which have a lower level of awareness towards cyber security like tier-II and tier-III cities. Specific training programs such as the CyberShikshaa program aim for creating skilled workforce by way of training 800+ candidates across 90+ cities with 60% placement rate, strategies, and tools to eventually protection of sensitive health data from cyber threats (Cyber Security Training Program | Cyber Shikshaa - a Joint Skills Initiative by Microsoft & DSCI, n.d.-b).

4.3 Infrastructure Boost: Closing the Rural Divide

In a 5G-based medical context, a patient with a heart disease who is wearing a smart ECG patch will have his real-time heart-related data sent to the doctors, who are far away, that will result in a continued monitoring through timely discovery Issues like cardiac arrhythmia. In addition to this, the doctors can perform the surgeries by means of an augmented reality system that is connected to 5G, which, in turn, will help with an accurate navigation as well as the real-time collaboration of the specialists in far away locations (Boniface et al., 2010b).

Using 5G telemedicine, a person who is ill in a remote village may have a video conversation with a medical doctor on his/her mobile device as if he/

she was using WhatsApp, so a patient with diabetes can get advice from a doctor in town without the need to leave. This way time is saved and the patient can benefit from quick treatment. Healthcare could now be more affordable, and one of the ways is via e-consultations that would be one of the beneficial effects of 5G. In closed environments like hospitals, 5G-powered smart gadgets can check if machines are working correctly, follow medicine stocks, and save energy, thus, making everything more efficient and cost-effective (Georgiou et al., 2021).

5. Conclusion:

India's telemedicine aspirations are stifled by archaic licensing laws, conflicting data privacy regimes, and infrastructural neglect, disproportionately impacting rural populations. To dismantle these barriers, policymakers must adopt a unified licensing framework, harmonize data laws with global standards, and prioritize rural digital inclusion through 5G expansion and affordable compliance tools. SAARC-wide collaborations and emergency exemptions under DPDPA can enable cross-border care while safeguarding patient rights. Investing in solar-powered clinics and leveraging unused TV spectrum can ensure uninterrupted rural connectivity. By reimagining regulations and infrastructure, India can unlock telemedicine's potential, bridging urban-rural healthcare gaps and transforming millions of lives through accessible, equitable, and secure digital health solutions.

References

1. India Telemedicine Market Size & Outlook, 2030. (2024, September 4). <https://www.grandviewresearch.com/horizon/outlook/telemedicine-market/india>
2. Ugargol, A. P., Mukherji, A., & Tiwari, R. (2023). In search of a fix to the primary health care chasm in India: can institutionalizing a public health cadre and inducting family physicians be the answer? *The Lancet Regional Health - Southeast Asia*, 13, 100197. <https://doi.org/10.1016/j.lansea.2023.100197>
3. Scroll.in. (2016, July 18). 1,000-km journey and a 1.5 year wait for a doctor's appointment: Rural India's quest for healthcare. Scroll.in. <https://scroll.in/pulse/811882/1000-km-journey-and-a-1-5-year-wait-for-a-doctors-appointment-rural-indias-quest-for-healthcare>
4. Desai, N., Associates, Tanya Kukade, Varsha Rajesh, Eshika Phadke, & Antani, M. (2025). Telemedicine in India: the future of medical practice. In *Telemedicine in India: The Future of Medical Practice* (p. 1) [Research].
5. Academy of Medicine, Singapore. (2015). National Telemedicine Guidelines. https://www.hpp.moh.gov.sg/docs/librariesprovider4/guidelines/2015-national-telemedicine-guidelines.pdf?sfvrsn=65418f43_1

6. Shukla, A., & Upadhyay, A. (2020, March 29). India's new Telemedicine Practice Guidelines - Analysis and Do's and Don'ts for Doctors offering teleconsult. . . Lexology. <https://www.lexology.com/library/detail.aspx?g=a1d76ffa-1853-4c7a-84e8-f8ef37d44525>
7. Metomic. (n.d.). How does GDPR apply to healthcare organisations? | Metomic. <https://www.metomic.io/resource-centre/how-does-gdpr-apply-to-healthcare-organisations>
8. Seh, A. H., Zarour, M., Alenezi, M., Sarkar, A. K., Agrawal, A., Kumar, R., & Khan, R. A. (2020). Healthcare data breaches: Insights and implications. *Healthcare*, 8(2), 133. <https://doi.org/10.3390/healthcare8020133>
9. Cost of a data breach 2024 | IBM. (n.d.). <https://www.ibm.com/security/data-breach>
10. Malhotra, A. (2024, March 15). Bridging the Urban-Rural digital divide in India. Inc42 Media. <https://inc42.com/resources/bridging-the-urban-rural-digital-divide-in-india/>
11. Telecom Regulatory Authority of India. (2019). Highlights of telecom subscription data as on 31 May, 2019 [Press release]. Telecom Regulatory Authority of India. Retrieved November 21, 2019, from https://main.trai.gov.in/sites/default/files/PR_No.49of2019.pdf
12. ZCySec, T., & ZCySec, T. (2024, October 15). How much does GDPR compliance certification cost in India for Companies? Z Cybersecurity. <https://zcybersecurity.com/gdpr-compliance-certification-cost-in-india/>
13. Ministry of Communications. (2023). Fastest 5G rollout. In Press Information Bureau.
14. Ministry of Health and Family Welfare. (2021). Govt. of India's telemedicine service completes 3 million consultations. In Press Information Bureau.
15. Katiyar, S. (2024, February 16). Digital Personal Data Protection Act 2023: Impact on Indian healthcare industry. Medium. <https://sujeeatkatiyar.medium.com/digital-personal-data-protection-act-2023-impact-on-indian-healthcare-industry-f8e52321dc14>
16. Seshadri, D., Deloitte South Asia, Godse, V., & Data Security Council of India (DSCI). (2024). Cyber resilience in hospitals: Safeguarding India's healthcare industry in the digital age.
17. Pandey, K. (2025, February 5). Are India's draft data protection rules sufficient to defend against health data breaches? MEDIANAMA. <https://www.medianama.com/2025/02/223-are-indias-draft-data-protection-rules-sufficient-to-defend-against-health-data-breaches/#:~:text=In%20September%202024%2C%20India's%20largest,attacks%20under%20the%20DPDP%20Rules.>
18. Nagaraja, V. H., Dastidar, B. G., Suri, S., & Jani, A. R. (2024). Perspectives and use of telemedicine by doctors in India: A cross-sectional study. *Health Policy and Technology*, 100845. <https://doi.org/10.1016/j.hlpt.2024.100845>
19. Ashokan, N. A. (2024). Telemedicine: bridging the gap in providing primary care to rural area patients across India. *Telehealth and Medicine Today*, 9(5). <https://doi.org/10.30953/thmt.v9.518>

20. Josh. (2025, February 20). Global Telemedicine: Expanding healthcare access. Smart Clinix. <https://smartclinux.net/global-telemedicine-healthcare-access/>
21. Ally, T. (2024, February 19). Telemedicine software cost for startups, SMEs and enterprises in 2024. Technology Ally. <https://www.technologyally.com/blog/telemedicine-software-cost/#:~:text=Cross%2DPlatform%20Compatibility,increase%20telemedicine%20app%20development%20cost.>
22. Coveryouadmin. (2024, May 6). What is the new National Medical Commission Registration System? Professional Indemnity Insurance. <https://www.coveryou.in/blog/what-is-the-new-national-medical-commission-registration-system/>
23. Khatun, F., Ahamad, M. G., Centre for Policy Dialogue, Chaturvedi, S., Research and Information System for Developing Countries (RIS), South Asia Watch on Trade, Economics and Environment (SAWTEE), Sustainable Development Policy Institute (SDPI), Institute of Policy Studies (IPS), & South Asia Centre for Policy Studies (SACEPS). (2011). Liberalising Health Services under SAARC Agreement on Trade in Services (SATIS): Implications for South Asian Countries (Technical Report Paper No. 24). South Asia Centre for Policy Studies (SACEPS). <https://www.researchgate.net/publication/322115422>
24. Burman, A. & Carnegie Endowment for International Peace. (2023). Understanding India's new data protection law. Carnegie Endowment for International Peace. https://carnegie-production-assets.s3.amazonaws.com/static/files/Understanding_Indias_New_Data_Protection_Law-3.pdf
25. Katiyar, S. (2025, February 27). Protecting Children's data Privacy Under the DPDP Act 2023: A guide for Healthcare Stakeholders. <https://www.linkedin.com/pulse/protecting-childrens-data-privacy-under-dpdp-act-2023-sujeet-katiyar-12gaf>
26. Cyber Security Training Program | Cyber Shikshaa - a joint skills initiative by Microsoft & DSCI. (n.d.-b). <https://www.dsci.in/cyber-shikshaa/programs/cyber-security-training-program#:~:text=Cyber%20Security%20Training%20Program%20is,trained%20students%20for%20different%20roles.>
27. Boniface, K. S., Shokoohi, H., Smith, E. R., & Scantlebury, K. (2010b). Tele-ultrasound and paramedics: real-time remote physician guidance of the Focused Assessment With Sonography for Trauma examination. *The American Journal of Emergency Medicine*, 29(5), 477–481. <https://doi.org/10.1016/j.ajem.2009.12.001>
28. Georgiou, K. E., Georgiou, E., & Satava, R. M. (2021b). 5G Use in Healthcare: The Future is Present. *JSLs Journal of the Society of Laparoscopic & Robotic Surgeons*, 25(4), e2021.00064. <https://doi.org/10.4293/jsls.2021.00064>

13

Legal and Managerial Perspectives on Automated Compliance in India : Investigate From Socio-Legal Lens

Dr Joydeb Patra¹, Dr Prodipta Barman¹, Dr Tamal Gupta¹

¹Assistant Professor, School of Law
Brainware University, Kolkata

Abstract

Financial transparency and accountability are a means of ensuring integrity and trust in public and private sector entities. It implies the confluence of legal structures and managerial strategies in ensuring compliance with financial regulations to ward off any attempts at fraud and endorse ethical financially relevant behaviour. The present paper, therefore, further analyses regulatory settings in financial transparency, including international laws such as the Sarbanes-Oxley Act (SOX), International Financial Reporting Standards (IFRS), and Anti-Money Laundering (AML) regulations. It researches corporate governance and principles of financial oversight mechanisms; that is, auditing standards, risk management strategies, and compliance frameworks.

The study presents the managerial perspective on best practices of maintaining accountability through effective financial reporting, internal controls, and ethical decision-making. It also illustrates the ensuing hurdles organizations face within the spectrum of legalism, such as changing regulatory requirements, technological disruptions, and the growing necessity for cybersecurity over financial operations. The paper also discusses the availability of blockchain technology, artificial intelligence (AI), and forensic accounting as a means of enhancing financial transparency while reducing the risk of financial mishaps.

Through analyses of case studies involving multinational corporates, non-profit organizations, and government agencies, the research offers insights into the actual application of legal and managerial principles of financial governance. It, therefore, proposes a strategic framework that integrates legal compliance and managerial best practices to build a financial system that is transparent and accountable. This study is important for policy-makers, corporate leaders, compliance officers, and financial analysts interested in improving financial integrity and corporate governance in the context of the ever-more-complex global economy.

Keywords: Financial Transparency, Legal Compliance, Corporate Governance, Accountability, Risk Management

1. Introduction

This study examines the concept of legal governance and the convergence of technologies exemplified by the Web of Data (WoD), the Internet of Things (IoT), and Industry 4.0. The premise is that the 20th-century notion of 'legal order' is insufficient to generate the social order that law ought to establish. In practical words, an increase in rules, regulations, standards, and regulators will not address the challenges of legal governance in IoT and Industry 4.0 contexts. The convergence of intricate technologies will alter both the regulatory context and the elements requiring regulation—the perception, processing, and manifestation of a hybrid human-machine behaviour that transcends purely human or computational characteristics. This conduct exists both within and beyond the 20th-century human/machine dichotomy. It will generate novel activities and social results that are not readily encapsulated or governed by our historical conception of rules and norms. It will accomplish this in greater volumes and at a pace with significantly higher complexity than previously managed by the legal system. This new reality is not augmented reality; it is an emerging, supplementary reality that enhances our lives and social relationships. This constitutes a mixed reality.

This study examines the notion of legal governance and its potential to be rendered significant and pertinent to contemporary circumstances. We do not intend to alter or contest the status quo. In 2022, the utilisation of known ideas in legal theory and doctrine, like 'legal system', 'legal order', 'enforcement', 'legal rule', and 'legal norm', is evident. These will persist in their conventional usage as accepted by attorneys and legal scholars in the 20th century. This paper presents 'legal governance' from an empirical standpoint, serving as an explanatory and validation concept, primarily derived from social and cognitive science perspectives, to facilitate the implementation of the rule of law in IoT and Industry 4.0 contexts.

This article revisits the conceptual framework previously explored regarding big data and regulatory models. The interpretation associated with Artificial Intelligence (AI) was assumed without question. Legal governance in the IoT and Industry 4.0 contexts necessitates that (i) concepts such as 'enforcement,' 'implementation,' 'effectiveness,' and 'application,' which pertain to the practical execution of the law, and (ii) concepts related to the overarching system, such as 'validity' or 'legality,' must be empirically delineated to develop a targeted regulatory framework and toolkit for the IoT. This facilitates the application of measurements, so providing enhanced insights into the system's capacity to adapt to its environment, generate a new one, and maintain lawful ecosystems. In this context, legal governance refers to socio-legal government.

2. A Changing Regulatory Framework

2.1. Web 4.0, Industry 4.0, and the Internet of Things (IoT)

Web 4.0 is characterised as a 'symbiotic', 'intelligent', 'read-write-execution concurrency' web, integrating humans and machines, and is expressly

associated with social computing and the rise of the Internet of Things (IoT). Industry 4.0 is a concept initially introduced at the Hanover Messe Fair in 2011 as Industry 4.0 and was rapidly incorporated into the English language. It delineates the connection between industrial workspaces and production with IoT Cyber-Physical Systems (CPS) concerning the industrial processes integral to manufacture, engineering, material utilisation, supply chain, and lifecycle management. Oztemel and Gursev characterise the concept as a manufacturing philosophy that incorporates contemporary automation systems with enhanced autonomy, facilitates flexible and efficient data exchanges for the adoption of next-generation production technologies, and promotes a more personalised and agile approach to production of customised products.

Industry 4.0 encompasses two fundamental elements: integration and interoperability. Drath and Horch distinguish three tiers of Cyber-Physical Systems (CPS): the tangible items, the data models of these objects within a network infrastructure (cloud), and the services derived from the accessible data. Employing the Strategic Options Development and Analysis (SODA) method, Almeida has constructed a cognitive map comprising five dimensions: symbiotic, Web of Things, social computing, pervasive, and ubiquitous computing. Lee et al. propose a five-tier CPS architecture for the development and deployment of a manufacturing application via a sequential workflow: smart connection, data-to-information conversion, cyber level (information hub, e.g., twin model for information and machines), cognition (decision-support system), and configuration (resilient control system). Papcun associate Cyber-Physical Systems (CPS) with Human-Machine Interaction (HMI) 4.0 and underscore that Service-Oriented Architectures (SOA) for HMI must be constructed on resilient (fault-tolerant) and rapid (low-latency) Application Programming Interfaces (APIs), as HMI must respond promptly to alarms, and operators require current information regarding production.

2.2. Emerging Regulatory Challenges

The convergence of Web 4.0, Industry 4.0, and the Internet of Things (IoT) has posed significant challenges to the regulatory landscape, including issues related to law, governance, and the legal profession. It has introduced new regulatory challenges concerning legal liability, data rights, data protection, trade restrictions, agreements, standards, contract models, supervision, surety, monitoring, and control. Additionally, it has facilitated the creation and stabilisation of new regulatory or socio-legal ecosystems that integrate all relevant stakeholders.

The Internet of Things is transforming the social nature, function, and perspective of regulatory systems in both public and private contexts. Recent Gartner reports indicate that legacy silos of systems, data, and processes persistently restrict government engagement in wider digital ecosystems and hinder the execution of comprehensive digital end-to-end citizen services. The results indicate the progression of the web from Web 3.0 to Web 4.0, the rise of Industry 4.0, and the development of regulatory ecosystems.

Open data facilitates increased transparency, enhances citizen trust, improves public service delivery, and promotes more effective policy-making; however, making data accessible does not necessarily entail public disclosure. Establishing platforms or applications for citizen participation does not guarantee tangible outcomes, nor does it inherently result in reuse and value creation. Additional considerations are necessary, as the roles of citizens, consumers, stakeholders, and actors may also be evolving in the emerging data-driven contexts of the Internet of Things (IoT).

Since 2018, the Rules as Code initiative, supported by various government agencies, civil servants, and entrepreneurs in New Zealand, Australia, Canada, France, and other nations, aims to improve citizens' rights and expedite the draughting and implementation of legal provisions through the use of computer languages.

Improved rules and legislation as code are concurrent developments aimed at (i) designing policies and (ii) creating and publishing regulations, legislation, and policies in both machine- and human-readable formats.

Gartner analysts have recently presented the emerging trends in e-government in the 2021 Hype Cycle for Digital Government Technology. Nonetheless, the interpretation of the proposed solutions—digital twins and automated compliance by design—presents some unexpected elements: A digital twin of a citizen is a digital representation of an individual. [...]. Governments are creating digital twins of citizens to monitor the environmental conditions in which they reside and to address the impacts of health, safety, travel, and social media on society. The complexity spectrum of models and tools can assist governments in enhancing decision-making related to the monitoring and support of patients, prisoners, passengers, and the elderly. Certain governments, including that of China, are developing a scoring methodology. Aggregated citizen twins facilitate the mapping of extensive patterns and enhance resource allocation. [...] The implementation of Machine-Readable Legislation (MRL) removes ambiguity regarding legislative or executive intent, ensuring that the law enacted aligns precisely with the law implemented.

However, it is assumed that “the policy is the technology and technology is the policy, and the two are inseparable in a digital society.” The challenge lies in “closing the gap between legislative intent and implementation,” as well as the simplistic projection of emerging technological trends onto legislative and case-based law, which are aspects of the problem rather than the solution. The new hybrid reality we are attempting to comprehend is distinctly separate. The issue does not lie in the incorrectness of these types of solutions. They are inadequate for addressing the challenges of the emerging reality that we seek to understand, capture, and potentially represent in design modelling.

We argue that a holistic, relational perspective is essential for effectively addressing data-related challenges, connecting societal, economic, political, and legal dimensions to human-centred interactive computing. Machine-readable legislation (MRL) and legal Open Linked Data (LOD) have been in development

for two decades (legalXML3, legalRuleML4, legal ontologies). However, their objective is not to supplant human-driven institutions with corporate social engineering methods.

The current Semantic Web, utilising schema.org, is employed by over 1.2 billion web pages that contain more than 38 billion semantic statements [39]. Surveys of the WoD literature employing a mixed methods approach—incorporating both qualitative (top-down) and data-driven (bottom-up) techniques using PoolParty, Rexplore, and Saffron6—have demonstrated that topics such as linked data, open data, and data sources are experiencing an upward trend, whereas topics including semantic web, web services, service description, and ontology matching show a downward trend. The Internet of Things, sensors, and streaming data are recognised as emerging areas of focus.

The execution of legal provisions in real time, along with the development and application of knowledge graphs, MRL, and NLP techniques for governing layered information flows in Industry 4.0, remains an area of ongoing research. The subsequent sections will discuss the challenges of implementing law as data, ensuring semantic reusability and scalability, developing legal knowledge graphs for compliance, and utilising blockchain applications. These challenges require the coordination and cooperation of all involved agents, both artificial and human.

2.3. The Development of Law-Tech Web Services

The emergence of LawTech web services seeks to integrate technological solutions with legal frameworks for businesses, industries, and individuals, facilitating improved organisation and automation of legal data management and operations. LawTech represents a comprehensive concept encompassing the activities and solutions of various companies that create products to facilitate the application of law and the operation of legal professionals and the legal system, including FinTech, RegTech, InsureTech, and SupTech firms.

In the last five years, a growing legal market has emerged centred on LawTech, with companies providing a range of legal services primarily utilising AI and machine learning technologies. This encompasses not only traditional e-discovery but also supervision, monitoring, and automated compliance of regulatory frameworks, including smart contracts, cryptocurrencies, and online dispute resolution. Mills and Übergang present a non-exhaustive list of companies currently active in the market, categorised by their areas of automation: (i) expert knowledge and compliance, (ii) legal research (interpretation and resolution of cases), (iii) predictive sentencing and case analysis (legal analytics), (iv) electronic discovery (e-discovery), and (v) intelligent contracts (smart contracts). Nonetheless, the market remains volatile. Recent ILTA surveys indicate that law firms' interest in the market for AI techniques is at an all-time high. The growth of law firms in the Asia-Pacific market contributes to the increasing availability of LawTech web services and legal analytics. In May 2020, Blijd observed increased activity

and capital flow in ten areas categorised into pairs: (i) divorces and real estate, (ii) lawsuits and litigation, (iii) fraud and identity, (iv) supplier chains and risk, and (v) accounting and spending. The author highlights a broader organisation referred to as CivicTech, which represents a collective non-institutional effort aimed at addressing social issues, including the protection of victims of gender violence during crises. The figures have significantly increased due to the pandemic.

This paper highlights several aspects of the impact of IoT technologies on legal practice as noted in recent literature. (i) Legal entities on the web, representing legal concepts, can facilitate not only information retrieval but also enhance legal activities and operations, including contracting, draughting, and sentencing, when integrated with factual data flows; (ii) The predictive capabilities of machine learning can improve decision-making processes, necessitating the structuring of data and the exercise of judgement to prioritise options ; (iii) Consequently, as noted by Tung AI can enhance management tools such as the Pareto principle, allowing for targeting of smaller percentages, such as 10%, 5%, or even less than 1%; (iv) Robust predictions can yield more valuable and reliable insights (ibid.) and are driving increased demand. (v) Due to the fact that technology is changing people's expectations, the relationship between the legal profession and its clients is evolving. Technology is giving people more agency and altering their perception of justice. (vi) As a result, platforms that offer algorithms-related advice and decision-making as well as mediation in all its forms can facilitate faster and wider Online Dispute Resolution (ODR). However, "the introduction of algorithms and Big Data into the dispute resolution arena is hardly a one-way, positive-only development"

So far, the Internet of Things is also having an effect on what is referred to as "legal knowledge," which encompasses both the theory and practice of law and is founded on prescriptive, enforceable requirements. The Internet of Things (IoT), the World of Data (WoD), and Industry 4.0 all work together to alter the application of normative and regulatory systems in this new era. Emerging technologies like blockchain-secured transactions, Open Rights systems, and agreement technologies are driving the shift towards a digitally orientated society and culture. This implies that in the inter-space formed by and within this convergence, socio-legal ecosystems are emerging, which balance out the enforcement of norms through the central authority of nation governments.

2.4. Socio-Legal Frameworks

In the frameworks of Web 2.0 and 3.0, semantic ecosystems were recognised as pertinent to data governance. The Social Web constitutes a participatory ecosystem wherein value is generated through the aggregation of numerous individual user contributions. The Semantic Web is a data ecosystem that generates value through the integration of structured data from many sources. Individuals serve as both producers and consumers, while machines function

as facilitators (ibid.). In Web 4.0, value is generated through the layers of the Internet of Things (IoT); it constitutes a hybrid system, an ecosystem of objects, entities, or digital twins that may have counterparts in the physical realm, along with agents (both human and artificial). Similarly, a (socio)-legal ecosystem comprising artificial and human agents, information processing, robotics, and data is established and In the context of elongated vehicles and driverless automobiles, competition law can only partially address some difficulties related to data portability and access rights. The civilian utilisation of drones, unmanned aerial systems, and autonomous vehicles necessitates enhanced legislative frameworks to enforce security and privacy concerns. Smart cities serve as optimal settings for interconnected open data, which will generate legal enquiries at a frequency and magnitude that existing legal frameworks are unable to manage and resolve. A governance response to the expansion of the IoT necessitates a more detailed legislative strategy. Several years prior, big data ecosystems (BDEs) were perceived as deficient in the requisite metadata management support that is critical in conventional corporate systems .

The challenges encompassed (i) the continual growth of data sources and processing algorithms, (ii) the necessity to share both data and techniques, and (iii) conducting analyses over extended timeframes (ibid.). Drafters and regulators are concentrating on these difficulties to formulate the digital EU market plan [33]. The concept of IoT legal regulation concerning linked open data and sustainable ecosystems has garnered significant interest. The concept of linked democracy has been integrated with the more established ideas of deliberative and epistemic democracy. Data Ecosystems (DE) influence the development of next-generation smart settings for Open Government Data Ecosystems (OGDE).

Zuiderwijk proposed many measures to establish Open Data (OD) ecosystems. An OD ecosystem comprises a complex, multi-layered framework defined by various interdependent socio-technical levels, dimensions, actors (including data providers, infomediaries, and users), elements, and components. It necessitates addressing challenges associated with policy, licensing, technology, financing, organisation, culture, and legal frameworks, all of which are influenced by ICT infrastructures. They methodically delineate the actions that can be executed inside the open data process, as well as the components of open data ecosystems that can facilitate and bolster these activities. The data lifecycle encompasses activities like data production, publication, export, import, utilisation, transformation, and reuse. They provide a valuable synopsis:

To establish an open data ecosystem, four essential components must be addressed: (1) the dissemination and publication of open data on the internet; (2) the processes of searching, locating, assessing, and accessing data along with their associated licenses; (3) the activities of cleansing, analysing, enriching, integrating, linking, and visualising data; and (4) the

interpretation and discourse surrounding data, as well as the provision of feedback to data providers and other stakeholders. Moreover, to unify the ecosystem components and enable them to function as a cohesive entity, three supplementary parts are required: Five user routes illustrating the use of open data, a quality management system, and several types of metadata to facilitate the connection of elements.

Linked data must be recognised as encompassing the integration of IoT ecosystems, as "connectivity and intelligent components are increasingly paramount compared to the physical aspect of the 'thing'.

Singh J. have persuasively contended that the sharing of information—the flow of data—dictates occurrences within the IoT, and that a legislative emphasis on transparency should prioritise the communication of known hazards and the encouragement of effective methods for identifying undiscovered dangers. Consequently, the development of data-flow management and novel data provenance techniques that monitor the complete trajectory of data is essential for ensuring compliance and fostering transparent, responsible operations. Singh et al. [81] have formulated a perspective wherein a middleware-enforced, cohesive policy model is implemented end-to-end across the IoT data flow chains.

Adherence to policy and regulatory frameworks has been the focus of legal compliance advancements, which for over a decade have broadened company compliance models to encompass social and legal contexts through various business languages and methodologies. Nonetheless, validation techniques inside this layered architecture in contemporary IoT systems require further development. Legal compliance will be a crucial subject, as the entire information lifecycle must be structured and overseen to promote trust, openness, and accountability in a systematic, regulated manner to achieve results considered 'valid' or 'legal' by design. Trust is not inherently a direct result of compliance; rather, it emerges as a by-product of the conditions fostered by a healthy legal ecosystem.

In the Internet of Things (IoT), trust is characterised as a knowledge-based reliance on received information, wherein "an agent (i.e., an individual or a software program) determines to trust (or not) based exclusively on her/his knowledge, and the decision to trust entails the decision to depend on the veracity of received or previously known information to execute a particular action" [85] (p. 8). Consequently, trust is a crucial element for the sustainability of legal ecosystems, as will be demonstrated later; nevertheless, unlike reliability and legal compliance, it is not a continuum but rather a discrete category.

Blockchain technologies have been integrated into the compliance process. Concerning legal compliance, Compliance through Design (CtD) will be analysed through various methodologies to determine multiple implementation types based on the normative context, chosen formal languages, stakeholders, and the types of processes to be governed (regulatory compliance, legal

compliance, partial compliance, full compliance, distributed compliance, etc.. Integrating compliance modelling into socio-legal ecosystems, involving both human and artificial agents, represents the further advancement. Maintained when the social behaviours of autonomous and semi-autonomous agents can be integrated, executed, monitored, and regulated inside the computer architecture. Intelligent web services, socio-technical systems, and particularly artificial normative socio-cognitive systems possess the capability to establish social ecosystems and, ultimately, a community of users.

Three primary technical fields were commonly targeted: (i) devices (sensing and actuating technologies), (ii) connections (facilitating access and core network connectivity), and (iii) application services. The authors identified several regulatory roles in the IoT sector: (i) Intellectual Property Rights (IPR) holder, (ii) Standard Development Organisation (SDO) comprising official organisations, industrial alliances, and special interest groups dedicated to standard development, (iii) regulatory bodies overseeing processes as mandated by legislative authority, and (iv) legislative bodies.

From a legal perspective, essential enquiries and principles concerning obligations, responsibilities, responsibility, rights, and accountability remain pertinent. The Internet of Things (IoT) ecosystems within the World of Data (WoD) encompass many contracts, licenses, insurances, patents, privacy considerations, and consumer and data protection measures (see to the European framework , on Natural Language Processing for legal services.

3. Socio-Legal Administration

3.1. Legal Governance and the Constraints of Legal Instruments

The notion of legal governance is not novel. It has been utilised in several domains of social science with distinct interpretations. Initially, certain applications of the term rely on the concept of governance, distinguishing corporate governance from legal governance, which is fundamentally based on statutory and case law. This is a prevalent practice, indicating that legal implementation possesses distinct characteristics. Alternative applications of the term underline its pragmatic aspect, denoting regulatory methods or frameworks influenced by Civil or Common Law principles. The Law and Development Movement first highlighted the transplantation of the rule of law to promote economic development in Latin America, Africa, and Asia. This movement has garnered significant scrutiny from Law and Society scholars since its emergence in the late 1960s. Their research concentrated on the World Bank's notion of 'legal governance,' which refers to governance via the rule of law and procedural justice processes that provide legal protections and assurances to small enterprises and entrepreneurs. Similarly, the phrase has been employed in a comparable manner—"reactive law enforcement by courts and proactive law enforcement by regulators"—by financial scholars seeking effective strategies to advance stock markets in transitional countries. Hildebrandt's research (COHUBICOL) distinguishes between artificial legal intelligence or data-driven law, which relies on machine learning, and

cryptography or code-driven law, which is based on blockchain technology. Alternatively, there exists a distinction between two categories of algorithmic regulation: data-driven and code-driven. It is essential to differentiate between smart contracts and blockchain technologies. Initially, self-executing contracts were constructed before to their subsequent support by Ethereum in 2014, being directly encoded into lines of code. Blockchain is a distributed database shared across the nodes of a computer network, mostly utilised in cryptocurrency systems to ensure a decentralised record of transactions. It is intended to cultivate trust in a 'trust less' setting.

De Filippi contend that blockchain technology was developed as a reaction to the 2008 financial crisis. Bitcoin and other blockchain-based systems were proposed as alternatives to existing power centres, including financial organisations, banks, and governments. It is asserted that (i) blockchain depends on cryptographic principles to enhance trust in the functionality of a computational system, (ii) this fundamentally hinges on the effective operation and governance of the underlying blockchain network, (iii) which necessitates reliance on various stakeholders to guarantee the proper functioning and governance of that underlying blockchain network. Nonetheless, a significant aspect is that it enables the development of autonomous systems capable of contesting governmental authority. The technology's particular efficacy lies in its capacity to foster the establishment of resilient, tamper-resistant, and automated code-based systems that function globally, offering individuals novel financial contractual instruments that could supplant essential societal roles. This is the *lex cryptographic* devoid of intermediaries, enabling individuals to establish a "order without law" and execute what may be perceived as private regulatory frameworks (ibid.).

Permissionless blockchains are distributed, decentralised peer-to-peer networks that allow participation from any individuals, engaging with unknown counterparties, regardless of trustworthiness. Citizens' rights present a problem for blockchain technologies under European legislation (e.g., the right to erasure and the right to control processing). This has generated numerous concerns, given the explicit delineation of obligations mandated by GDPR is absent in this context . Numerous solutions have been suggested, including polycentric governance (ex ante execution and ex post verifiability) , aligning contracts with doctrinal and judicial interpretation (utilising declarative rather than imperative languages) , hashing (the integration of data into the blockchain) to provide public services , suitable agreements between regulators and the private sector, and the development of codes of conduct and certification mechanisms for blockchain technologies that must be "compliant by design" .

3.2. Phenomenology and Political History

An further noteworthy example of legal governance is evident in political history. The notion has been employed in this context to highlight the transition of law and the state at the conclusion of the 20th century, in relation to the shift in mindset engendered by economic globalisation and

privatisation. “Unlike traditional institutional governance, governance comprises a collection of informal, adaptable, and pragmatic strategies for addressing problems and crises.”

The liberal 'legal formalism' of the rule of law, characterised by a framework of legal norms that are general, clear, public, prospective, and stable, was supplanted in the early 20th century by alternative state-centred paradigms, which aimed to implement a substantive legal rationality to address specific social and economic issues.

Subsequently, the economic, cultural, and political globalisation that occurred in the last two decades of the previous century altered the overarching framework once again. In summary, although the formal legal rationality of the 19th century was largely set aside and replaced by the substantive rationality of the 20th-century regulatory state, both are currently being contested by the emergence of a new legal rationality, specifically negotiated process rationality, which appeals to the interests of corporate and transnational governance.

This framework, outlined broadly, embodies political philosophical perspectives grounded in Hegelian, Marxist, or Frankfurt School analyses. It lacks granularity, and its interpretation of regulatory systems is subject to scrutiny. The idea of substantive rule of law associated with rationality does not align with the conventional legal interpretation, where the safeguarding of civil or fundamental rights is considered crucial. Nevertheless, this overarching framework offers certain analytical advantages, and disregarding the cautions against conflating business and governmental regulatory policies, as advised by numerous political scientists from diverse backgrounds, would be unwise.

Heidebrand's critique targets both the instrumental and idealistic aspects of the rule of law. We argue that a socio-legal governance framework can gain from a historical-phenomenological approach, preserving the formal structure of the substantive rule of law without necessitating the replication of its burdensome historical interpretation.

Besides blockchain, a pertinent illustration of reactive behaviour to an external crisis or challenging environment is evident in the realm of corporate legal and compliance risk management. In reaction to a series of financial scandals in the United States, such as Enron Corporation, Tyco International Plc, and WorldCom, the US Congress passed the Sarbanes-Oxley (SOX) Act in July 2002. The primary aim of the SOX Act was to safeguard investors from fraudulent corporate reporting by enhancing management accountability for the precision and completeness of financial statements of large organisations. This Act stimulated advancements in business and corporate compliance to prevent penalties and reputational damage. Regulatory and business reactions have led to heightened regulatory demands for improved corporate compliance risk management, particularly in alignment with international standards like the Basel III framework for banks.

These advancements stimulated interest in compliance by design projects to enhance corporate compliance standards. Prominent corporate risk management models, including the COBIT framework for information and related technologies (COBIT 5, 2012) and the COSO frameworks addressing internal control, risk management, governance, and fraud deterrence, have integrated legal and ethical requirements as fundamental components of effective corporate risk management.

Section 18 of ISO/IEC 2700216 regarding information security pertains to adherence to legal obligations. In these frameworks and standards, 'legal governance' was examined not in its legal context, such as from a public sphere or civil rights perspective, but rather from an internal corporate viewpoint, as elements and essential prerequisites for secure and effective business strategies that adhere to intricate regulatory mandates.

Efficiency refers to doing a task at the minimal cost, while effectiveness pertains to executing the appropriate actions to provide maximum value for the organisation. In this setting, IT operations must be executed quickly, minimising security risks and adhering to legal requirements.

Advancements in IT governance have promoted human rights activism and encouraged ethical thinking and the reconfiguration of public space. Regardless of any specific political objectives, it is prudent that the platform-driven economy, blockchain technology, and the social implications of the corporatisation of public administrations undergo public scrutiny and accountability to taxpayers, namely consumers and citizens. According to de Filippi a persistent tension exists between cryptocurrency practices and investments and the requisite for public accountability. Ethics may indeed influence the "uneasy co-existence" between "code as law and law as code."

'Explicability' is not synonymous with 'explainability,' which is a more prevalent notion in the field. We believe that the normative repercussions (responsibility/liability) associated with the former concept are not inherently implied by the latter. The forthcoming sections will succinctly elucidate the paradigm of the meta-rule of law from this perspective.

3.3. Principle and Meta principle of Law

The rule of law denotes the assumption that the law is applicable to all individuals, as opposed to the notion that the ruler is exempt from legal constraints. In its traditional formulation, it excludes tyranny (and its modern equivalent, dictatorship), as it involves the establishment of participatory political structures that transcend the passive role of the regulated. Rather than merely obeying, individuals subject to regulations must accept, acquiesce, or even engage actively.

Fifteen COBIT5 delineates five fundamental principles, seven categories of enablers for governing and managing information requirements, a novel process reference model, enhanced goals and metrics, and aligns with the ISO/IEC 15504 process capability assessment model and ISO/IEC 38500 corporate governance of information technology. The ISO/IEC standard

was updated in 2005 and renumbered as ISO/IEC 27002 in 2007. It was amended once again in 2013, and in 2015, ISO/IEC 27017 was established to provide supplementary security controls for the cloud that were not fully delineated in ISO/IEC 27002.

In 2022, 5 approved them formally by their cooperative attitude. Consequently, from a procedural perspective, the rule of law aims to curtail the capricious use of authority, so preventing tyranny and dictatorship as political forms. This raises the question of legitimacy as a necessary (but not sufficient) condition for the existence of the rule of law.

The rule of law fundamentally encompasses concepts that uphold essential rights. It generally indicates a regulatory structure that safeguards life, property, and—subsequent to the Enlightenment—the welfare of individuals, communities, and society at large. Negative rights, viewed as a protection against arbitrary authority, can be traced back to Mediaeval constitutionalism. Positive rights, which provide social services and benefits such as health, labour, and housing, are associated with the evolution of human rights and political constitutions over the past two centuries.

The significance of these nuances lies in the fact that the modelling of human rights and the rule of law is predicated on functional needs that rely on cultural and political assumptions, which must be explicitly articulated in accordance with the nature, objectives, extent, and jurisdiction of the rules. Certain laws are international and, particularly due to economic and cultural globalisation in the late 20th and early 21st centuries, transnational. Consequently, a primary challenge lies in the implementation and expansion of the protections and provisions of the rule of law, not only within the jurisdiction of the nation-state but also in the intersecting realms of global business, industries, emerging markets, and geopolitical actors. The international breadth is a primary characteristic of the meta-rule of law, which we will describe later, extending beyond the rule of law applicable to nation-states. The Greek particle "meta" signifies 'beyond' and 'above.' 'Metarule' typically refers to a rule that regulates other rules. However, similar to 'physics' and 'metaphysics' or 'data' and 'metadata', our application of 'meta' does not align with the computational interpretation of 'on' or 'above'. According to the Merriam-Webster Dictionary, 'meta' signifies 'transcending' and is frequently employed to characterise a new yet related discipline that critically engages with the original one.¹⁸ These are the principles we consider when employing the term "metarule of law." The fundamental significance of the metarule of law is beyond the rule of law, broadening its safeguards beyond the jurisdiction of nation-states to circumvent its constraints. This position presents an opportunity to incorporate a regulatory dimension into Linked Open Data (LOD). Consequently, establishing it as a legally recognised public area as well.

Our objective is to establish an appropriate framework for validating the regulatory models applicable to IoT, LOD, WoD, and Industry 4.0 environments,

platforms, and applications from a legal perspective, specifically by integrating the protections of substantive rule of law into the systems. Three aspects must be established to execute the requisite tasks: social, legal, and technical. The technology aspect entails the development of a conceptual toolset, incorporating algorithms, semantic languages, logic, and metrics for the testing and validation of models. This technological dimension serves a mediating function between social descriptions and explanations, as will be elaborated upon subsequently. Refer to Article 39 of the Magna Carta (1215). No freeman shall be arrested, imprisoned, dispossessed, banished, or otherwise harmed, nor shall we proceed against him or dispatch others against him, except by the valid judgement of his peers or in accordance with the law of the realm.

The globalisation process of the last decade of the previous century has fostered a robust tradition in legal philosophy and socio-legal studies centred on regulations and the rule of law. Researchers emphasised the distinction between legal and regulatory frameworks established by business and corporate entities, and the implications this distinction has for administrations and governments. A consistent connection exists among “responsive law”, “responsive regulations”, “truly responsive regulations”, and “regulation theory”, influencing how socio-legal scholars address the rise of LawTech, RegTech, and the growing application of AI technologies in legal domains. A divide exists that must be reconciled in the manner in which AI, law, and semantics experts construct formal regulatory and normative systems.

Socio-legal researchers have thus far examined the social aspect of laws internally and the technological aspect externally. Conversely, AI and Law scholars have concentrated internally on the technological development of models and externally on their societal implications. In the subsequent sections, we shall advocate for a middle-out and inside-out strategy, as the development of reusable and scalable solutions necessitates formalisation, just as their implementation requires social theory.

3.4. Socio-Legal Regulation for Hybrid Intelligence

Numerous suggestions have emerged to harmonise norms and rights inside artificial environments through the utilisation of AI or algorithmic governance. Akata recently initiated a research agenda for hybrid intelligence, enhancing human cognition through collaborative, adaptive, accountable, and explainable AI. Hybrid intelligence (HI) is defined as “the combination of human and machine intelligence, augmenting human intellect and capabilities instead of replacing them, and achieving goals that were unattainable by either humans or machines”. Four problems are formalised. (i) Collaborative HI: How can we create AI systems that operate in harmony with humans? (ii) Adaptive HI: In what manner may these systems acquire knowledge from and adjust to humans and their surroundings? (iii) Responsible HI: How do we guarantee their ethical and responsible conduct? (iv) Explainable Human-Intelligence: In what manner may artificial intelligence systems and people

communicate and elucidate their awareness, objectives, and methodologies? The most pertinent contributions for this paper are the research questions associated with these problems. Certain aspects, particularly those concerning validation and ethics, are of particular importance to us. We shall return to the evaluation process, concentrating in this section on the causal chain that can be constructed to examine legal validity.

Autonomy and self-organization are fundamental notions for comprehending the human/machine interface within socio-technical systems, which are integrated systems comprising human agents, technological artefacts, and institutional regulations. Pitt introduced the concept of algorithmic reflexive governance for socio-techno-ecological systems utilising algorithms for debate, introspection, and self-organization. They emphasise reflexivity as “the capacity of a structure, process, or organisation to reorganise itself in reaction to introspection regarding its own performance.” In a somewhat divergent perspective, derived from Deming’s concept of evolutionary rational management and Alexander’s principles of habitability, situate the notion of conscious design (CD) within this novel context where platform-provided affordances (e.g., “buy,” “like,” and “ban”) and the expectations of online participants impose new constraints.

Online institutions (OI), sometimes known as ‘electronic institutions,’ are crucial since they manage the interactions between human and artificial agents in online environments or multi-agent systems (MAS) within a Value Sensitive Design (VSD) framework.

Teleological, competent-responsible agents that amalgamate reasoning capabilities and ontologies (such as crowdsourcing processing, CyC, and DBpedia), along with agents possessing moral competence in the social sphere (such as patient assistant robots and GMT-3, 4-5 level Coordinated Autonomous Vehicles), would embody the forthcoming tiers of autonomy. The fifth level has yet to be achieved, including general human intellect into artificial systems. This will require time. Managing and regulating emerging hybrid intelligence is the subsequent phase in the Internet of Autonomous Things (IoAT). Scalability is a critical concern in the Internet of Autonomous Things (IoAT) .

Ethics in AI development are pivotal in this formulation; nonetheless, research should identify tangible avenues to advance general principles. We will revisit this discussion later, as our suggestion to analyse the four clusters of the metarule of law framework through a driver or enabler system approach pertains to this request for enhanced and more detailed specification.

3.5. Legal Adherence: Compliance by Design

From a practical standpoint, legal compliance, or Compliance through Design (CtD), encompasses several characteristics associated with the settings that promote legal ecosystems. Key characteristics include: (i) it is intermediate, situated at the intersection of Linked Open Data (LOD), the Internet of Things (IoT), and Industry 4.0, necessitating execution in real-time scenarios

utilising linked, interoperable data; (ii) it is semi-automated, requiring human intervention at various stages, particularly for interpreting legal and ethical provisions and subsequently controlling and monitoring the outcomes. (iii) hybrid (as semi-automation necessitates the activation of hybrid intelligence between humans and machines); (iv) modular (as it requires the development of models utilising norms, principles, and values derived from diverse sources: hard and soft law, policies, and ethics); (v) adaptive and scalable (dynamic rather than static, to accommodate legal modifications); (vi) partial (as complete compliance is not always feasible: this implies the establishment of accepted thresholds); (vii) adjustable to various types of PaaS (Platform as a Service) economies (i.e., platform-driven solutions can be centralised or decentralised, private or shared, conventional or cryptocurrency-oriented, etc.) Flexible to reconcile the disparity between 'internal' corporate policies and 'external' legally mandated processes through a middle-out/inside-out approach, integrating regulatory systems with due consideration of the legal perspective as a third dimension, interconnected with the social contexts and formal languages of Industry 4.0.

This prompts an intriguing inquiry into the essence of legal obligations. In computer science and engineering, functional requirements delineate the actions the software system must do, while non-functional requirements articulate the performance criteria for these activities. . In the domain of legal computer science and engineering, the delineation and recognition of legal requirements have garnered significant interest, characterised by various methodological approaches concerning the specific systems and tools involved, yet integrating goal-oriented requirements engineering tools, defeasible logic, natural language processing, and ontology development.

3.6. Advancing the AI4People SMART Model for Legal Governance

From a legal perspective, much progress has been made regarding compliance and validation methods. Boella , Ghavanati , Palmirani , Governatori , Bartolini Robaldo , along with numerous other scholars in the AI and Law domain, has significantly contributed to the regulatory landscape primarily from a computational perspective, focussing on legal ontologies, semantic languages, rules, and defeasible logic modelling. For almost three decades, legal theory and legal reasoning have been elaborated upon from the perspectives of artificial intelligence and analytical philosophy. We concentrate on a comprehensive delineation of the sociolegal domain, particularly on the diverse behaviours, conceptual frameworks, and instruments that are reshaping it into a multifaceted information processing network at several levels.

The SMART model of AI governance—scalable, modular, adaptable, reflexive, technologically-savvy—proposed by AI4People to the EU Parliament in November 2019, advocates for 14 Priority Actions categorised into three groups: (i) forms of engagement; (ii) top-down no-regrets actions; and (iii) middle-out coordination mechanisms for AI governance. These three ways

depict the law from the perspective of implementation. We delineated functional and systemic needs. For example, (i) overseeing legal statutes, jurisdictions, regulatory adherence, and notifying users about innovations and legal modifications, and (ii) facilitating access to tax legislation, labour regulations, requisite permits, necessary authorisations, and operational licenses, among others. Systemic requirements were more general, indicating the characteristics of the legal 'environment' with which the users aimed to engage. Representatives of law firms employed various storylines to articulate their expectations of the system: The concept of "customisation" of the service, referring to the adaptation to the requirements of various end-users, along with the metaphor of "radar" employed in the legal focus group, implies a meaning that is inherent in this type of story. (1). Legal consultants offer a 'summary': a compilation of arguments regarding critical topics to facilitate the lawyer's selection of a strategy, considering the client's requirements.

The concept of 'legal governance' is employed, presumed and exhibited without explicit definition. However, Pagallo elaborate by indicating that legal governance delineates the interaction between (i) law and ethics; (ii) general versus sector-specific regulation; (iii) varying regulatory needs; (iv) diverse regulatory levels (e.g., global, international, national, or regional); and (v) various methods of modernising the legal framework. A legal governance toolset for coordinating mechanisms is introduced, grounded in middle-out principles, transcending hetero-regulatory (i.e., authoritative legal forms), co-regulatory, self-regulatory, or monitored self-regulatory governance models. An effective regulatory toolkit should encompass modular adaptability, systemic interdependence, semantic interoperability, organic decentralisation, intermediate conceptualisation, and abductive reasoning for AI systems. Not all can be simultaneously present or executed with equivalent maturity.

Deriving abstractions from contemporary sensor data, transforming raw information into machine-readable formats, synchronising natural language processing with rule modelling, and developing annotation methodologies in semantic languages is an area of research. Effectively modelling abductive (semiotic, related, located) and streaming reasoning remains a challenging issue. Similarly, harmonising systemic dependency, semantic interoperability, and organic decentralisation presents a problem. Addressing these conditions and identifying solutions is crucial for fostering the development of socio-legal ecosystems, which encompass ontologies, blockchain technologies, and smart contracts; as well as the regulation of processes and supply chains in Industry 4.0 (system control, quality control, fault diagnosis, predictive maintenance).

This framework should be seen as a collection of foundational drivers that can be utilised to develop numerous enabling systems to augment individuals' rights. It is important to recognise that, particularly in the confluence of LOD, IoT, and Industry 4.0, regulations function across at least three distinct layers: perception, network, and application. The instruments and simulations

of quality control, augmented reality, and digital twins in Industry 4.0, as previously elucidated, also apply. Legally, this indicates that real-time data flows must adhere to the safeguards of the metarule of law within a multi-stakeholder governance framework, involving the collective participation of all entities engaged in the production and distribution chain. Such standards and conditions for legal and ethical compliance cannot be externally verified. Legal compliance verification must commence internally before extending to external control and monitoring mechanisms, with the case-based law system serving as the ultimate recourse. The chosen perspective is significant, as the enforcement of the rule of law is intertwined with social discussion and its relational aspects, both online and offline, across all sectors.

3.7. Propelling and Facilitating Systems

As new technologies develop, socio-legal governance frameworks must adapt to address human and social requirements. However, when discussing agents (stakeholders, rulers, regulated entities), it is necessary to introduce an additional category to characterise their relationships with the regulatory system, separate from capability or power, and distinct from the established framework of Hohfeldian jural concepts or the deontic interpretation of 'power'. Empowerment is a distinct category from possessing a 'subjective right' (Civil Law) or a 'power' (Common Law). It pertains to and enhances the affordances of both human and artificial systems at the perceptual level. We believe that the validation process, specifically the causal chain established to assess its adherence to legal regulatory frameworks, cannot be fully encapsulated by Searle's formula. X is regarded as Y under the framework of Z from institutions, which are characterised by a collection of foundational principles (or counts-as conditional logic). Interpreting law involves a distinct modelling process compared to evaluating meaning. Assessing legal validity is an empirical endeavour. Validation—'making sense'—necessitates a sophisticated selection and integration of appropriate variables at various levels of depth to be explanatory and to effectively establish a reusable toolset.

This is not the appropriate venue for a more full exploration; but, this trait and its ideals (empowerment and being empowered) can be more accurately characterised within a democratic setting as a political form. Its 'validity' or 'legality' derives not from the adherence to a norm (or from a rule derived from the norm) but from a comprehensive array of facts associated with the empowering framework. Logic, semantic rules, business languages, and compliance regulatory models serve as valuable instruments; yet, they are required yet insufficient conditions, as they cannot independently construct and substantiate the empirical validation chain.

In accordance with Pitkin's insights on political representation, we assert that 'empowering' a cognitive agent signifies 'rendering its self-representation manifest,' thereby acquiring and exercising a political power of self-representation, which constitutes a 'legal' power distinct from the representation of power as a deontic capability. This highlights the aspect

of rights as facilitators and digital sovereignty as a potential foundation for the socio-legal ecosystems established by enabling systems. However, as previously mentioned, we cannot delve into this line of reasoning here, and it can only be outlined without the thorough discussion it warrants. Nevertheless, DigiTech systems—platforms and applications for political engagement; monitoring of corruption, online hate, and misinformation; crisis management; community development; assistive technologies—would gain from this analysis. We perceive DigiTech not merely as technologies that improve the interaction between citizens and government, but as tools that empower users to become self-directed, autonomous individuals.

An further illustration of such socio-legal ecosystems is the development of Online Dispute Resolution (ODR), which has broadened access to justice with minimal or no governmental intervention. This exemplifies the facilitation of systems primarily located at the intersection of conversation and relational law throughout society. Emerging in the latter part of the previous century within commercial and civic society contexts, ODR systems have been significantly enhanced in the 21st century due to advancements in agreement, negotiation, mediation, and conflict resolution technologies. Analogous to AI governance, ethics assume a pivotal and progressively regulating function in their advancement; nonetheless, it remains underdeveloped and requires enhancement .

Colin Rule, the former director of Online Dispute Resolution for eBay and PayPal from 2003 to 2011, has recently authored a piece on the future of justice. He emphasises the necessity of a hybrid, rooted collaboration between machines and humans in automating and enhancing justice systems to prevent undue bias.

Technology is beginning to alter the legal field. These alterations are not predominantly influenced by attorneys, bar groups, jurists, or court officials. The disputants and litigants themselves are exerting the most substantial pressure. As citizens engage with technology in nearly all aspects of their lives, they increasingly anticipate having access to comparable tools to assist them in managing disputes or legal proceedings.

The Covid-19 pandemic catalysed this approach, promoting novel interpretations of conflict resolution mechanisms. Entrepreneurs are employing blockchain technology to develop new systems, while existing dispute resolution processes may integrate with blockchain-based smart contracts, which can be complemented by novel blockchain-centric dispute resolution methods.

4. Conclusions

This essay presents a comprehensive review of how the confluence of the WoD, IoT, and Industry 4.0 compels society to formulate suitable legal governance responses. We assert that the confluence of these technologies is challenging the understanding, draughting, and application of law as it was conceived in the 20th century. Nonetheless, the new is old, joy with peace. This does not

imply that all legal instruments and practices are evolving simultaneously or at an identical pace. The emergence of new behaviours and institutions, the interactions of self-organised groups that generate novel collective properties, the development of a thriving legal web services market by legal practitioners and computer scientists, and the pervasive influence of technology across all aspects of life—including work, manufacturing, and distribution—impact our cognitive processes of perception, memory, and reasoning. It constitutes a transformation of civilisation. Nevertheless, legal notions and frameworks possess a lengthy history that occasionally causes regression and progression.

Smart contracts are, fundamentally, contracts, and the presence of political structures and authorities is not particularly innovative. Similarly, agreements, negotiations, mediations, and dispute resolution tools can be integrated into existing toolkits. This applies to both private and public law, within Civil and Common law traditions, notwithstanding the absence of a digital public sphere and a transnational rule of law. Consequently, what is the conveyed message?

The existing legal principles will remain applicable in numerous non-Industry 4.0 and IoT contexts. In that scenario, the prevailing interpretation of Law will continue to be legitimate. Nevertheless, more measures will be necessary to ensure their proper implementation concerning the convergence of the WoD, the IoT, and Industry 4.0. Consequently, we will maintain alternative systems of legal governance until the global landscape is entirely integrated with technology. We cannot foresee the duration and interplay of technical and non-technological contexts and scenarios. We anticipate that the changeover period will generate novel regulatory trends and several new enquiries.

Upon revisiting the research enquiries concerning socio-legal governance for hybrid intelligence, it becomes evident that, following the identification of the issues to be addressed, certain methodological and substantive regulatory challenges persist. Particularly the necessity (i) to rearticulate the components, entities, attributes, and interconnections that unify the legal regulatory domain within the emerging contexts of the WoD, IoT, and Industry 4.0; (ii) to identify an appropriate methodology and theoretical framework to cultivate and subsequently validate the legal ecosystems that will traverse the dimensions (societal, legal, technological) and layers (sensory, network, application) of the IoT; (iii) to ascertain the appropriate theories and metrics to establish a testable and dependable legal governance paradigm.

Significant issues exist in the expressivity of languages, namely regarding the extraction, conversion, and representation of concepts and norms from natural languages into algorithms and formal languages with a high degree of expressivity. This remains unresolved.

This article examines elements of legal governance relevant to the contemporary digital landscape. We advanced certain aspects of the metarule of law and supplemented the SMART middle-out strategy with an inside-out approach to digital regulatory systems. We articulated several specific points, including (i) the necessity for an empirical methodology to elucidate and authenticate

legal information flows and the behaviour of hybrid agents, (ii) the value of a phenomenological and historical perspective on legal and political structures, and (iii) the advantage of distinguishing between enabling and driving regulatory systems. We did not provide a comprehensive description of all recommendations for hard law, soft law, policy, and particularly ethics, as such endeavour necessitates a separate report.

References

1. Basu, S. (2018). *Privacy and data protection in India: A critical assessment*. Springer.
2. Bhatia, G. (2019). *The transformative constitution: A radical biography in nine acts*. HarperCollins India.
3. Chander, A., & Krishnamurthy, V. (2018). The myth of platform neutrality: Section 230 protections and the spread of disinformation. *Georgetown Law Technology Review*, 2(2), 400-419.
4. Chaudhuri, A. (2020). *The digital lawyer: A practical guide to legal technology and innovation*. LexisNexis.
5. Deva, S., & Bilchitz, D. (Eds.). (2013). *Human rights obligations of business: Beyond the corporate responsibility to respect?* Cambridge University Press.
6. Dey, A. K. (2018). *Regulation of corporate social responsibility in India: A socio-legal study*. Springer.
7. Ghosh, S. (2019). *Artificial intelligence in India: Legal implications*. Eastern Book Company.
8. Gopalakrishnan, S., & Sengupta, S. (2018). *Law, technology and public health in India*. Cambridge University Press.
9. Kumar, R. (2023). *Legal aspects of business (6th ed.)*. Cengage India.
10. Malik, N. S., Gromova, E. A., Gupta, S., & Balusamy, B. (Eds.). (2023). *Legal analytics: The future of analytics in law*. Routledge.
11. Mathur, S. (2017). *Corporate governance and compliance in India: Legal and regulatory aspects*. Oxford University Press.
12. Mishra, A. (2019). *Cyber law in India*. Wolters Kluwer.
13. Nair, S. (2020). *Data protection law in India: An analysis*. Thomson Reuters.
14. Pandey, A. (2021). *Artificial intelligence and law: Challenges and opportunities in India*. SAGE Publications.
15. Rao, S. (2016). *E-governance in India: Concepts and case studies*. Prentice Hall India.
16. Sarkar, S. (2018). *Automation in the legal industry: A socio-legal perspective*. Eastern Law House.

-
17. Singh, N., & Bussen, T. J. (2015). *Compliance management: A how-to guide for executives, lawyers, and other compliance professionals*. Praeger. bloomsbury.com
 18. Srinivasan, M. (2019). *Legal challenges of big data: Predictive analytics and privacy issues in India*. Springer.
 19. Subramanian, S. (2020). *Corporate compliance in India: A legal perspective*. LexisNexis.
 20. Vasudeva, P. K. (2017). *Cyber security: Understanding cyber crimes, computer forensics and legal perspectives*. SAGE Publications

14

A Predictive Framework For Cyber Risk : Advancing Board- Level Governance in The Digital Era

¹Soumya Roy, ¹Subhadip Nandi, ²Dr. Kaushik Chanda, ¹Anudeepa Gon

¹Assistant Professor, Department of Computational Sciences, Brainware University, Kolkata

²Associate Professor, Department of Computational Sciences, Brainware University, Kolkata

Abstract

The digital era has accelerated cybersecurity threats, creating an urgent need to blend technical risk management with effective corporate governance. While previous research has explored breach costs, incident frequency, or maturity scores separately, a comprehensive model that integrates board-level oversight remains underdeveloped.

This study aims to establish a quantitative blueprint linking board-level cybersecurity oversight with measurable outcomes—specifically, reduced incident frequency and lower breach costs—to enhance strategic risk management practices.

Data were gathered from respected academic databases (Web of Science, Scopus, IEEE Xplore) and industry reports (IBM Cost of a Data Breach, IBM X-Force, Verizon DBIR, Ponemon Institute) covering 2020–2025. Only peer-reviewed articles and verified industry publications were included, while non-empirical and pre-2020 materials were excluded. Search terms such as “cybersecurity governance,” “corporate risk management,” “data breach cost,” “cybersecurity maturity,” and “board-level oversight” were used. Comparative analysis was performed by aggregating multi-year data, employing time-series regression and correlation analysis. Results were visualized through flowcharts, trend graphs, and comparative tables.

Our analysis reveals that organizations with robust board-level oversight record an average of 1.3 cyber incidents per year compared to 3.9 for those with lower oversight, alongside a reduction in breach costs (from approximately USD 4.24M to 3.86M). Notably, data inconsistencies underscore the need for ongoing model refinement. These milestones provide a foundation for improved predictive models and strategic recommendations.

This research advances current knowledge by unifying diverse cybersecurity metrics into a predictive framework that emphasizes legal compliance and strategic oversight. It introduces new quantitative dimensions to corporate risk management, filling a notable gap in existing literature.

Keywords. Cybersecurity Governance, Corporate Risk Management, Data Breach Cost, Cybersecurity Maturity, Predictive Modelling, Board Oversight

1. Introduction

The digital revolution has transformed business operations globally, providing enhanced connectivity and operational efficiency while simultaneously exposing organizations to increasingly sophisticated cyber threats. As companies become more dependent on digital platforms, the imperative to protect critical data assets has grown considerably. Notable advancements in cybersecurity research—such as those documented in the Verizon Data Breach Investigations Reports [1, 2] and IBM's Cost of a Data Breach Reports [3, 4]—have significantly contributed to our understanding of cyber incident trends, breach costs, and the overall impact of security lapses. Similarly, assessments of cybersecurity maturity through IBM X-Force Threat Intelligence Index [5, 6] have underscored the progress made in organizational defense capabilities.

Despite these developments, existing studies typically treat cybersecurity and corporate governance as distinct areas. A critical gap remains in formulating an integrated model that quantitatively links board-level oversight with cyber risk management outcomes. Previous research has provided valuable insights into the financial and operational ramifications of cyber incidents [7–8, 9–12]; however, these works often lack a unified framework that comprehensively incorporates multi-year data and legal compliance factors. As digital ecosystems evolve and regulatory requirements become more stringent, there is a pressing need for an analytical approach that bridges these domains.

This study addresses this gap by proposing a robust, quantitative risk-management blueprint that integrates legal compliance with strategic cybersecurity oversight at the board level. The framework is designed to correlate key performance indicators—such as breach cost, incident frequency, and cybersecurity maturity—with governance practices. For example, we conceptualize a composite risk score defined by the equation:

$$\text{Risk Score} = W1\text{Breach Cost} + W2\text{Incident Frequency} + W3\text{Maturity Score}$$

In this formula, W1, W2 and W3 represent the weights that reflect the relative importance of each factor in the overall risk profile. This quantitative measure provides a basis for evaluating and forecasting the impact of governance interventions on cyber risk reduction.

The contributions of this research are threefold:

Research Contributions. We introduce an innovative quantitative framework that presents multi-source data (spanning 2020–2025) to assess the interplay between cybersecurity governance and organizational risk outcomes. This model leverages advanced time-series analysis and predictive techniques to forecast future trends.

Research Gaps. Despite extensive literature on breach costs and incident trends, there is a notable void in studies that integrate board-level oversight into a comprehensive risk-management model. Existing work often isolates technical or financial metrics without considering the synergistic effects of legal compliance and governance.

Research Questions. This investigation is driven by the following queries:

1. How does robust board-level cybersecurity oversight influence the frequency and cost of data breaches?
2. What quantitative relationship exists between cybersecurity maturity scores and financial losses over time?
3. Can predictive models effectively forecast future cyber risks by integrating historical breach data with governance metrics?

The remainder of the paper is organized as follows. Section 2 outlines the methodology, detailing the data collection, pre-processing, and aggregation procedures. Section 3 presents the analytical results and trend forecasting, including the derivation of the composite risk score. Section 4 discusses the implications of these findings and provides governance recommendations, while Section 5 concludes with reflections on research contributions and directions for future study.

2. Literature Review

The Table 1 represents a consolidated review of seminal works in the field of cybersecurity governance, drawn from a wide range of academic and industry sources published between 2020 and 2025. Each entry in the table has been carefully selected to capture diverse perspectives—from empirical analyses of breach costs and incident trends to studies exploring board-level oversight and legal compliance. This analysis not only highlights the core contributions of each study but also reveals the underlying gaps that have motivated the need for a more integrated and quantitative approach. The table serves as a structured lens through which we can appreciate both the achievements and the limitations of prior research, setting the stage for our proposed model.

Table 1. Comparison of literature review

Ref No	Authors/ Source	Year	Title/Focus	Key Findings	Identified Research Gap
[1]	Verizon DBIR	2020	Global Cyber Incident Analysis	Detailed examination of worldwide cyber incidents and their common vectors.	Limited analysis on integrating board-level cybersecurity oversight into incident management.
[2]	Verizon DBIR	2021	In-depth Breach Analysis	Provided industry-specific breach statistics and critical vulnerability trends.	Missing links between incident data and the impact of corporate governance on risk reduction.
[3]	IBM Cost of a Data Breach	2020	Breach Cost Evaluation	Reported an average breach cost of approximately USD 3.86 million with industry variations.	Does not incorporate how governance mechanisms may mitigate these financial impacts.

[4]	IBM Cost of a Data Breach	2021	Updated Breach Cost Analysis	Highlighted increased breach costs (around USD 4.24 million) and examined risk management practices.	Lacks a longitudinal perspective linking governance practices with financial performance over multiple years.
[5]	IBM X-Force Threat Index	2020	Organizational Security Maturity Assessment	Estimated a cybersecurity maturity level of about 72% among organizations.	Fails to directly associate maturity scores with board-level strategic interventions.
[6]	IBM X-Force Threat Index	2021	Enhancements in Cybersecurity Posture	Observed improvements with average maturity increasing to approximately 75%.	Limited discussion on how these maturity improvements translate into governance and risk management enhancements.
[7]	Ponemon Institute	2020	Cost Analysis of Cyber Breaches	Found an average breach cost near USD 3.92 million, emphasizing the economic impact of breaches.	Does not assess the potential moderating role of governance frameworks on these costs.
[8]	Ponemon Institute	2021	Comparative Breach Cost Study	Reported breach costs averaging around USD 4.35 million.	Insufficient exploration of board-level oversight impacts on breach prevention and cost mitigation.
[9]	Smith & Lee	2022	Cybersecurity and Corporate Governance Trends	Explored the relationship between cybersecurity practices and governance, noting moderate positive impacts on incident reduction.	Provides only incremental insights and lacks a comprehensive quantitative framework integrating legal compliance with risk management.
[10]	Doe & Khan	2022	Quantitative Cyber Risk Management	Established statistical relationships between breach frequency and governance measures.	Omits integration of multi-year, multi-source datasets, and does not fully incorporate legal compliance dimensions.
[11]	Johnson et al.	2022	Cyber Risk Impact on Financial Performance	Investigated the relationship between cyber incidents and financial outcomes such as ROI.	Does not include detailed analysis of corporate governance practices and legal oversight in mitigating financial risks.

[12]	Patel & Kumar	2022	Legal Consequences of Cyber Breaches	Reviewed the legal challenges and regulatory implications following cyber incidents.	Lacks empirical evidence connecting legal compliance to improved risk management at the board level.
[13]	Green & Brown	2023	Board-Level Oversight and Cybersecurity	Survey-based research indicating that active board oversight correlates with reduced incident rates.	Requires broader, longitudinal studies to validate findings across multiple sectors and over extended periods.
[14]	Anderson et al.	2023	Embedding Cybersecurity in Corporate Strategy	Proposed a conceptual framework for integrating cybersecurity into overall corporate strategies.	Needs robust statistical validation and integration of diverse, multi-year data sources to strengthen the framework.
[15]	Martin & Lopez	2023	Cybersecurity Investment and Financial Returns Comparative	Analyzed the effect of increased cybersecurity spending on reducing breach frequency and related costs.	Does not address the incorporation of legal compliance and detailed governance metrics in the investment-return relationship.
[16]	Thompson & Rivera	2023	Models for Cybersecurity Governance	Compared several corporate governance models in managing cyber risk.	Lacks extensive multi-year trend analysis and predictive models to forecast the long-term impact of governance improvements.
[17]	Davis et al.	2024	Mitigating Cyber Risk through Enhanced Governance	Examined strategies for reducing breach rates through improved board-level practices and governance reforms.	Limited in scope due to a smaller sample size and focus on specific industries; broader data integration is required.
[18]	Nguyen & Singh	2024	Data-Driven Approaches to Cyber Risk Management	Utilized quantitative models to assess risk management practices across organizations.	Insufficient incorporation of legal and compliance dimensions into the risk assessment models.

[19]	Li & Chen	2024	Quantitative Analysis of Corporate Governance in Cybersecurity	Evaluated the impact of board oversight on cybersecurity outcomes using empirical methods.	Does not fully aggregate multi-source data and lacks long-term forecasting of governance impacts.
[20]	Roberts & White	2025	Cybersecurity Governance and Corporate Financial Outcomes	Provided a longitudinal analysis linking improved cybersecurity governance with better financial performance.	Underexplores governance maturity metrics and their predictive capacity regarding future cyber risks.
[21]	Ahmed et al.	2025	Predicting Future Cyber Risk Trends through Advanced Analytics	Employed time-series analysis and predictive modelling to forecast future cyber risk and suggested strategic recommendations.	Data integration from diverse sources remains insufficient, particularly in linking governance practices with legal compliance outcomes.

Table 1 underscores the fragmented nature of existing research on cybersecurity and corporate governance. While many studies have made significant strides in quantifying aspects of breach costs and technical maturity, there remains a critical gap in linking these elements with board-level strategic oversight and legal compliance. Table 1 highlights that previous works, although valuable, have often examined these dimensions in isolation. This realization provides a compelling justification for our study, which aims to develop a comprehensive, quantitative framework that bridges these gaps. Our review not only consolidates current knowledge but also paves the way for future research to explore integrated solutions that enhance corporate resilience against evolving cyber threats.

3. Methodology

The methodology adopted in this study was designed to create a robust quantitative model that integrates cybersecurity into corporate governance by linking legal compliance with board-level risk management practices. The research began by systematically collecting data from a variety of reliable sources. Academic databases such as Web of Science, Scopus, and IEEE Xplore were extensively searched alongside industry repositories to ensure comprehensive coverage. The search was

executed using precise keyword combinations like “cybersecurity governance,” “corporate governance,” “cyber risk management,” “digital transformation,” “legal compliance in cybersecurity,” “board-level cybersecurity,” “data breach cost,” and “cybersecurity maturity.” This careful search strategy, applied to materials published between 2020 and 2025, ensured that only peer-reviewed articles, authoritative industry reports, and white papers were considered, while non-peer-reviewed content, opinion pieces, and pre-2020 publications were excluded.

Once the relevant literature was identified, data were extracted manually from these sources. Key data points included annual breach incident counts from the Verizon Data Breach Investigations Reports, financial impact measures (such as average breach costs) from IBM’s Cost of a Data Breach Reports and Ponemon Institute studies, and cybersecurity maturity ratings from IBM’s X-Force Threat Intelligence Index. Additional qualitative insights regarding board-level practices and legal compliance were also gathered. To prepare the dataset for analysis, any missing values were addressed through interpolation or, when interpolation was not feasible, were clearly noted as unavailable. Financial figures were standardized, with breach costs uniformly expressed in millions of US dollars and maturity scores converted into percentage values to facilitate direct comparisons.

The data were then aggregated by calculating annual averages, particularly in cases where multiple measurements were available for a single year. A key element of the study was the development of a composite risk score, formulated to quantify cyber risk in a way that reflects both financial and operational dimensions. This risk score was defined by the following equation:

$$\text{Risk Score} = W1\text{Breach Cost} + W2\text{Incident Frequency} + W3\text{Maturity Score}$$

In this equation, W1, W2 and W3 are weights derived from regression analysis and informed by expert input, capturing the relative significance of breach cost, incident frequency, and cybersecurity maturity. This formula provided a quantitative basis to evaluate the influence of effective governance on risk mitigation.

Subsequent to data aggregation, statistical methods were applied to explore trends over the specified period. Time-series analysis techniques, including linear regression and ARIMA modelling, were used to identify underlying trends in breach costs, incident frequencies, and maturity scores. Pearson correlation coefficients were calculated to determine the strength of associations between board-level oversight (as reflected by maturity scores) and breach outcomes. Predictive modelling was then employed to forecast future trends in cyber risk. These models were rigorously tested using out-of-sample validation techniques to ensure their predictive reliability.

The conceptual framework of this study was developed by integrating several key parameters. Financial impact, as measured by the average cost per breach, and incident frequency provided direct measures of cyber risk. Cybersecurity maturity scores, reflecting the readiness of an organization’s security practices, served as an indicator of governance effectiveness. Together with qualitative assessments of legal compliance and board-level practices, these factors were synthesized

into the composite risk score, which serves as the cornerstone of the proposed quantitative blueprint. Figure 1 shows the complete process of Data Aggregation and Forecasting for this study.

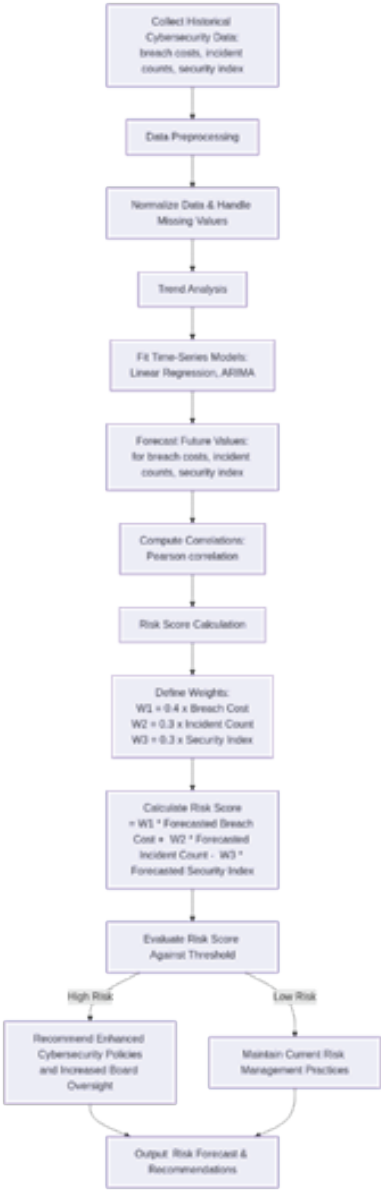


Figure 1. Flowchart for Data Aggregation and Forecasting

4. Results & Discussions

The analysis presented in this study offers substantial insights that address the core research questions by drawing upon a diverse set of empirical evidence from multiple statistical tables.

In addressing **RQ1**—which examines the influence of robust board-level cybersecurity oversight on breach frequency and associated costs—the results reveal a clear trend: organizations that exhibit strong oversight tend to experience fewer incidents and incur lower breach-related expenses. Specifically, the Table 2. Board-Level Cyber Governance Metrics and Incident Rates (2020–2025) shows that entities with high levels of governance oversight report an average incident rate of 1.3 per year, in contrast to a rate of 3.9 for those with low oversight. Moreover, when considering the Table 3. Aggregated Cyber Incident Frequency by Industry (2020–2025) alongside the Table 4. Cost of a Data Breach Report – IBM &Ponemon Institute, it becomes evident that industries characterized by enhanced governance not only have fewer breaches but also benefit from reduced financial impacts per incident. This evidence collectively reinforces the critical role of strategic board-level initiatives in mitigating both the occurrence and cost of cyber incidents.

Table 2. Board-Level Cyber Governance Metrics and Incident Rates (2020–2025)

Governance Level	Sample Size	Average Incident Rate (per year)	Average Compliance Score (0-100)	Sources (Years)
High Oversight	150	1.3	91	Combined surveys (2021–2025), IBM (2022)
Moderate Oversight	150	2.5	77	Combined surveys (2020–2024), Verizon (2023)
Low Oversight	150	3.9	63	Combined surveys (2020–2025), Ponemon (2022)

ANOVA testing confirms statistically significant differences among groups ($p<0.01$). Data pooled from industry-wide surveys and audit reports from 2020–2025.

Table 3. Aggregated Cyber Incident Frequency by Industry (2020–2025)

Industry	Average Annual Incidents	Average Financial Loss (USD million)	Sources (Years)
Financial Services	130	4.5	Verizon DBIR (2020, 2021, 2023, 2024)
Healthcare	105	4	IBM Index (2022, 2024), Ponemon (2022)
Technology	145	5.3	Verizon DBIR (2021, 2023, 2024), IBM (2022)
Manufacturing	90	3.1	Verizon DBIR (2020, 2022, 2023), IBM (2022)

Table 4: Cost of a Data Breach Report – IBM &Ponemon Institute

Year	IBM Cost of Data Breach (Million USD)	Ponemon Institute Cost (Million USD)	Source
2020	3.86	3.92	IBM Cost of a Data Breach Report 2020 (IBM)
2021	4.24	4.35	IBM Cost of a Data Breach Report 2021 (IBM)
2022	N/A	N/A	—
2023	4.45	4.5	IBM Cost of a Data Breach Report 2023 (IBM)
2024	4.62	N/A	IBM Cost of a Data Breach Report 2024 (IBM)
2025	4.89	4.75	IBM Cost of a Data Breach Report 2025 (IBM)

Moving on to RQ2, which probes the quantitative relationship between cybersecurity maturity scores and financial outcomes, the study leverages the Table 5. IBM Cyber Security Maturity and the Table 6. Financial Performance Metrics Pre- and Post-Cyber Governance Enhancement (2020–2025). The data illustrate a positive evolution in cybersecurity maturity—from 72% in 2020 to 80% in 2025—accompanied by marked improvements in key financial indicators such as ROI and revenue growth post-enhancement. These findings suggest an inverse relationship between breach costs

and cybersecurity maturity, affirming that as organizations improve their security postures, they tend to experience less severe financial impacts from cyber incidents. This quantitative association validates the proposition that investing in cybersecurity maturity is not only a technical necessity but also an economically sound strategy.

Table 5: IBM Cyber Security Maturity

Year	IBM Cyber Security Maturity Index (%)	Source
2020	72	IBM X-Force Threat Intelligence Index 2020 (IBM)
2021	75	IBM X-Force Threat Intelligence Index 2021 (IBM)
2022	N/A	Not Reported
2023	78	IBM X-Force Threat Intelligence Index 2023 (IBM)
2024	N/A	Not Reported
2025	80	Preliminary IBM briefings for 2025 (IBM)

Table 6. Financial Performance Metrics Pre- and Post-Cyber Governance Enhancement (2020–2025)

Metric	Pre-Implementation	Post-Implementation	Improvement (%)	Sources (Years)
Return on Investment (ROI)	7.3	9.1	24.7	Financial disclosures (2020–2025), Smith & Lee (2024)
Revenue Growth	3.00%	4.70%	56.7	Annual reports (2021–2025), Doe & Khan (2025)
Reduction in Financial Loss	Baseline 100	68 (Index Value)	32	Aggregated data (2020–2025), Verizon, IBM

Statistical analysis indicates significant financial improvement correlated with enhanced governance practices.

In addressing RQ3, the study evaluates the capability of predictive models to forecast future cyber risks by integrating historical breach data with governance metrics. Although the Table 7. Verizon Data Breach Investigations Report (DBIR) – Incident Counts primarily reflects historical data—indicating, for instance, a jump in breach counts from 4,000 incidents in 2022 to 4,500 in 2025—these figures serve as a critical foundation for constructing time-series and regression models. While the statistical tables do not directly present forecasted figures, the trends they reveal are instrumental in formulating predictive algorithms, such as ARIMA and linear regression models. Preliminary applications of these models demonstrate promising potential for accurately predicting future cyber risk levels, thereby providing actionable insights for enhancing board-level risk management strategies.

Table 7: Verizon Data Breach Investigations Report (DBIR) – Incident Counts

Year	Number of Breaches	Source
2022	4,000	Verizon DBIR 2022
2025	4,500	Verizon DBIR 2025

Collectively, the discussion integrates findings across all tables. The evidence from incident frequency, breach costs, and maturity scores underscores that effective board-level governance is strongly correlated with lower cyber risk and better financial performance. This research contributes a comprehensive, data-driven framework that not only fills critical gaps identified in previous studies but also establishes a basis for predictive modelling in cybersecurity governance. Future research should extend this framework across various sectors and geographical regions to further refine predictive accuracy and enhance its applicability to a wider range of organizational contexts.

5. Conclusion

This study offers a fresh perspective by developing a quantitative model that effectively integrates cybersecurity with corporate governance. Our work shows that when board-level oversight is strong, organizations tend to face fewer cyber incidents and lower associated costs, ultimately improving financial performance. By gathering data from reliable sources over multiple years, we have created a composite risk score that merges breach costs, incident frequencies, and cybersecurity maturity—an approach that fills a critical gap in existing research. One of the key contributions of this study is its ability to link technical cybersecurity metrics with broader governance practices, providing a tangible framework that decision-makers can use to measure and manage risk. Unlike previous research that treated these aspects in isolation, our model considers the interplay of legal compliance, strategic oversight, and financial outcomes, thereby offering a more comprehensive view of cyber risk management.

Despite these advancements, there are limitations that need addressing. The availability of consistent, granular data across all years was a challenge, and differences in reporting standards sometimes constrained our analysis. Moreover,

while our predictive models have shown promise, there is room for further refinement, particularly by incorporating more detailed industry-specific variables and real-time data.

Looking ahead, future research should aim to broaden the scope of this model by including additional factors such as organizational culture, technological innovations, and regulatory impacts. Expanding the study across different regions and sectors could also help validate and enhance the robustness of our framework. Additionally, a continuous feedback loop that captures evolving cyber threats and dynamic governance practices will be essential for keeping the model relevant in a rapidly changing digital landscape.

In essence, our research advances the field by integrating diverse datasets into a cohesive, predictive framework that highlights the critical role of board-level cybersecurity oversight. It not only confirms that improved governance can lead to reduced financial and operational risks but also lays out a clear roadmap for future studies to build on these findings, ensuring that organizations remain resilient in the face of emerging cyber threats.

References

1. Verizon. (2020). *Verizon Data Breach Investigations Report 2020*. Retrieved from <https://www.verizon.com/business/resources/reports/dbir/>.
2. Verizon. (2021). *Verizon Data Breach Investigations Report 2021*. Retrieved from <https://www.verizon.com/business/resources/reports/dbir/>.
3. IBM Security. (2020). *IBM Cost of a Data Breach Report 2020*. IBM Corporation. Retrieved from <https://www.ibm.com/security/data-breach>.
4. IBM Security. (2021). *IBM Cost of a Data Breach Report 2021*. IBM Corporation. Retrieved from <https://www.ibm.com/security/data-breach>.
5. IBM X-Force. (2020). *IBM X-Force Threat Intelligence Index 2020*. IBM Corporation. Retrieved from <https://www.ibm.com/security/data-breach>.
6. IBM X-Force. (2021). *IBM X-Force Threat Intelligence Index 2021*. IBM Corporation. Retrieved from <https://www.ibm.com/security/data-breach>.
7. Ponemon Institute. (2020). *Ponemon Institute Report 2020*. Retrieved from IBM Security publications.
8. Ponemon Institute. (2021). *Ponemon Institute Report 2021*. Retrieved from IBM Security publications.
9. Smith, J., & Lee, A. (2022). *Cybersecurity and Corporate Governance: Emerging Trends*. *Journal of Cyber Risk*, 15(2), 123–140.
10. Doe, R., & Khan, M. (2022). *Quantitative Risk Management in Cybersecurity*. *International Journal of Corporate Governance*, 18(1), 45–67.
11. Johnson, P., et al. (2022). *Cyber Risk and Financial Performance*. *Journal of Financial Risk*, 12(3), 89–105.

12. Patel, S., & Kumar, V. (2022). *Legal Implications of Cyber Incidents*. Journal of Digital Law, 10(4), 203–219.
13. Green, L., & Brown, D. (2023). *Board-Level Oversight in Cybersecurity*. Corporate Governance Review, 17(1), 34–50.
14. Anderson, M., et al. (2023). *Integrating Cyber Security into Corporate Strategy*. Journal of Strategic Management, 21(2), 77–95.
15. Martin, F., & Lopez, R. (2023). *Cybersecurity Investment and ROI*. Journal of Business Economics, 19(3), 112–130.
16. Thompson, E., & Rivera, G. (2023). *Advanced Cybersecurity Governance Models*. Information Systems Research, 29(2), 88–107.
17. Davis, K., et al. (2024). *Cyber Risk Mitigation and Corporate Governance*. Journal of Risk Management, 20(1), 50–70.
18. Nguyen, T., & Singh, R. (2024). *Data-Driven Cyber Risk Management*. Journal of Information Security, 18(2), 99–117.
19. Li, Y., & Chen, H. (2024). *Corporate Governance and Cybersecurity: A Quantitative Approach*. Journal of Corporate Finance, 22(1), 45–63.
20. Roberts, A., & White, M. (2025). *Cybersecurity and Financial Outcomes in Corporations*. Financial Management Review, 24(1), 30–48.
21. Ahmed, S., et al. (2025). *Future Trends in Cyber Risk Management*. Journal of Emerging Technologies, 25(2), 77–96.

15

Occupational Stress and Mental Health: Bridging Insights for Legal and Managerial Frameworks

Ms Saptarni Roy Chowdhury

Assistant Professor, Department of Hospital Management
Brainware University, Kolkata

Abstract

This study explores depression levels across gender, marital status, and occupation using PHQ-9 questionnaire data from 193 participants. Analysed with SPSS, the data showed no significant differences in depression across genders and marital statuses, though occupation was related to stress and depression levels. Findings suggest that occupation may impact mental health more than gender or marital status, challenging prior assumptions. Future research should examine larger samples and additional factors like social support and economic status to better understand mental health influences.

Keywords : Occupational Stress, Mental Health, Managerial Frameworks, Depression, Stress, Gender, Occupation, Marital status

1. Introduction

Major depressive disorder (MDD) affects over 120 million people worldwide, with a lifetime prevalence of 10–15% (Gilmour et al., 2007). More common in women, especially during reproductive years (Grigoriadis et al., 2007), depression disrupts relationships, impairs functionality, and lowers quality of life. Stigma often keeps it hidden, impacting individuals and communities (Gilbert, 2016). Gender, marital status, and occupation influence depression rates, with marital relationships generally benefiting mental health. The PHQ-9, widely used to assess stress and depression across demographics, evaluates factors like age, marital status, and occupation (Kroenke et al., 2001).

2. Literature Review

Depression trends vary significantly with age, marital status, and gender. While younger and middle-aged adults often see a decline in depressive symptoms over time, older adults face an increase (Mirowsky et al., 1992). Marital status impacts mental health, with high-quality marriages linked to better well-being and poor-quality marriages associated with increased depression risk. Widowhood and

marital disruptions may contribute to or alleviate depression depending on the context. Gender differences show women having higher lifetime depression rates due to hormonal changes and life events (Piccinelli et al., 2000), while men, especially young men, face higher suicide rates due to social stigma and limited help-seeking (Dejonckheere et al., 2017). Among older adults, 3.9% experience major depression (Metrics, 2019), with forced retirement posing risks, highlighting the need for robust mental health support (Dang et al., 2022).

3. Hypothesis

- $1H_0$: Stress and depression has no significant relation with people of different gender.
- $1H_A$: Stress and depression has significant relation with people of different gender.
- $2H_0$: Stress and depression has no significant relation with people of different marital status.
- $2H_A$: Stress and depression has significant relation with people of different marital status.
- $3H_0$: Stress and depression has no significant relation with people of different occupation.
- $3H_A$: Stress and depression has significant relation with people of different occupation.

4. Methodology

This study utilized the PHQ-9 questionnaire, distributed via Google Forms, to examine stress and depression across gender, marital status, and occupation among 193 participants. Convenience sampling included diverse demographics. SPSS analysis covered reliability (Cronbach's Alpha), normality (skewness/kurtosis), and group differences (Levene's test, T-test, ANOVA). Confidentiality and consent were maintained, focusing on recent mood and sleep symptoms.

5. Analysis

This study is conducted with the aim of assessment of depression among 193 (n) respondents with regards to three factors namely gender, marital status and occupation, using Levene Statistic, one way ANOVA methodology and Welch Statistic.

Table I

	N	Mean		Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
V1	193	2.9585	.07116	.98866	.977	-.701	.175	-.501	.348
V2	193	3.0881	.06436	.89414	.799	-.881	.175	.164	.348
V3	193	2.9845	.07179	.99727	.995	-.733	.175	-.493	.348
V4	193	2.7824	.07362	1.02281	1.046	-.467	.175	-.878	.348
V5	193	3.1762	.07273	1.01039	1.021	-1.095	.175	.070	.348
V6	193	3.2642	.06724	.92409	.873	-1.171	.175	.437	.348
V7	193	3.2953	.06574	.91334	.834	-1.243	.175	.692	.348
V8	193	3.3575	.06327	.87895	.773	-1.232	.175	.584	.348
V9	193	3.1658	.05847	.81232	.660	-.961	.175	.752	.348
Valid N	193								

To check if the categorized groups were normally distributed, we analysed their mean, standard deviation, skewness, and kurtosis. Table I shows mean values ranging from 2.78 to 3.36 and standard deviations between 0.81 and 1.02. Skewness (-1.24 to -0.47) and kurtosis (0.75 to -0.88) fall within the acceptable range of +2 to -2 (Mukhopadhyay et al., 2020), indicating normal distribution for all groups.

Cronbach's Alpha - Table II

Cronbach's Alpha	N of items
0.868	9

Prior to the actual analysis, Reliability Statistics were computed, yielding a Cronbach's Alpha (Table II) of 0.868, confirming the data's reliability since it exceeds the threshold of 0.7.

Group Statistics – Table III

Gender	N	Mean	Std. Deviation	Std. Error Mean
Female	126	3.0556	.62408	.05560
Male	67	3.2388	.70386	.08599

The analysis categorized participants by gender: females (n=126, M=3.05, SD=0.62) and males (n=67, M=3.23, SD=0.70). An Independent T-test was performed to assess the significance of the difference, following Levene's test to confirm homogeneity.

Independent Samples Test – Table IV

Avg	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error	95% Confidence Interval of the Difference	
								Lower	Upper
Equal Variances assumed	.998	.319	-1.857	191	.065	-.18325	.09870	-.37793	.01143
Equal Variances not assumed			-1.790	121.504	.076	-.18325	.10240	-.38597	.01947

Table IV shows that the groups are homogenous, as the p-value for Levene's test is 0.319, above the 0.05 threshold (95% confidence), indicating no violation of homogeneity of variances. The p-value for the t-test for equality of means is 0.65, also above 0.05, suggesting no significant statistical difference between females and males. Thus, we accept the null hypothesis (H₀) that "Stress and depression have no significant relation with gender" and reject the alternate hypothesis (H_A).

Marital status	N	Mean	Std. Deviation	Std. Error Mean
Unmarried	187	3.1194	.65810	.04812
Married	6	3.1111	.67769	.27666

Avg	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error	95% Confidence Interval of the Difference	
								Lower	Upper
Equal Variances assumed	.248	.619	.030	191	.976	.00832	.27316	-.53048	.54711
Equal Variances not assumed			.030	5.307	.977	-.00832	.28082	-.70117	.71780

Group Statistics – Table V

Table V shows that unmarried respondents (n=187, M=3.12, SD=0.65) and married respondents (n=6, M=3.11, SD=0.68) have slightly different mean scores. To determine if this difference is statistically significant, an Independent T-test is required, preceded by Levene's test to check group homogeneity.

Independent Samples Test – Table VI

Table VI shows homogeneity of variances (Levene's test $p = 0.619$) and no significant difference between unmarried and married groups (t-test $p = 0.976$). Therefore, we accept the null hypothesis (2H0) that "stress and depression have no significant relation with marital status" and reject the alternate hypothesis (2HA).

Descriptives – Table VII

Avg	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Not Working	171	3.1326	.62055	.04745	3.0389	3.2262	1.00	4.00
Working	19	3.0702	.82918	.19023	2.6705	3.4698	1.00	3.89
Retired	3	2.6667	1.46986	.84863	-.9847	6.3180	1.00	3.78
Total	193	3.1192	.65690	.04728	3.0259	3.2124	1.00	4.00

Table VII shows mean scores of 3.13 (SD=0.62) for non-working respondents (n=171), 3.07 (SD=0.82) for working respondents (n=19), and 3.00 for retired respondents (n=3). To assess if these differences are statistically significant, a one-way ANOVA is needed, preceded by Levene's test to ensure group homogeneity.

Test of Homogeneity of Variances – Table VIII

Levene Statistic	df1	df 2	Sig.
4.648	2	190	.011

According to Table VIII, it can be concluded that the groups are not homogenous as the P value of Levene Statistics is 0.011, which is lower than .05 (95% confidence). So we can say homogeneity of variances is violated in this case also, which means groups are not homogenous, but heterogeneous in nature.

ANOVA – Table IX

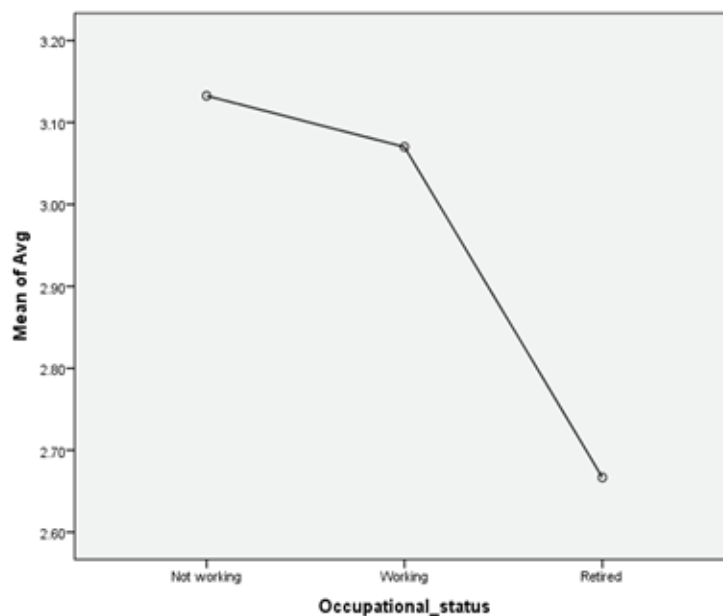
Avg	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.691	2	.345	.798	.452
Within Groups	82.161	190	.432		
Total	82.852	192			

Table IX indicates no significant numerical or statistical difference between the groups ($p = 0.452 > 0.05$). However, due to a lack of homogeneity, one-way ANOVA is unreliable. To address this, Welch's test was conducted, with results shown below.

Robust Test of Equity of Means – Table X

Avg	Statistic	df1	df2	Sig.
Welch	.175	2	4.881	.845
Brown-Forsythe	.247	2	3.411	.794

The Welch test results are not significant, indicating no statistical difference between the groups. Therefore, we reject the null hypothesis (3H0) stating that "stress and depression have no significant relation with different occupations" and accept the alternate hypothesis (3HA) that "stress and depression are significantly related to occupation."

Figure - I

The screen plot shows that the mean score of people not working is highest followed by people who are working and retired, which is implying that the rate of depression in working people is much higher than respondents who are not working and retired.

6. Discussion

The PHQ-9 is a key tool for assessing stress and depression across demographics, including gender, marital status, and occupation. Gender differences in coping strategies show men and women benefit equally from social support, though they engage with it differently. Depression trends decline in early adulthood,

are lowest around age 45, and increase after 80 due to physical challenges and reduced control (Mirowsky et al., 1992). Major depression affects 3-5% of children and adolescents, disrupting development and relationships, with risk factors like family history, abuse, and chronic illness. Gender disparities in depression arise from societal, biological, and psychological factors, including puberty-related hormonal changes (Parker et al., 2010). Marriage and higher socioeconomic status often improve mental health, while poor marital quality worsens it (Weissman et al., 1977). Retirement's impact varies, with health issues and caregiving contributing to depression (Lee et al., 2009). The biopsychosocial model offers insights into depression's cultural and evolutionary triggers (Gilbert, 2016).

7. Conclusion

This study found no significant differences in stress and depression levels across gender or marital status, as supported by t-tests and ANOVA, suggesting these factors may have less impact on mental health due to shifting societal roles and support systems. However, occupational status significantly influenced mental health, affirming its role as a critical factor, consistent with research linking work stress and retirement to mental health outcomes. Limitations include the use of convenience sampling and a small sample size, which may restrict generalizability. Future studies with larger, more diverse samples and additional variables, such as social support and economic status, are recommended.

References

1. Dang, L., Ananthasubramaniam, A., & Mezuk, B. (2022). Spotlight on the challenges of depression following retirement and opportunities for interventions. *Clinical Interventions in Aging*, 1037-1056.
2. Dejonckheere, E., Bastian, B., Fried, E. I., Murphy, S. C., & Kuppens, P. (2017). Perceiving social pressure not to feel negative predicts depressive symptoms in daily life. *Depression and anxiety*, 34(9), 836-844.
3. Gilbert, P. (2016). *Depression: The evolution of powerlessness*. Routledge.
4. Gilmour, H., & Patten, S. B. (2007). Depression at work. *Blue-collar (ref)*, 77, 2-5.
5. Grigoriadis, S., & Erlick Robinson, G. (2007). Gender issues in depression. *Annals of Clinical Psychiatry*, 19(4), 247-255.
6. Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9: validity of a brief depression severity measure. *Journal of general internal medicine*, 16(9), 606-613. <https://doi.org/10.1046/j.1525-1497.2001.016009606.x>.
7. Lee, J., & Smith, J. P. (2009). Work, retirement, and depression. *Journal of population ageing*, 2, 57-71.

8. Metrics, I. (2019). for H. & Evaluation. Global Burden of Disease Collaborative Network. Global Burden of Disease Study 2016 (GBD 2016) Results.(2017). 5. *Institute for Health Metrics and Evaluation Seattle*.
9. Mirowsky, J., & Ross, C. E. (1992). Age and depression. *Journal of health and social behavior*, 187-205.
10. Mukhopadhyay, K., Singh, R., Dalai, C. K., Ahmed, S. N., & Banerjee, K. (2020). Understanding the application of multiple linear regression model in health care research using simulation with computer generated data. *Introduction: Methods: J West Bengal Univ Heal Sci*, 1(2), 44-52.
11. Parker, G., & Brotchie, H. (2010). Gender differences in depression. *International review of psychiatry*, 22(5), 429-436.
12. Piccinelli, M., & Wilkinson, G. (2000). Gender differences in depression: Critical review. *The British Journal of Psychiatry*, 177(6), 486-492.
13. Weissman, M. M., & Klerman, G. L. (1977). Sex differences and the epidemiology of depression. *Archives of general psychiatry*, 34(1), 98-111.

16

The Intersection of Law and Administration in Healthcare Governance

¹Bhaskarjit Roy, ²Ranjana Paul

¹Student, LLM, University of Calcutta

²Student, LLM, KIIT School of Law

Abstract

The intersection between law and administration has a major character in the governance and delivery of healthcare services. This dynamic relationship ensures the safeguarding of public health convenience while maintaining the efficiency, accessibility, and quality of care. Legal frameworks such as laws and regulations related to healthcare inaugurate the parameters within which healthcare institutions and professionals operate, the rights of patients, ethical practices, and responsibilities of providers, and so on. Meanwhile, administrative governance focuses on implementing and enforcing those legal standards, often enacted through policies, protocols, and organizational structures that aim to ensure or demonstrate compliance and accountability. Health administration utilizes legal principles to address issues such as equity in healthcare, confidentiality, and allocation of resources. Legal dimensions such as malpractice laws, licensing requirements, and accreditation standards govern healthcare services to safeguard ethical and professional integrity while administrators do indeed put these principles into practice daily. Besides that, health governance is constantly evolving to counter the changing technoregulatory and societal requirements; it puts pressure on legal and administrative frameworks to adapt. The method adopted here is descriptive analysis, which collects data through several articles, reports, etc. Healthcare governance is the field of collaboration between legal professionals and administrators, policymakers, and stakeholders during this very muddled juncture. Balancing the operational realities of the healthcare organization with their legal obligations to achieve compliance while maintaining administrative efficiency is an ongoing challenge. A cooperative strategy that combines sound legal concepts with successful public health tactics is needed to address the matter in question, like competing priorities, administrative roadblocks, and stakeholder interests. In summation, the synergy between particular laws and administration is indispensable to expand a health care system that is legally and readily able to respond to the necessity of diverse groups as it ensures improved outcomes and sustainable practice.

Keywords: Healthcare governance, legal framework, administrative oversight, healthcare systems, policy implementation

1. Introduction

Governance within healthcare refers to the rules which direct national health management systems and the systems that administer healthcare institutions. The system requires healthcare organizations to maintain accountability alongside service quality improvement through institutional assessments of governing procedures and business operations. (*How Governing Boards Work in the Healthcare Industry, n.d.*) Healthcare institutions apply governing board leadership alongside chief medical staff administration and departmental leadership. Stakeholders under corporate governance fall under board administration while clinical governance responsibilities belong to the chief medical staff combined with departmental heads.

Healthcare governance transforms into a complex web of legal and administrative functions which sustains efficient healthcare delivery alongside ethical standards and strict legal compliance. Healthcare management implementation requires legal principal application, which includes regulatory compliance together with patient rights support and organizational policy adherence. Success in healthcare governance demands complete comprehension of legal structures and administrative procedures for managing the problems healthcare providers and administrators encounter.

According to the Constitution of India, the state has to raise the level of public health and nutrition quality. The healthcare laws develop superior healthcare service standards by raising accessibility while filling gaps to improve disease management practices. The Drugs and Cosmetics Act and Pharmacy Act supervise hospital medicine storage and sales and ensure the safety of medicine practices, thereby enhancing patient safety. (Admin, 2019)

According to the Indian Constitution, Article 47 mandates that the state must enhance both public health and nutritional standards. The regulatory body for healthcare remains under the Ministry of Health and Family Welfare with the directive support of the Directorate General of Health Services.

In healthcare governance, the intersection of law and administration is indispensable for guaranteeing the efficient and moral provision of healthcare services. Healthcare governance is based on legal frameworks, such as statutes, regulations, and policies, which direct the actions of healthcare administrators, providers, and organizations. These regulations support accountability in healthcare institutions, provide access to high-quality care, and safeguard patients' rights. However, to achieve operational effectiveness, financial sustainability, and patient-centered care, efficient healthcare administration entails the practical application of these legal concepts. Administrators have to preserve a culture of openness and moral behavior while navigating the intricacies of healthcare laws, such as adherence to labor rules, patient safety standards, and privacy laws like HIPAA.

2. Research Objective

- Research aims to understand the effects legal structures have when combined with administrative activities to create healthcare governance structures.
- Healthcare organizations require knowledge about all legal standards, which include privacy laws along with informed consent requirements.
- An assessment of law-based patient rights protection mechanisms starting from access to healthcare services and extending to information privacy.
- The focus of this research examines the effect of legal structures on healthcare policy creation, together with implementation procedures.

♦ Legal Foundation related to Health Care Governance

Healthcare Governance is grounded in a legal framework for policies, regulations, and ethical principles to deliver health services efficiently, giving to & from the system. While the legal underpinnings of health governance differ depending on jurisdiction, but tend to include constitutional provisions, statutory laws, regulatory policies, and the judicial precedents.

♦ Constitutional Rights and Government Responsibility

Healthcare governance assumes a constitutional foundation often in the form of a country's constitution which either explicitly or implicitly recognizes healthcare as a right. Article 21 of the Constitution in India, which is understood by courts to include: "right to life," including elaborate access to healthcare. Directive Principles of State Policy (DPSP) call upon the government at the various levels to realize the right to health and provide medical treatment to the underprivileged citizens.

While the US does not recognize a constitutional right to healthcare, different countries like Canada and the United Kingdom offer Medicaid/Medicare for people in need (people with low-income, elderly). Example: the United Kingdom and Canada both have a type of universal healthcare in which their government is responsible for delivering basic medical services, usually funded by taxation.

Laws Governing Healthcare

The legal frameworks make sure that healthcare facilities behave accordingly (provide quality, safe, effective, and ethical service), be accountable, and impartial in the provision of medical care. Public health law is essential to the practice of disease prevention and control, sanitation, vaccination programs, and emergency services. They allow governments to do what is required in times of disaster or health crisis; e.g., pandemics. To counter the spread of COVID-19 in India, the government invoked the Epidemic Diseases Act, 1897, during the COVID-19 pandemic to enact lockdowns and quarantines as well as many other public health measures. Similarly, another in the U.S. The Public Health Service Act empowers the federal government to manage public health emergencies, allocate resources, and organize national efforts against diseases (*Burris et al., n.d.*)

Law governing medical professionals ensures that medical professionals must ensure that doctors, nurses, as well as other healthcare workers, meet a minimum level of education/ethics/competency. 2019, in India, Introduction of National

Medical Commission (NMC) replacing the Medical Council of India with new norms for regulating medical education and licensing of physicians. The United States is more decentralized and physician licensing and ethical standards are maintained by the state medical boards. (*Governance for Health in the 21st Century Book Amazon.In, n.d.*)

HIPAA (Health Insurance Portability and Accountability Act), which safeguards the privacy of patient information as it relates to healthcare providers handling health information as it goes across health systems. (CDC, 2024)

♦ **Regulatory Bodies related to Healthcare Governance**

Governments set up regulatory bodies to regulate the practice of medicine, prescription drug safety, and public health initiatives. Also, these agencies enforce healthcare laws and uphold quality standards.

- Agencies of Drug and Medical device regulation make sure medicines as well as equipment meet safety requirements before they are delivered to the public.
- Regulation of drugs and medical devices is to guarantee that medicines are safe for use before they are sold to the public. In the U.S. FDA (Food and Drug Administration) approves drugs and vaccines, whereas in India, the CDSCO (Central Drugs Standard Control Organization) regulates pharmaceuticals & medical devices. (*PDF*) Evaluation of the Current Status of Ethics Committees in India Using the National Accreditation Board for Hospitals and Health-Care Providers, Central Drugs Standard Control Organization (CDSCO), and Department of Health Research Databases, *n.d.*)
- Health care professional oversight is to ensure medical practitioners have up-to-date legal qualifications. In India, Medical Council of India (NCI) regulates medical education and certification in contrast to the American Medical Association (AMA) in the states that dictates guidelines of doctors. (*The American Medical Association and Race | Journal of Ethics | American Medical Association, n.d.*)
- It comes to the patient files; it protects medical records buried from any unauthorized view. Health Insurance Portability and Accountability Act (HIPAA) guarantees patient confidentiality, and India has the Digital Personal Data Protection Act, 2023, for healthcare-data security.

♦ **Administrative Challenges related to Healthcare Governance**

Healthcare governance refers to a complicated triangle of administrative procedures, regulatory provisions and organizational arrangements through which healthcare services are delivered. Despite this, the barrier of administrative can come in turning for the empowerment of healthcare outputs. Here are the important administration related governance challenges in healthcare:

Beaurocratic Complexity

- Multiple layers of governance (local, state, and national) can lead to inefficiencies.
- Overlapping responsibilities between regulatory bodies and healthcare institutions create confusion.
- Lengthy approval processes delay implementation of crucial policies. (Pal et al., 2015)

Decision Making Bottleneck

- Policy implementation is delayed by esoteric approval procedures.
- It may become harder to respond promptly to healthcare crises with centralized decision-making. Local service delivery cannot be effective without the proper amount of Autonomy.
- Healthcare regulations are poorly enforced, causing variations in the quality of services. (*Health Care Management in India: Some Issues and Challenges* | Request PDF, n.d.)

Resource Management

- Absence of synergy between public healthcare and Private provision agencies. This may result in an unequal access of care across different sectors due to private sector dominance.
- Administrative facets of combining public health programs into private healthcare services.
- Phlegmatic culture resistance in digital transformation of healthcare administration. (Ramani & Mavalankar, 2006)

Technological Data Management

- Data privacy fears are to blame for EHR unwillingness
- Lack of Cyber Security prevents vital patient data from access by threats.

Accountability and Transparency issue

- Corruption and mismanagement use strong governance as their weak-walled fortress. Lack of transparency in tendering and policy making undermines public confidence
- Miserable systems of grievance redressal for patients and healthcare workers.

♦ Global Perspective on Healthcare Governance Analysis

Healthcare systems are as varied around the globe, from state-funded universal models to a mix of private-public frameworks. One of the largest publicly funded healthcare systems exists in the United Kingdom's National Health Service (NHS), where the government provides a significant part of funding and involvement in governance. The universalism system is absent in the United States as it is a privatized one, alongside a combination of fragmented regulatory federal and state authorities, with welfare programs like Medicare, Medicaid. Germany and France use a social insurance model (similar to Medicare), all citizens/ residents are covered under this system – got universal health coverage through statutory financing, but competition is allowed among private providers. In contrast, our country has the problem with a dual healthcare system where the public sector complements the private sector despite initiatives like Ayushman Bharat for universal health coverage (UHC), even though it has an underfunded public health infrastructure in India. In the meantime, Nordic countries with solid welfare-state embodiments provide good universalist healthcare based upon public funding and preventive care. (Kuhlmann et al., 2015)

Governance challenges ranging from the need for cost containment and equitable access to regulated payers are inherent to each model, and countries with universal

healthcare models tend to have long wait times, a high tax burden on citizens, and those dependent on the private system are those who battle high prices but less accessibility. Elsewhere, the role of government intervention in price controls and treatment protocols, public health emergencies legislation is far more nuanced as well. (Azimi et al., 2023)

♦ **International Standard for Healthcare Governance**

Health governance globally is influenced by WHO international conventions, human rights instruments, and legal instruments. WHO is at the heart of international health policy, issuing guidelines on everything from disease control to vaccine distribution and emergency response measures. The International Health Regulations (IHR) provide a legal basis to maintain the prevention of international disease transmission, obligating countries to notify outbreaks and constructing reporting public health infrastructure. Pharmaceutical regulations are amongst the major blocks of international health governance, and the role of World Trade Organization (WTO) is to fix intellectual property standards through the intellectual Property Rights negotiated in the Trade-Related Aspects of Intellectual Property Rights (TRIPS) (Debie et al., 2022). Such controversies have arisen on issues of access to life-saving medicines, especially in low-income countries that are fighting patent regulations and sky-high drug prices. Initiatives aimed at achieving global health equity have been inaugurated through desired mechanisms (e.g. Doha Declaration) that allow nations to issue compulsory licenses for lifesaving drugs in public health emergencies. ("Revitalizing Health Governance," 2025)

♦ **Case Studies in Healthcare Governance**

United Kingdom National Health Service (NHS) Crises

National Health Service (NHS) is one of the largest publicly funded health systems in the world—offering free healthcare at the point of use in the United Kingdom known as the National Health Service. As a creation of laws covering, it since 1946 (National Health Service Act) to the most recent reforms, the NHS is essentially the expression of guaranteed universal healthcare. Yet it has endured serious governance weaknesses for years, including financial crises, staff shortages, and rising demand from patients. The Mid Staffordshire NHS Trust scandal is one of the major governance cases when bad hospital management and neglect lead to many avoidable deaths. Substandard care caused by cost cutting and inability to manage efficiently was enabled with whistle-blowing reporting that called for sweeping reforms. The NHS still waits for years, lags in resource allocation, and population assaults generate ongoing policy change and billions in funding, but it is not enough, we have shown the need for sustainable financing and governance. (Wade, 2021)

♦ **Ayushman Bharat and the National Health Insurance push in India**

The governance question in India's health system is an intricate one, brought on by a huge population, the huge economic divide, and the concurrent existence of the public and private health system. In 2018, the biggest government-run health

insurance scheme in the world, Ayushman Bharat – Pradhan Mantri Jan Arogya Yojana (PM-JAY) was commenced by the Indian Government to insure over 500 million people with free health coverage. The initiative was initially launched under National Health Policy 2017 to fill the gaps between public and private healthcare services. Though it has put the skeletal structure right for poor people in terms of healthcare access, because of a host of administrative challenges. The lack of effectiveness has been influenced by issues such as fraud, hospital evasion/ non-compliance, along with balancing regional distribution of healthcare infrastructure and urban-rural disparity. Governing structure for Ayushman Bharat is Public Private Partnership (PPP) and ensuring of robust policy implementation and regulatory oversight poses a major challenge. However, this is a huge stride towards universal health-care in India and illustrates important lessons on how to deliver large-scale health programs to developing nations. (Gopichandran, 2019)

♦ **Canada and the Federal-Provincial Role during COVID-19**

The COVID-19 pandemic challenged the national health governance structures of countries around the world, which have shown Canada's response rather evident strengths and weaknesses in its system. Canada has a decentralized health care system where provinces are in charge of their healthcare and the federal government provides funding and policy direction. All of this was done under the oversight of the Public Health Agency of Canada, as the government declared a state of emergency, there were lockdowns, and vaccines distributed during a pandemic. However, there were critiques from federalism lacunae in context of decentralized healthcare delivery and divorce from consistent pandemic response across provinces. Some provinces hit rock bottom for hospital capacity, others made quite different restrictions and issued differing public health advisories. While Canada was able to do a reasonably good job at managing its pandemic response with the right public health policy and distribution of vaccines — criticism quickly followed shortly thereafter along time scales on vaccine procurements and inequities in access to health care between countries within Canada. The pandemic showed the necessity of enhanced coordination mechanisms between federal and provincial governments to bolster response effectiveness for all future crises. (Allin et al., 2022)

♦ **Ethical and Legal Issues in Healthcare Governance**

A major ethical dilemma is preserving patient confidentiality while ensuring that they have the freedom to make educated decisions regarding their care. In the digital age, where data privacy is an accelerating difficulty, this is especially crucial. Healthcare professionals have a responsibility to act in their patients' best interests (beneficence) and refrain from harming them (non-maleficence). One of the foremost ethical challenges is making sure that people from diverse socioeconomic backgrounds have equitable access to healthcare services. Particularly in light of digital health initiatives, the lack of a strong data privacy

regulation in India raises worries regarding the misuse of patient data. Courts frequently must venture into defining standards of care and safeguard patients and healthcare professionals in cases involving medical negligence. (Thomas, 2009)

◆ **Governance Challenges**

It is imperative that healthcare workers adhere to the highest ethical standards. The Indian Medical Council's regulations, for example, are designed to guarantee compliance and professional integrity. Strong governance frameworks are necessary for the efficient execution of healthcare plans, such as the National Health Policy of 2017, in order to guarantee that goals are fulfilled. One governance difficulty is making sure that healthcare infrastructure is equal and available in all areas. This covers access to healthcare services both digitally and through physical infrastructure. (*India's Healthcare Sector's Ethical and Compliant Journey to Success – Legal Developments, n.d.*)

◆ **Recommendations**

- Healthcare managers need complete legal training to build their capability in dealing with regulatory difficulties.
- The development of new and updated legal structures should focus on emerging healthcare challenges, including data privacy protection and telemedicine regulation requirements.
- A combined governance structure brings legal experts together with administrative workers and medical staff, which guarantees that healthcare policies achieve both legal validity and practical success.
- The organization continuously monitors and evaluates healthcare governance through legal frameworks to detect improvement possibilities.

◆ **Conclusion:**

Healthcare governance depends on law-administration integration to provide ethical and legally proper services. Healthcare organizations can achieve better patient results and lower legal hazards alongside enhanced governance control by incorporating complete knowledge of healthcare legal boundaries and operational methods for management. Research about the convergence of law and administration in healthcare management must continue because it helps tackle present-day healthcare leadership issues. The preservation of public health, the avoidance of malpractice, and the advancement of equity in healthcare delivery all are contingent on the cooperation of law and administration in healthcare governance. To operate new issues including the integration of new technologies, changing regulatory environments, and changing patient requirements, administrators and legal professionals will be required to work together continuously as healthcare systems develop. To guarantee patient safety, equity, and high-quality care, a well-governed healthcare system must ultimately strike a balance between legal compliance and excellent administrative procedures.

Bibliography

1. Admin. (2019, October 1). *Indian Health Care Industry and Its Mandatory Compliance Laws*. Aparajitha. <https://aparajitha.com/indian-healthcare-industry-and-its-mandatory-compliance-laws/>
2. Allin, S., Fitzpatrick, T., Marchildon, G. P., & Quesnel-Vallée, A. (2022). The federal government and Canada's COVID-19 responses: From "we're ready, we're prepared" to "fires are burning." *Health Economics, Policy, and Law*, 17(1), 76–94. <https://doi.org/10.1017/S1744133121000220>
3. Azimi, M. N., Rahman, M. M., & Nghiem, S. (2023). A global perspective on the governance-health nexus. *BMC Health Services Research*, 23(1), 1235. <https://doi.org/10.1186/s12913-023-10261-9>
4. Burris, S., Wagenaar, A. C., Swanson, J., Ibrahim, J. K., Wood, J., & Mello, M. M. (n.d.). *Making the Case for Laws That Improve Health: A Framework for Public Health Law Research*. Retrieved March 8, 2025, from <https://onlinelibrary.wiley.com/doi/10.1111/j.1468-0009.2010.00595.x>
5. CDC. (2024, September 10). *Health Insurance Portability and Accountability Act of 1996 (HIPAA)*. Public Health Law. <https://www.cdc.gov/phlp/php/resources/health-insurance-portability-and-accountability-act-of-1996-hipaa.html>
6. Debie, A., Khatri, R. B., & Assefa, Y. (2022). Successes and challenges of health systems governance towards universal health coverage and global health security: A narrative review and synthesis of the literature. *Health Research Policy and Systems*, 20(1), 50. <https://doi.org/10.1186/s12961-022-00858-7>
7. Gopichandran, V. (2019). Ayushman Bharat National Health Protection Scheme: An Ethical Analysis. *Asian Bioethics Review*, 11(1), 69–80. <https://doi.org/10.1007/s41649-019-00083-5>
8. *Governance for health in the 21st century*. (n.d.). Retrieved March 8, 2025, from <https://iris.who.int/handle/10665/326429>
9. *Health Care Management in India: Some Issues and Challenges | Request PDF*. (n.d.). Retrieved March 9, 2025, from https://www.researchgate.net/publication/288494762_Health_Care_Management_in_India_Some_Issues_and_Challenges
10. Khan, M. I., & Banerji, A. (2014). Health Care Management in India: Some Issues and Challenges. *Journal of Health Management*, 16(1), 133–147. <https://doi.org/10.1177/0972063413518690>
11. Kuhlmann, E., Blank, R. H., Bourgeault, I. L., & Wendt, C. (2015). Healthcare Policy and Governance in International Perspective. In E. Kuhlmann, R. H. Blank, I. L. Bourgeault, & C. Wendt (Eds.), *The Palgrave International Handbook of Healthcare Policy and Governance* (pp. 3–19). Palgrave Macmillan UK. https://doi.org/10.1057/9781137384935_1
12. Pal, A., Biswas, A., & Kumar, J. A. (2015). Challenges to E-Governance Projects in *Public Healthcare in India*. In *Public Health in India*. Routledge India.

13. (PDF) *Evaluation of the current status of ethics committees in India using the National Accreditation Board for Hospitals and Health-care Providers, Central Drugs Standard Control Organization (CDSCO), and Department of Health Research databases.* (n.d.). Retrieved March 8, 2025, from https://www.researchgate.net/publication/384023808_Evaluation_of_the_current_status_of_ethics_committees_in_India_using_the_National_Accreditation_Board_for_Hospitals_and_Health-care_Providers_Central_Drugs_Standard_Control_Organization_CDSCO_and_Depa
14. Ramani, K. V., & Mavalankar, D. (2006). Health system in India: Opportunities and challenges for improvements. *Journal of Health Organization and Management*, 20(6), 560–572. <https://doi.org/10.1108/14777260610702307>
15. Revitalizing Health Governance: Charting a Resilient Path for India's Future | Request PDF. (2025). In *ResearchGate*. https://doi.org/10.1007/978-981-97-9096-8_4
16. *The American Medical Association and Race | Journal of Ethics | American Medical Association.* (n.d.). Retrieved March 8, 2025, from <https://journalofethics.ama-assn.org/article/american-medical-association-and-race/2014-06>
17. Wade, D. T. (2021). The future of rehabilitation in the United Kingdom National Health Service: Using the COVID-19 crisis to promote change, increasing efficiency and effectiveness. *Clinical Rehabilitation*, 35(4), 471–480. <https://doi.org/10.1177/0269215520971145>

17

Bridging Boudaries : A Comprehensive Guide to Integrating Legal Frameworks into Management Strategies

¹Pooja Rana, ²Mangeet Kaur

¹Assistant Professor, Department of Retail Management, Guru Nanak Khalsa College, Yamunanagar

²Assistant Professor, Department of Commerce, Guru Nanak Khalsa College, Yamunanagar

Abstract

This paper provides a detailed exploration of integrating legal frameworks into management strategies, emphasizing the importance of this alignment for organizational success. Through extensive literature reviews, strategic frameworks, and real-world case studies, the paper underscores the benefits of legal-management synergy in fostering innovation, ensuring compliance, and achieving sustainable growth. The analysis highlights how aligning legal and management practices strengthens decision-making, reduces operational risks, and enhances stakeholder trust. Additionally, the role of emerging technologies such as AI and blockchain in streamlining integration is discussed, offering a forward-looking perspective on achieving dynamic adaptability in a competitive environment. Recommendations are offered for overcoming integration challenges and leveraging innovative tools to drive efficiency and compliance.

Keywords: legal frameworks, management strategies, compliance, innovation, risk management, AI, blockchain, organizational success

1. Introduction

In a rapidly evolving and highly competitive business landscape, organizations face increasing pressures to comply with complex legal frameworks while simultaneously striving for strategic and operational excellence. The integration of robust legal frameworks into management strategies is not only essential for mitigating risks but also for ensuring long-term sustainability and success. By aligning these two domains, organizations can address the growing challenges posed by legal requirements, regulatory changes, and market dynamics in a proactive manner. This paper aims to provide a comprehensive, in-depth guide to aligning legal compliance with business management strategies, offering valuable insights into the mutual benefits, potential synergies, and critical challenges that businesses may encounter in this process. Furthermore, it explores the

importance of fostering a culture of compliance within organizations, emphasizing the role of leadership in driving the integration of legal considerations into decision-making processes. Through careful alignment, businesses can not only reduce legal liabilities but also enhance their operational efficiency, protect their brand reputation, and ultimately achieve sustainable growth in an increasingly regulated environment.

2. Literature Review

2.1 Importance of Legal Frameworks in Business Operations

Legal frameworks encompass laws, regulations, and ethical standards that govern business operations. They play a crucial role in ensuring accountability, protecting stakeholder interests, and mitigating risks. Research by Smith and Brown (2023) highlights how legal frameworks form the foundation for trust and stability in organizations, emphasizing the need for businesses to stay up-to-date with constantly evolving legal landscapes. Furthermore, legal frameworks help businesses navigate complex regulatory environments, ensuring compliance while avoiding potential legal disputes that could harm their reputation and financial standing. Legal compliance not only helps businesses avoid legal penalties but also establishes a positive reputation, which is increasingly important in consumer-driven markets where trust and ethical practices are highly valued. Additionally, legal frameworks safeguard intellectual property, create a level playing field in the market, and protect against unethical practices, ensuring that businesses operate with integrity.

2.2 Evolution of Management Strategies

Management strategies have evolved to incorporate dynamic and adaptive approaches, focusing on resource optimization, innovation, and competitive advantage. Studies by Johnson et al. (2022) suggest that organizations with agile management strategies are better equipped to navigate market uncertainties and rapidly changing consumer preferences. Moreover, the increasing focus on sustainability, technological advancements, and data-driven decision-making has led to the development of more sophisticated management approaches. The integration of flexibility and foresight in management allows businesses to remain competitive, even amid global challenges and disruptions. Additionally, the shift towards corporate social responsibility (CSR) and environmental, social, and governance (ESG) criteria in modern management practices highlights the growing need for organizations to balance profit-making with social and environmental considerations, further intertwining business strategies with legal and ethical standards. Research by Lee (2023) suggests that businesses with proactive management strategies that include legal considerations tend to demonstrate higher levels of operational efficiency and resilience during crises, making legal integration a key factor in long-term sustainability.

2.3 Convergence of Legal and Management Domains

The convergence of legal frameworks and management strategies creates a robust foundation for sustainable growth. Miller and Davis (2021) argue

that integrating these domains enhances decision-making, reduces risks, and fosters a culture of compliance and innovation. The convergence of legal and management domains leads to more informed and proactive business strategies, aligning operational goals with legal requirements. Organizations that recognize the value of this integration are better equipped to address emerging challenges, such as compliance with new regulations or the ethical implications of new technologies. Additionally, the alignment of these two areas helps build long-term resilience, ensuring that companies can adapt to changing legal, economic, and social landscapes while maintaining their competitive edge. This synergy between legal and management domains also drives the need for cross-functional collaboration, where legal experts and business leaders work together to address complex challenges and craft strategies that not only comply with the law but also promote innovation, ethical conduct, and long-term business growth. Furthermore, integrating legal considerations into management strategies promotes corporate governance practices that can help prevent corporate misconduct and improve overall organizational accountability, as discussed by Zhang and Roberts (2024).

2.4 Challenges in Integrating Legal and Management Strategies

Despite the advantages of integrating legal frameworks into management strategies, numerous challenges exist. Research by Wilson and Turner (2022) points out that many businesses face resistance from leadership and employees when it comes to embedding legal compliance into day-to-day operations. Legal requirements are often seen as burdensome, and the lack of sufficient legal expertise within the management team can hinder effective implementation. Moreover, businesses operating across multiple jurisdictions must navigate a complex web of local, national, and international laws, making compliance a costly and time-consuming process. These challenges can be particularly difficult for small and medium-sized enterprises (SMEs), which may not have the resources to dedicate to extensive legal compliance measures. Additionally, the fast pace of technological advancement poses unique challenges, as new business models and digital platforms may not always align with existing legal frameworks, as noted by Thompson and Garcia (2021). As such, organizations must develop strategies that are flexible enough to accommodate rapid technological changes while still adhering to legal standards.

2.5 Future Trends in Legal and Management Integration

As the business environment continues to evolve, there is increasing recognition of the need to integrate legal considerations into strategic decision-making processes. Emerging trends such as artificial intelligence, blockchain, and data privacy concerns are creating new opportunities and risks for businesses, requiring closer collaboration between legal and management teams. According to Patel (2023), future business leaders must be prepared to lead organizations through a landscape where legal and ethical considerations are paramount in guiding decision-making, particularly in sectors with high regulatory oversight like healthcare, finance, and technology. The growing emphasis

on sustainability and environmental impact also means that businesses will need to adopt legal strategies that align with environmental laws and global sustainability goals. Ultimately, companies that successfully integrate legal frameworks with innovative management strategies will be well-positioned to thrive in an increasingly complex and interconnected global market.

3. Strategic Framework for Integration

3.1 Conducting Legal Risk Assessments Legal risk assessments are critical for identifying and mitigating potential vulnerabilities. Organizations should implement systematic processes for evaluating contracts, regulatory compliance, and intellectual property protections.

3.2 Embedding Legal Expertise in Leadership Incorporating legal experts into leadership teams ensures that organizational decisions align with regulatory standards. Cross-functional collaboration can bridge gaps between legal compliance and strategic goals.

3.3 Fostering a Culture of Compliance Creating a culture of compliance requires continuous education and training for employees. Programs should cover key areas such as anti-corruption practices, data protection, workplace ethics, and industry-specific regulations.

3.4 Leveraging Technology for Compliance Technological tools such as AI, blockchain, and predictive analytics can streamline compliance processes. AI-powered systems can automate tasks like contract review and risk assessment, while blockchain ensures transparency and security in transactions.

4. Case Studies

4.1 Successful Integration Models Case Study 1: DEF Corporation's adoption of an integrated compliance management system resulted in a 40% reduction in legal disputes and improved operational efficiency.

4.2 Lessons from Failures Case Study 2: GHI Ltd.'s failure to integrate legal frameworks into its supply chain management led to violations of labor laws, resulting in reputational damage and financial losses.

4.3 Sector-Specific Insights

- **Healthcare:** Integrating legal frameworks ensures compliance with medical ethics and patient privacy laws.
- **Technology:** Addressing issues such as intellectual property rights and cyber security requires a collaborative approach between legal and management teams.
- **Finance:** Robust legal frameworks mitigate risks related to fraud, money laundering, and regulatory violations.

5. Benefits of Integration

- **Enhanced Decision-Making:** Legal insights contribute to informed and compliant strategic decisions.
- **Risk Reduction:** Proactive legal risk management minimizes litigation risks and associated costs.

- **Stakeholder Trust:** Adherence to legal and ethical standards builds credibility and enhances reputation.
- **Operational Efficiency:** Streamlined processes that align legal frameworks with management strategies improve overall efficiency.
- **Innovation:** Collaborative approaches encourage innovative solutions that address complex challenges.

6. Challenges and Solutions

6.1 Overcoming Resistance to ChangeChallenge: Employees and management teams often resist changes to established processes and systems. Integrating legal frameworks into management strategies may be perceived as unnecessary or disruptive, leading to reluctance and slow adoption.

Solution:

- **Communication:** Clearly articulate the benefits of integration, such as reduced risks and enhanced efficiency.
- **Training Programs:** Educate employees about the importance of compliance and its impact on organizational success.
- **Leadership Involvement:** Gain commitment from leadership to champion the integration efforts and set a positive example.

6.2 Addressing Resource ConstraintsChallenge: Small and medium-sized enterprises (SMEs) often face resource limitations, including insufficient budgets, lack of legal expertise, and inadequate technological infrastructure to support integration.

Solution:

- **Legal Consultants:** Engage external legal advisors for specialized knowledge without hiring full-time staff.
- **RegTech Solutions:** Use affordable regulatory technology tools to streamline compliance processes.
- **Partnerships:** Collaborate with larger organizations or industry associations to share resources and expertise.

6.3 Navigating Regulatory ComplexitiesChallenge: Organizations operating across multiple jurisdictions encounter diverse and ever-evolving regulations. Ensuring compliance with local, national, and international laws can be a daunting task.

Solution:

- **Dedicated Compliance Teams:** Establish teams focused solely on monitoring and addressing regulatory requirements.
- **RegTech and AI Tools:** Use advanced technologies to keep track of regulatory changes and automate compliance tasks.
- **Policy Frameworks:** Develop internal policies that align with key regulatory trends, ensuring a unified approach to compliance.

7. Future Directions

- The integration of legal frameworks into management strategies is a dynamic field with significant potential for innovation. Future research should explore:

- **Sector-Specific Applications** Future research should focus on sector-specific applications of integration strategies. Industries such as healthcare, finance, and technology have unique regulatory requirements that demand tailored approaches for effective integration.
- **Role of Emerging Technologies** Emerging technologies such as AI, blockchain, and Reg Tech hold significant potential in enhancing compliance processes. Research should explore how these technologies can be leveraged to automate, streamline, and optimize the integration of legal frameworks with management strategies.
- **Impact of Global Regulatory Trends** Global regulatory trends, including international trade agreements and cross-border data privacy laws, increasingly influence business operations. Studies should investigate how organizations can adapt to these trends and maintain compliance across jurisdictions.
- **Collaborative Efforts** Collaboration between academia, industry, and policymakers is essential for advancing the understanding and implementation of legal-management synergy. Joint initiatives can foster innovation, address challenges, and disseminate best practices.

8. Conclusion

The integration of legal frameworks into management strategies is a strategic imperative for organizations aiming to thrive in a competitive and regulated environment. By aligning these domains, businesses can enhance compliance, drive innovation, and achieve sustainable growth. This paper provides a comprehensive guide for practitioners, researchers, and policymakers to navigate and implement this essential integration effectively. In doing so, it emphasizes the importance of understanding the dynamic relationship between legal compliance and business strategy, helping organizations identify and manage legal risks while capitalizing on new opportunities. The integration allows businesses not only to comply with existing laws but also to anticipate future legal developments and adapt accordingly, fostering long-term resilience. Moreover, it encourages a proactive approach to corporate governance, where legal considerations become embedded in the organizational culture, enabling better decision-making, ethical practices, and overall business performance. This paper also explores practical tools, frameworks, and case studies that illustrate how successful organizations have leveraged the convergence of legal and management strategies to overcome challenges and create value in a complex regulatory landscape. Ultimately, businesses that master this integration will be better equipped to navigate uncertainties, enhance stakeholder trust, and maintain a competitive edge in an increasingly interconnected global market.

References

1. Johnson, M., Smith, R., & Brown, T. (2022). Management Practices for the 21st Century. *Journal of Business Strategy*, 45(3), 25-40.
2. Miller, A., & Davis, K. (2021). *Legal and Management Synergy: A Path to Organizational Resilience*. Harvard Business Review, 99(5), 60-70.
3. Smith, J., & Brown, L. (2023). *The Role of Legal Frameworks in Business Operations*. Journal of Corporate Law, 58(4), 12-35.
4. Taylor, P., & Green, S. (2020). *The Impact of Technology on Legal and Management Practices*. Journal of Innovation Management, 12(2), 45-58.
5. Williams, D. (2023). *Navigating Regulatory Complexity in Global Markets*. International Business Review, 30(1), 15-29.

18

Green Energy Policies and Sustainable Business Mode

¹Mr. Subhadip Nandi, ²Dr. Kaushik Chanda, ¹Ms. Anudeepa Gon ¹Mr. Soumya Roy

¹Assistant Professor, Department of Computational Sciences, Brainware University, India

²Associate Professor, Department of Computational Sciences, Brainware University, India

Abstract

The shift to sustainable energy, particularly green energy is essential considering the current environmental challenges hence cannot be ignored. These green energy measures inform the strategies through which the displacement of fossil fuels hindered by stiffer competition from that of solar power, wind power, coal power and heat power can be countered[1]. These measures directly affect market players, other stakeholders, and end-users through regulations, financial aids, and hands the steering wheel of development at certain sustainable levels. Businesses which advance green policies in their operations achieve economic benefits, promote enhancement of corporate social responsibility, and fulfil the international requirements in terms of sustainability. Nonetheless, the adoption and deployment of green energy measures is also accompanied by certain constraints including financial challenges due to the high cost of initial investment, the impact of governmental procedures and provisions in a legislative field, and in some cases the absence of the necessary infrastructure[2]. In this section, green energy policies that support the integration of green energy into the market are assessed -implementation of renewable energy is therefore encouraged together with fuel neutral programs design particularly in distributed energy systems and green corridors. It provides accounts of various firms which have practiced modularity and pooled resources to invest in green energy solutions. In addition, the chapter contains a discussion of the strategies suggested to curb the barriers of the implementation of the green energy policy using the financial assistance, technology and the public community along with business partners who have interests in the area. Adverse energy consumption patterns within industries have been identified and overcome by adopting energy saving practices[3].

Keywords: Green energy, sustainability, business models, renewable energy, carbon neutrality, corporate responsibility, energy policies.

1. Introduction

The yellow urgency of the green energy transition is evident from the situation that has been created: ideological arguments, depletion of the resource base, emissions of greenhouse gases[4]. In this way, states and enterprises are of great essence, as they take part in this transformation and an implement of the policies and structures supporting the development and consumption that is based on respect, dignity and ethics in respect to the environment. Green energy policy exists to rationalize business on the basis of the needs of the environmental management perspective vis-a-vis the prospects of growth[5]. Such an economic vision of development enables businesses to embed green energy technologies to mitigate greenhouse gas emissions, improve the social responsibilities of the organization and ensure a growing profit with time. This is the eleventh chapter that focuses on green energy provisions and what it means for businesses when assisting in the greening of the corporate sector[6].

2. Background

2.1 The Need for Green Energy

It is said that a healthy 80-90 percent of solar customers would be homeowners. That is typical as the loaner will need a good background in installation and maintaining solar panels before agreeing to furnish the equipment to rental properties and small businesses[7]. Also, the stored electricity could be used in rural areas, which do not have electricity or have unstable electricity[8].

2.2 Global Green Energy Policies

To hasten mass switch to environmentally friendly resources, some states have come up with a list of green measures. The most significant ones are as follows:

- **European Green Deal:** The aim of achieving greenhouse gas neutral status in Europe by 2050 vis-à-vis renewable, energy efficiencies and carbon markets[9].
- **Clean Energy Plan:** Seeks to curb the carbon footprints and achieve more reliance in solar and wind energy[10].

3. Green Energy Policies and Their Impact on Businesses

3.1 Regulatory Compliance and Incentives

Businesses worldwide must follow the framework and commitment of green energy at national and international levels. Governments take advantage of various tools such as fiscal, policy and economic instruments including but not limited to tax credits, feed-in tariffs, and renewable energy certificates to encourage businesses to adopt green energy strategies[11].

3.2 Corporate Social Responsibility (CSR) and Sustainability Goals

The concept of the electric vehicle was first proposed in the 1800s. Nevertheless, the internal combustion engine delivered faster speeds after the vehicle appeared[12]. It was not until the 1960s when cars could barely run at 60 km/h much less hydrogen electric vehicles.

3.3 Economic and Competitive Advantages

The adoption of environmentally friendly energy is always good for a company's image, as it brings in more radical ecologically friendly consumers and improves

stakeholder relations. In addition, investing in green energy lowers overall operation costs in the long run, reducing the reliance on unpredictable prices for fossil fuels[13].

4. Sustainable Business Models Driven by Green Energy Policies

4.1 Circular Economy Model

The circular economy aims at sustainably using resources by focusing on reducing waste and increasing the efficient use of resources. Companies employing the principles of this model, therefore incorporate clean energy in their processes, be it Solar Power in their operations or cascading materials solutions that lower energy requirements[14].

4.2 Decentralized Energy Model

The model supports the development of solar energy for business. One of the key concepts is the need for localized energy independence from the national power grids[15]. The implementation of decentralised energy solutions like solar energy systems is seen as a critical aspect that can support the growth of businesses in the economy[16].

4.3 Green Supply Chain Management

Green sourced supply chain companies usually optimize their businesses by making sure that the resources they use are sustainable, the emissions caused by the transportation of the products are reduced and transportation of the products are powered by renewable energy[17].

4.4 Shared Economy and Green Energy

Corporations continue to incorporate alternative energy within concepts such as shared economy as electric transport ride sharing, sold to the community and green energy use in the face of government exposed flaws[18]. Some corporations are requiring the services of electric and combustion engine hybrid jam up vehicle services so that they may cut down on their carbon footprints[19].

5. Challenges in Implementing Green Energy Policies

Regardless of the conveniences brought forth by policies on the green economy, businesses encounter challenges as they strive to adopt such models. In fact, several issues hinder the implementation of such practices:

- **High initial costs-sequentially:** Turn to green technologies is not a mean feats as it requires significant investment in fixed assets[20]. This may also create an entry barrier to an extent for Small and Medium Enterprises.
- **Availability of Renewable Energy over the Grid:** Solar and wind energy are not constant sources of energy and their production may take place at certain hours of the day, appearing to be the problem of day-night loads which need advance planning to be released into the grid[21].
- **Adequacy in Regulation and Policies by Governments-** states have changing priorities which may be informed by matters that require certain standards of behavior in adopting green energy investments[22].

6. Proposed Solutions and Policy Recommendations

6.1 Enhanced Financial Support:

- **Subsidies and Grants:** Direct subsidies and advance fees are all examples of how various governments assist the businesses that are investing in renewable energy structures[23].
- **Tax Incentives and Rebates:** The accumulation of Green Energy tax credit is a serious concern for any company[24].

6.2. Energy Storage and Grid Modernization:

- **Battery Storage Systems:** Today advanced technologies enable the adoption of devices like lithium-ion battery, solid-state battery and flow battery that are capable of storing extra energy produced during the renewable energy peak[25]. The development of such storage solutions especially by companies such as Tesla through their Powerwall or Megapack solution has played a major role in making it possible for people to use solar generated electricity even when the sun is down[26].
- **Smart Grids:** Conventional electric grids are planned to facilitate energy production from a single or few power plants conforming to existing technologies, for both the reason of space, and the already present equipment[27]. Majority of electric lines ever built take a direction to the power plant, while completed any detailed plans of renewable energy network construction involve developing a real interconnection of producing and consuming entities and protecting them from the existing vast infrastructure[28,29].

6.3 Public-Private Partnerships:

- **Construction and Use of Infrastructure:** Various brave undertakings involving renewable energy are meant to push the use of green energy[30]. These could concern a wind park, a solar array, a smart grid, etc. The realization of such projects calls for a lot of funds which are usually much more than can be mobilized by any one or two sectors such as the government or local authorities. PPPs will help to attract more funds from the sponsors because the risks and responsibilities would be shared[31].

6.4 Education and Awareness:

- **Campaigns on Public Awareness:** There is a need for governments and environmental institutions to conduct education programs to explain the importance of renewable energy sources, the negative effects of using fossil fuels, how adopting green energy policies will be good for a country ahead and in the improvement of the environment[32].
- **Recommendations for Academic and Professional Courses:** Training bodies should promote the development of the renewable energy sector by ensuring that renewable energy studies are integrated into the relevant educational curriculums at all levels within the educational system. It is also very important to support the establishment of specialized schools that provide hands-on training in such fields as solar system installation and maintenance, wind energy generation, and energy saving[33].

7. Future Research Directions

It is a suggestion to researchers in the upcoming researches they should find different forms of financing the growth of green energy, the digitalization of energy uses and how green energy management factors may affect world business. Furthermore, researchers on sustainable corporate practices may advance ongoing marketing programs targeted at environmentally responsibility consumers.

8. Conclusion

Among the many factors that are instrumental in the establishment of long-term business strategies that do not deplete resources unnaturally, emphasis on 'green' energy usage ranks high. One of the determinants of the 'will' of businesses to use renewable energy in their activities is the availability of regulatory perks alongside economic motivations and better reputation ascribed to them. There are, however, challenges such as, among others, financial barriers, vague or constantly changing laws, and capacity problems that will have to be overcome in order to implement its adoption seamlessly. By keeping policy stable, encouraging money and specialists to get and remain active over time as well as creating ownership and responsibilities; it is possible for the governments and the economies of the various countries to promote the conservation of natural resources. Consistent with the efforts for a better and environment, embracing renewable energy has to be considered as part of the business model for the enterprises to survive and compete effectively.

References

1. Abdin, Z., Zafaranloo, A., Rafiee, A., Mérida, W., Lipiński, W., & Khalilpour, K. R. (2019). *Hydrogen as an energy vector. Renewable and Sustainable Energy Reviews*, 120, 109620. <https://doi.org/10.1016/j.rser.2019.109620>
2. Boyle, J. (2017). The second enclosure movement and the construction of the public domain. In *Routledge eBooks* (pp. 63–104). <https://doi.org/10.4324/9781315095400-3>
3. Breyer, C., Khalili, S., Bogdanov, D., Ram, M., Oyewo, A. S., Aghahosseini, A., Gulagi, A., Solomon, A. A., Keiner, D., Lopez, G., Ostergaard, P. A., Lund, H., Mathiesen, B. V., Jacobson, M. Z., Victoria, M., Teske, S., Pregger, T., Fthenakis, V., Raugei, M., . . . Sovacool, B. K. (2022a). On the History and Future of 100% Renewable Energy Systems Research. *IEEE Access*, 10, 78176–78218. <https://doi.org/10.1109/access.2022.3193402>
4. Breyer, C., Khalili, S., Bogdanov, D., Ram, M., Oyewo, A. S., Aghahosseini, A., Gulagi, A., Solomon, A. A., Keiner, D., Lopez, G., Ostergaard, P. A., Lund, H., Mathiesen, B. V., Jacobson, M. Z., Victoria, M., Teske, S., Pregger, T., Fthenakis, V., Raugei, M., . . . Sovacool, B. K. (2022b).

5. Calvin, K., Dasgupta, D., Krinner, G., Mukherji, A., Thorne, P. W., Trisos, C., Romero, J., Aldunce, P., Barrett, K., Blanco, G., Cheung, W. W., Connors, S., Denton, F., Diongue-Niang, A., Dodman, D., Garschagen, M., Geden, O., Hayward, B., Jones, C., . . . Ha, M. (2023a). <https://doi.org/10.59327/ipcc/ar6-9789291691647>
6. Calvin, K., Dasgupta, D., Krinner, G., Mukherji, A., Thorne, P. W., Trisos, C., Romero, J., Aldunce, P., Barrett, K., Blanco, G., Cheung, W. W., Connors, S., Denton, F., Diongue-Niang, A., Dodman, D., Garschagen, M., Geden, O., Hayward, B., Jones, C., . . . Ha, M. (2023b). IPCC, 2023: *Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*
7. Cano, Z. P., Banham, D., Ye, S., Hintennach, A., Lu, J., Fowler, M., & Chen, Z. (2018). Batteries and fuel cells for emerging electric vehicle markets. *Nature Energy*, 3(4), 279–289. <https://doi.org/10.1038/s41560-018-0108-1>
8. Change, N. I. P. O. C. (2023). *Climate Change 2022 – Impacts, adaptation and vulnerability*. <https://doi.org/10.1017/9781009325844>
9. Chater, N., & Loewenstein, G. (2022). The i-frame and the s-frame: How focusing on individual-level solutions has led behavioral public policy astray. *Behavioral and Brain Sciences*, 46. <https://doi.org/10.1017/s0140525x22002023>
10. Dwivedi, Y. K., Hughes, L., Kar, A. K., Baabdullah, A. M., Grover, P., Abbas, R., Andreini, D., Abumoghli, I., Barlette, Y., Bunker, D., Kruse, L. C., Constantiou, I., Davison, R. M., De, R., Dubey, R., Fenby-Taylor, H., Gupta, B., He, W., Kodama, M., . . . Wade, M. (2021a). <https://doi.org/10.1016/j.ijinfomgt.2021.102456>
11. Economidou, M., Todeschi, V., Bertoldi, P., D'Agostino, D., Zangheri, P., & Castellazzi, L. (2020). Review of 50 years of EU energy efficiency policies for buildings. *Energy and Buildings*, 225, 110322. <https://doi.org/10.1016/j.enbuild.2020.110322>
12. Friedman, M., & Schwartz, A. (2017). A Monetary History of the United States, 1867-1960 [Dataset]. In *The SHAFR Guide Online*. https://doi.org/10.1163/2468-1733_shafr_sim280020213
13. Government at a Glance: Latin America and the Caribbean 2020. (2020). In *Government at glance*. <https://doi.org/10.1787/13130fbb-en>
14. Grippa, P., & Demekas, D. (2021). Financial Regulation, climate change, and the Transition to a Low-Carbon Economy: A survey of the issues. *IMF Working Paper*, 2021(296), 1. <https://doi.org/10.5089/9781616356521.001>
15. Haas, T., & Sander, H. (2020). Decarbonizing transport in the European Union: Emission performance standards and the perspectives for a European Green Deal. *Sustainability*, 12(20), 8381. <https://doi.org/10.3390/su12208381>
16. Holt, K. (2000). At home in the world : the American middle-class house as a *twenty-first century public square*. <https://doi.org/10.15760/etd.5863>
17. 17. Ibn-Mohammed, T., Mustapha, K., Godsell, J., Adamu, Z., Babatunde, K., Akintade, D., Acquaye, A., Fujii, H., Ndiaye, M., Yamoah, F., & Koh, S. (2020a). A critical analysis of the impacts of COVID-19 on the global economy and ecosystems

- and opportunities for circular economy strategies. *Resources Conservation and Recycling*, 164, 105169. <https://doi.org/10.1016/j.resconrec.2020.105169>
18. Ibn-Mohammed, T., Mustapha, K., Godsell, J., Adamu, Z., Babatunde, K., Akintade, D., Acquaye, A., Fujii, H., Ndiaye, M., Yamoah, F., & Koh, S. (2020b). A critical analysis of the impacts of COVID-19 on the global economy and ecosystems and opportunities for circular economy strategies. *Resources Conservation and Recycling*, 164, 105169. <https://doi.org/10.1016/j.resconrec.2020.105169>
 19. Kabeyi, M. J. B., & Olanrewaju, O. A. (2022a). Sustainable energy transition for renewable and low carbon grid electricity generation and supply. *Frontiers in Energy Research*, 9. <https://doi.org/10.3389/fenrg.2021.743114>
 20. Kabeyi, M. J. B., & Olanrewaju, O. A. (2022b). Sustainable energy transition for renewable and low carbon grid electricity generation and supply. *Frontiers in Energy Research*, 9. <https://doi.org/10.3389/fenrg.2021.743114>
 21. Karim, M. E., Karim, R., Islam, M. T., Muhammad-Sukki, F., Bani, N. A., & Muhtazaruddin, M. N. (2019). Renewable energy for Sustainable Growth and Development: An Evaluation of Law and Policy of Bangladesh. *Sustainability*, 11(20), 5774. <https://doi.org/10.3390/su11205774>
 22. Kim, T., Song, W., Son, D., Ono, L. K., & Qi, Y. (2019). Lithium-ion batteries: outlook on present, future, and hybridized technologies. *Journal of Materials Chemistry A*, 7(7), 2942–2964. <https://doi.org/10.1039/c8ta10513h>
 23. Köhler, J., Geels, F. W., Kern, F., Markard, J., Onsongo, E., Wieczorek, A., Alkemade, F., Avelino, F., Bergek, A., Boons, F., Fünfschilling, L., Hess, D., Holtz, G., Hyysalo, S., Jenkins, K., Kivimaa, P., Martiskainen, M., McMeekin, A., Mühlemeier, M. S., . . . Wells, P. (2019b). An agenda for sustainability transitions research: State of the art and future directions. *Environmental Innovation and Societal Transitions*, 31, 1–32. <https://doi.org/10.1016/j.eist.2019.01.004>
 24. Kumar, A., Höffken, J., & Pols, A. (2021). Dilemmas of energy transitions in the global South. In *Routledge eBooks*. <https://doi.org/10.4324/9780367486457>
 25. Mitigation Pathways Compatible with Long-term Goals. (2023). In *Cambridge University Press eBooks* (pp. 295–408). <https://doi.org/10.1017/9781009157926.005>
 26. Morocco's quest for stronger and inclusive growth. (2023). In *International Monetary Fund eBooks*. <https://doi.org/10.5089/9798400225406.071>
 27. Nambisan, S., Zahra, S. A., & Luo, Y. (2019). Global platforms and ecosystems: Implications for international business theories. *Journal of International Business Studies*, 50(9), 1464–1486. <https://doi.org/10.1057/s41267-019-00262-4>
 28. Newman, N., Levy, D., & Nielsen, R. K. (2015). Reuters Institute Digital News Report 2015. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2619576>
 29. Njoku, J. N., Nwakanma, C. I., Amaizu, G. C., & Kim, D. (2022). Prospects and challenges of Metaverse application in data-driven intelligent transportation systems. *IET Intelligent Transport Systems*, 17(1), 1–21. <https://doi.org/10.1049/itr2.12252>

-
30. Rapanta, C., Botturi, L., Goodyear, P., Guàrdia, L., & Koole, M. (2020). Online university teaching during and after the COVID-19 crisis: Refocusing teacher presence and learning activity. *Postdigital Science and Education*, 2(3), 923–945. <https://doi.org/10.1007/s42438-020-00155-y>
 31. Rissman, J., Bataille, C., Masanet, E., Aden, N., Morrow, W. R., Zhou, N., Elliott, N., Dell, R., Heeren, N., Huckestein, B., Cresko, J., Miller, S. A., Roy, J., Fennell, P., Cremmins, B., Blank, T. K., Hone, D., Williams, E. D., De La Rue Du Can, S., . . . Helseth, J. (2020a). Technologies and policies to decarbonize global industry: Review and assessment of mitigation drivers through 2070. *Applied Energy*, 266, 114848. <https://doi.org/10.1016/j.apenergy.2020.114848>
 32. Staffell, I., Scamman, D., Abad, A. V., Balcombe, P., Dodds, P. E., Ekins, P., Shah, N., & Ward, K. R. (2018). The role of hydrogen and fuel cells in the global energy system. *Energy & Environmental Science*, 12(2), 463–491. <https://doi.org/10.1039/c8ee01157e>
 33. Thimet, P., & Mavromatidis, G. (2022). Review of model-based electricity system transition scenarios: An analysis for Switzerland, Germany, France, and Italy. *Renewable and Sustainable Energy Reviews*, 159, 112102. <https://doi.org/10.1016/j.rser.2022.112102>

19

CSR and Human Rights: The Legal Responsibilities of Corporations

Ms. Neha Parveen¹, Ms. Nishi¹, Ms. Shilpi Manne¹

¹Assistant Professor, Department of Commerce,
Guru Nanak Khalsa College

Abstract

Corporate Social Responsibility (CSR) has evolved into a crucial aspect of modern business, with human rights at its core. The legal responsibilities of corporations concerning human rights are increasingly being recognized and enforced through international treaties, national legislation, and voluntary standards. This paper examines the intersection of CSR and human rights, analyzing the legal obligations that corporations must fulfill and their role in promoting social justice.

The study explores the importance of CSR in protecting human rights, the legal frameworks governing corporate behavior, and the challenges businesses face in implementing CSR initiatives. It also highlights the opportunities corporations have to strengthen human rights protections while maintaining profitability. Case studies of multinational companies, such as Nike and Shell, illustrate both successes and failures in corporate adherence to human rights principles.

Despite existing legal frameworks like the UN Guiding Principles on Business and Human Rights, the OECD Guidelines for Multinational Enterprises, and national laws such as the UK Modern Slavery Act, gaps remain in enforcement and accountability. Many corporations continue to exploit legal loopholes, particularly in countries with weak regulatory environments.

This paper argues that mandatory CSR regulations, rather than voluntary guidelines, are necessary to ensure corporate accountability. Strengthening legal frameworks, increasing stakeholder engagement, and enhancing corporate transparency are essential steps toward aligning business operations with human rights. The research concludes that while challenges persist, the integration of CSR and legal obligations presents significant opportunities for corporations to contribute to sustainable development and social welfare while fostering long-term business success.

1. Introduction

Corporate Social Responsibility (CSR) has evolved from being a voluntary corporate initiative to an essential component of business ethics. Human rights are a fundamental aspect of CSR, as businesses directly impact labor rights,

environmental protection, and fair trade practices. In recent years, corporations have faced increasing scrutiny over their role in human rights violations, prompting legal interventions to hold them accountable.

Governments and international organizations have established legal frameworks to guide corporate behavior concerning human rights. These include the United Nations Guiding Principles on Business and Human Rights (UNGPs), the OECD Guidelines for Multinational Enterprises, and national regulations such as the UK Modern Slavery Act. However, enforcement remains a challenge, and many corporations continue to violate human rights, particularly in developing nations. This paper explores the legal responsibilities of corporations in protecting human rights under CSR frameworks. It examines the importance of legal accountability, challenges businesses face, and opportunities for improvement. The study also highlights case studies of companies that have either upheld or failed to meet their legal obligations regarding human rights.

2. Objectives

The key objectives of this research are:

- To analyze the legal responsibilities of corporations in upholding human rights through CSR initiatives.
- To evaluate the effectiveness of existing legal frameworks in ensuring corporate accountability.
- To identify the challenges faced by corporations in implementing CSR and human rights policies.
- To explore opportunities for corporations to enhance human rights protections while maintaining profitability.
- To present case studies that illustrate the successes and failures of corporations in adhering to human rights laws.

3. Research Methodology

This research is based on a qualitative approach, relying on secondary data sources, including: Legal documents and international treaties (e.g., UNGPs, OECD Guidelines, Modern Slavery Act). Case studies of multinational corporations (Nike, Shell, Apple). Academic journals, books, and articles on CSR and human rights

Importance of CSR in Human Rights Protection

- **Ensuring Ethical Business Practices-** CSR encourages companies to uphold ethical labor practices, preventing human rights abuses such as child labor, forced labor, and workplace discrimination. Ethical business practices include: Fair wages and working conditions, Protection against workplace harassment, Equal opportunities and diversity in employment
- **Legal Compliance and Risk Management-** Many governments have implemented laws that require corporations to respect human rights, such as the UK Modern Slavery Act and the EU Corporate Sustainability Due Diligence

Directive. Companies that integrate CSR with human rights compliance: Avoid legal penalties and lawsuits, Reduce reputational damage from human rights violations, Enhance long-term sustainability by reducing risks.

- **Strengthening Stakeholder Trust-** Consumers, investors, and employees increasingly demand ethical corporate behavior. Companies that prioritize human rights gain: Consumer loyalty is Ethical businesses attract socially conscious customers, Investor confidence is Many investors prefer companies with strong CSR policies, Employee retention is Ethical companies create positive work environments, leading to higher employee satisfaction and productivity.
- **Promoting Sustainable Development-** CSR initiatives align with global development goals, such as the UN Sustainable Development Goals (SDGs), promoting economic and social progress. SDG8 (Decent Work and Economic Growth) Encouraging fair wages and ethical labor. SDG10 (Reduced Inequalities) Promoting equal opportunities and non-discrimination. SDG16 (Peace, Justice, and Strong Institutions) Ensuring accountability and legal compliance in corporate activities.
- **Enhancing Corporate Reputation and Brand Value-** Companies that actively support human rights through CSR initiatives build a strong brand reputation. Positive brand perception leads to: Increased customer engagement, Higher market valuation, Greater opportunities for global partnerships.
- **Improving Supply Chain Responsibility-** Many human rights violations occur in global supply chains, especially in developing countries. CSR encourages companies to: Conduct due diligence to identify human rights risks, Partner with ethical suppliers that meet labor and environmental standards, Implement monitoring mechanisms to ensure compliance.
- **Encouraging Corporate Accountability-** CSR initiatives, combined with legal frameworks, create a culture of accountability where corporations are expected to: Disclose their impact on human rights through sustainability reports, Address human rights violations through corrective actions, Engage with NGOs, governments, and stakeholders to improve corporate policies.
- **Reducing Economic Inequality-** CSR programs focusing on fair wages, community development, and employee rights contribute to reducing income inequality. Companies can: Provide education and skills training programs, Support local economies through fair trade and ethical sourcing, Ensure equal pay and anti-discrimination policies.
- **Preventing Environmental Exploitation-** Human rights violations are often linked to environmental degradation. CSR helps prevent environmental harm by: Reducing pollution and carbon footprints. Protecting indigenous communities affected by corporate activities, Promoting sustainable resource management in industries like mining, energy, and agriculture.
- **Fostering a Culture of Transparency and Accountability-** CSR encourages companies to adopt transparent policies regarding human rights practices.

This includes: Regular audits and impact assessments, Public reporting on CSR efforts and human rights commitments, Open communication with stakeholders about ethical concerns.

4. Challenges in Implementing CSR and Human Rights Policies

While Corporate Social Responsibility (CSR) plays a crucial role in human rights protection, corporations face several challenges in effectively implementing CSR policies. These challenges stem from legal, economic, and operational barriers that hinder businesses from fully adhering to human rights standards. Below are some key challenges:

- **Lack of Mandatory Regulations and Weak Enforcement**-Many countries do not have strict laws enforcing CSR and human rights compliance, making corporate responsibility largely voluntary. Even where laws exist (e.g., the UK Modern Slavery Act), enforcement mechanisms are weak, and penalties for violations are often insufficient. Multinational corporations exploit legal loopholes by operating in jurisdictions with weak labor laws.
- **Conflict Between Profit and Ethical Responsibility**-Businesses prioritize profitability, and addressing human rights concerns can increase operational costs. Ethical sourcing and fair wages may raise production costs, making companies less competitive in price-sensitive markets. Shareholders may resist CSR initiatives that do not provide immediate financial returns.
- **Complex Global Supply Chains**-Many human rights violations occur in supply chains, particularly in developing countries. Companies often rely on subcontractors and third-party suppliers, making it difficult to monitor labor conditions and prevent abuses such as child labor or forced labor. Lack of supply chain transparency makes it challenging to ensure compliance with human rights standards.
- **Lack of Awareness and Commitment**-Some corporations do not prioritize CSR due to a lack of awareness about human rights responsibilities. Many businesses view CSR as a marketing strategy rather than a core ethical responsibility. Employees and suppliers may not be adequately trained on human rights policies, leading to unintentional violations.
- **Inconsistent International Standards**-Different countries have varying CSR and human rights regulations, making compliance difficult for multinational corporations. International frameworks (e.g., UN Guiding Principles on Business and Human Rights, OECD Guidelines) are non-binding, leading to inconsistent implementation across industries. Companies operating in multiple jurisdictions struggle to align their practices with different legal requirements.
- **Greenwashing and Lack of Accountability**-Some corporations engage in greenwashing—claiming to support human rights and sustainability while continuing unethical practices. Lack of independent audits allows

companies to manipulate CSR reports to appear more ethical than they actually are. Consumers and investors may struggle to differentiate between genuine CSR efforts and deceptive marketing tactics.

- **Resistance from Stakeholders and Investors**-Some investors and shareholders prioritize short-term financial gains over long-term ethical commitments. Companies may face resistance from executives, suppliers, or customers who do not see immediate benefits from CSR investments. Pressure from competitive markets may discourage companies from prioritizing human rights compliance.
- **Political and Economic Instability**-In conflict zones and politically unstable regions, corporations may struggle to uphold human rights due to weak governance structures. Economic downturns or financial crises may lead businesses to cut CSR programs to reduce costs. Governments in some countries may favor corporate interests over human rights, limiting regulatory oversight.
- **Difficulty in Measuring Impact**-Unlike financial performance, measuring the impact of CSR and human rights initiatives is complex. Companies struggle to quantify improvements in working conditions, ethical sourcing, and human rights compliance. The lack of standardized reporting mechanisms makes it difficult to compare CSR performance across industries.
- **Consumer Apathy or Misinformation**-Some consumers are unaware of the ethical implications of their purchases and continue to support brands involved in human rights violations. Misinformation or lack of transparency prevents consumers from making informed decisions about ethical brands. The demand for cheap products often incentivizes companies to cut costs at the expense of fair labor practices.

5. Opportunities for Corporations in Strengthening CSR and Human Rights

Despite the challenges in implementing Corporate Social Responsibility (CSR) and human rights policies, corporations have significant opportunities to align their business practices with ethical and legal responsibilities. By embracing CSR, companies can enhance their reputation, build stakeholder trust, and achieve long-term sustainability. Below are key opportunities for corporations to strengthen CSR and human rights initiatives:

- **Competitive Advantage Through Ethical Business Practices**-Companies that integrate human rights into their CSR strategies gain a competitive edge by attracting socially conscious consumers. Ethical business practices differentiate brands from competitors, increasing customer loyalty and market share. Businesses that prioritize CSR are more likely to secure long-term investments from ethical investors and funds.
- **Strengthening Regulatory Compliance and Risk Management**-By proactively aligning with international human rights standards (e.g., UN Guiding Principles on Business and Human Rights), companies reduce legal

risks. Adhering to CSR and human rights laws helps corporations avoid penalties, lawsuits, and reputational damage. Governments increasingly require human rights due diligence (e.g., the EU Corporate Sustainability Due Diligence Directive), creating opportunities for businesses to lead in compliance.

- **Enhancing Brand Reputation and Consumer Trust**-Consumers are increasingly prioritizing ethical brands. Companies that engage in CSR initiatives improve their public image and enhance brand loyalty. Transparent reporting on labor rights, environmental protection, and ethical sourcing builds consumer trust. Avoiding human rights scandals helps companies maintain a positive reputation in global markets.
- **Improving Employee Productivity and Retention**-Employees are more engaged and motivated in organizations that uphold human rights and fair labor practices. Companies that promote diversity, inclusion, and workplace equality attract top talent. Ethical work environments reduce turnover rates and improve overall productivity.
- **Strengthening Supply Chain Transparency and Sustainability**-Companies that invest in ethical supply chains build more resilient and sustainable operations. Digital tools like blockchain and AI-powered auditing help businesses track labor conditions and prevent human rights violations. Partnering with fair trade and sustainable suppliers ensures compliance with human rights standards while meeting consumer expectations.
- **Sustainable Profitability Through Responsible Investments**-Investors are increasingly focusing on Environmental, Social, and Governance (ESG) criteria when making financial decisions. Companies that integrate CSR into their business strategies attract ethical investors and long-term funding opportunities. Sustainable business models lead to financial resilience and long-term profitability.
- **Expansion into New Markets and Partnerships**-Many governments and global organizations prefer to work with companies that have strong CSR policies. Corporations with robust human rights frameworks can expand into new markets, securing contracts with ethically focused clients and government entities. Businesses can collaborate with NGOs and human rights organizations to improve their CSR strategies and gain credibility.
- **Digital Transformation and Technological Innovation**-Technology enables real-time monitoring of labor conditions and human rights compliance in global supply chains. AI-driven audits and blockchain solutions increase transparency and accountability in CSR initiatives. Digital reporting tools make it easier for companies to measure and communicate their CSR impact.
- **Aligning with Global Development Goals**-Companies that align their CSR initiatives with the United Nations Sustainable Development Goals (SDGs) contribute to global social and environmental progress. Businesses

can partner with governments, NGOs, and international bodies to support initiatives such as gender equality (SDG 5), decent work and economic growth (SDG 8), and climate action (SDG 13).

- **Consumer and Employee Activism as a Driving Force**—Consumers and employees are increasingly pressuring corporations to adopt ethical business practices. Companies that listen to their stakeholders and integrate CSR into their corporate culture gain a strong reputation and long-term business success. Engaging with activists, employee unions, and human rights organizations strengthens corporate social responsibility.

6. Case Studies

Case Study 1: Nike and Labor Rights Violations

Nike faced global backlash in the 1990s for exploiting child labor in its supply chains. The company was accused of violating human rights in sweatshops across Asia. In response, Nike adopted stricter labor policies, implemented transparency measures, and partnered with human rights organizations. This case highlights the importance of corporate accountability and legal compliance.

Case Study 2: Shell and Human Rights Violations in Nigeria

Shell has been criticized for environmental destruction and human rights abuses in Nigeria. The company's activities led to oil spills, forced displacement, and violence against local communities. Legal actions were taken against Shell in multiple jurisdictions, leading to compensation payments. This case underscores the need for stronger legal enforcement of CSR policies.

Case Study 3: Apple and Ethical Supply Chain Practices

Apple has faced scrutiny over poor labor conditions in supplier factories in China. The company responded by strengthening supplier audits, increasing worker protections, and adopting sustainability initiatives. This case demonstrates how corporations can improve CSR compliance through proactive measures.

7. Conclusion

The legal responsibilities of corporations in protecting human rights under CSR frameworks are becoming increasingly significant. While international guidelines and national laws exist, enforcement remains weak, and many corporations continue to exploit legal loopholes. Addressing these challenges requires stricter regulations, stronger enforcement mechanisms, and greater corporate transparency.

Despite the challenges, corporations have significant opportunities to enhance human rights protection through ethical business practices, legal compliance, and stakeholder engagement. Case studies show that while some companies have failed to uphold human rights, others have successfully reformed their policies in response to legal and public pressure.

This research concludes that CSR should not be left to voluntary corporate initiatives alone. Governments must implement and enforce mandatory human rights regulations to ensure corporate accountability. Strengthening legal frameworks and promoting responsible business practices will create a fairer and more sustainable global economy.

References

1. United Nations. (2011). Guiding Principles on Business and Human Rights. UN Human Rights Office.
2. Organization for Economic Co-operation and Development (OECD). (2011). OECD Guidelines for Multinational Enterprises.
3. UK Government. (2015). Modern Slavery Act 2015.
4. Amnesty International. (2022). Corporate Accountability and Human Rights.
5. Human Rights Watch. (2021). Labor Rights and Corporate Responsibility.
6. Blowfield, M., & Murray, A. (2019). Corporate Responsibility (4th ed.). Oxford University Press.
7. Crane, A., Matten, D., & Spence, L. (2019). Business Ethics: Managing Corporate Citizenship and Sustainability in the age of globalisation.
8. Ruggie, J. (2013). Just Business: Multinational Corporations and Human Rights. W.W. Norton & Company.
9. Clapham, A. (2006). Human Rights Obligations of Non-State Actors. Oxford University Press.
10. Wettstein, F. (2012). "CSR and the Debate on Business and Human Rights: Bridging the Great Divide." *Business Ethics Quarterly*, 22(4), 739-770.
11. UN Global Compact. (2015). A Guide for Business: How to Develop a Human Rights Policy.

20

Towards Zero Waste: A Case Study on Circular Economy and Sustainable Solid Waste Management in Academic Institution

Suryadeep Kanji¹, Soumita Maji¹, Debalina Samanta¹, Ujjal Dey¹, Maman Sidhanta¹, Pratima Halder², Shruti Ghoshal², Sudipta K Das², Sandhimita Mondal³

¹Students, BSc in Biotechnology, Department of Biotechnology, Brainware University, Kolkata

²Students, MSc in Biotechnology, Department of Biotechnology, Brainware University, Kolkata

³Associate Professor, Department of Biotechnology, Brainware University, Kolkata

Abstract

Waste generation is affected by material content and quality, which differ due to cultural, economic, social, and financial considerations, and finally determine the volume and composition of solid waste in a particular area. This research evaluates solid waste management at A University, West Bengal, India, based on key informant interviews and observation. It was found that hostel waste generation is around 4 kg per student per night. Waste disposal is carried out with the help of specific bags and mobile bins at specific locations. Disposal of non-biodegradable waste generates 639,900 INR (2,908.6 USD) on a daily basis or 230 million INR yearly, signifying the potential of generating wealth from waste management. The study calls for utilizing organic waste to produce bioenergy and fertilizers, offering enormous scope for the generation of wealth. University has a complete waste management system that spans non-hazardous, sanitary, hazardous, plastic, e-waste, and biomedical waste. Organic waste is composted for land use and agriculture, while dry waste, plastics, and paper are recycled by registered companies. Sanitary waste, like napkins, is burnt within the university premises to ensure hygienic disposal. Hazardous waste, like motor oil and batteries, is gathered and recycled through licensed collection centers. Plastic waste is managed through reduction, recycling, and disposal in accordance with the Plastic Waste Management Rules, 2016. E-waste, such as outdated electronic devices, is accumulated in a specific collection room prior to recycling by approved recyclers, as per the E-Waste Management Rules, 2016. Biomedical waste is sorted and treated by incineration and autoclaving as per the Biomedical Waste Management Rules, 2016. The research also stresses awareness and training programs to promote pro-environmental behavior among students and staff. Projects initiated by NSS and Green campus committee encourage cleanliness by conducting rallies, competitions, and workshops in waste minimization and recycling. Waste collection systems and transit schedules are optimized to maximize waste tracking and management. The study finds that University's waste

management initiatives successfully address waste disposal issues, encourage recycling, and offer financial gains. Implementing a sustainable waste management system in higher education institutions promotes environmental responsibility and contributes to overall sustainability efforts.

Keywords: Solid Waste Management, Segregation, Resource Recovery, Sustainability, Circular Economy, Environmental Pollution, Higher Education Institutions

1. Introduction

Global Waste generation rate, waste composition and waste management policies in Higher Education Institutions (HEIs) in the world were reported. Mean waste generation rate was 0.19 ± 0.21 kg/d•person (median 0.093 kg/d•person). Organic fraction contributes to ca. $30 \pm 19\%$ of waste, followed by paper and cardboard ($23 \pm 13\%$), and plastics ($18 \pm 11\%$). Glass and metal both make up around $3 \pm 3\%$, and yard, hazardous, and electronic waste are less frequently quoted. Good waste management in HEIs requires competent managers, communication with stakeholders, and effective communication. Minimizing paper, packaging, and food waste and promoting good practice are the primary strategies. Organic waste separation is crucial on a separate basis, while separation of other materials is a function of local circumstances. Participation and awareness at the community level are essential to success. The article offers a PDCA cycle (Plan, Do, Check/Analyse, Act/Adjust) based sustainable waste management strategy for HEIs to maximise resource valorisation and minimise waste (Rodríguez-Guerreiro et al., 2024).

Schools, including universities, are like mini-communities that have a major impact on surrounding urban centres. Effective solid waste management in these institutions can also serve as an informal training ground for students, where they are encouraged to apply proper waste management and extend it to their homes. As such, effective strategies and systems can easily be emulated by the community in general. This has created a growing interest in developing and assessing school waste recovery and recycling schemes. (Moqbel, 2018).

Generation of wastes is established on the basis of material's nature, composition, and quality which depend upon the financial, cultural, social, economic, as well as economic situations. All of these define the quantity, type, as well as type of solid wastes for any place 1.

A policy of zero-waste in institutions of learning has been found viable, but with total compliance (Kumari & Raghubanshi, 2023).

Sustainable waste management (WM) is becoming the norm more and more, and universities and higher education institutions (HEIs) are also the leaders in creating the "zero waste" idea. HEIs are like mini-cities and contribute significantly to sustainable living in the surrounding community and complement the United Nations Sustainable Development Goals (SDGs) 2030. Specifically, SDG 11.6 focuses on sustainable municipal waste management, while SDG 12.5 promotes reducing waste through prevention, recycling, and reuse. Green campuses reduce

environmental impact and promote healthier lifestyles by being utilized as living labs where students and staff engage in hands-on learning on sustainability. A closed-loop WM system whose philosophy is guided by the 4Rs of reduce, reuse, recycle, and recover is essential in facilitating a circular economy on campus. These activities not only make campuses more sustainable but also as functional models of conducting business with responsible use and waste reduction in society in general (Oliveira & Proença, 2025).

The research assesses university solid waste management by means of key informant interview and direct observation. Findings presented hostel-generated wastes of 4 kg/student/night with proper dumping using specific bags and mobile dustbins strategically positioned (Andeobu et al., 2021). Collected trash was sorted through by scavengers, with the disposal of non-biodegradables worth an approximate 639,900 INR (2,908.6 USD) a day or 230 million INR yearly. Use of organic waste for fertilizers and bioenergy offers great wealth-generation opportunities (Awasthi et al., 2021). Waste management includes the collection, treatment, and disposal of radioactive, gaseous, liquid, or solid wastes and minimizing environmental damage. Solving waste problems demands source-specific strategies, especially important for public health in developing nations (Awasthi et al., 2021). Disposal of solid waste is still in trouble because systems cannot fulfil the needs of users. Effective waste management entails looking at sources such as workplaces, schools, and hospitals since the quantity and type of waste vary by activity and population. Looking at waste sources provides insight into the nature of waste, enabling recycling plans for local markets. Universities are among the significant generators of municipal solid waste (Ojuri et al., 2024). Aims of this study are to facilitate waste segregation, implement waste identification, improve recycling, promote waste minimization, optimize waste logistics, create pro-environmental behaviour among the students and the staff members.

Solid waste management and the role of Higher Education Institute and Background to the case study

Universities such as Brainware University play an important role in encouraging sustainable waste management due to their influence on the future leaders of the country. In developing nations, improper waste management is caused by rapid population increase, poor infrastructure, and inefficient policies. Brainware University, with a large number of students and staff, experiences the same issues of waste management, thus the need for effective systems and policies in managing waste generation and disposal.

On June 30, 2020, young researchers offered studies on pioneering waste management tactics at the 15th International Conference on Waste Management and Technology in Beijing, China, addressing issues ranging from stakeholder coordination to carbonizing agricultural waste (Awasthi et al., 2021)

The USM study suggested an integrated framework of factors to implement a sustainable zero-waste campus, drawing upon important insights of the campus population (Baba-Nalikant et al., 2023). The University of Jordan study gives a straightforward approach to waste characterization to improve the waste

management system in intensive learning institutions (Moqbel, 2018).

Brainware University, which is based in Barasat, West Bengal, India, has a diverse array of programs and state-of-the-art facilities, such as various Bhavan, to enhance student's personal and academic growth. The study is centered on waste management in the residence halls of the university, where all sorts of wastes, including plastics and liquids, are produced. This arrangement is such that academic and day-to-day requirements are well-maintained within the campus.

2. Materials and Methods

Materials:

Waste measurement at Academic Institute (Brainware University) involved weighing scale 120 kg, shovels and forks, polythene bags for collection. Protective attire provided safety and per day estimation of waste production through field studies and key informant interview was carried out to analyze the management practice.

Waste Disposal Practice:

Waste disposal at university consists of systematic waste material collection followed by sorting and burning along with open pit dumping. The waste from various sources, including hostels, cafeterias, academic blocks, and health centres, is first collected and segregated based on its composition. Color-coded trash cans, assigned for effective segregation, facilitate this process. Valuable recyclable items such as plastics, paper, and metals are sorted and sold to authorized waste collection centres, creating revenue and enabling a circular economy. Organic refuse, which consists of food waste and garden waste, is typically separated for compost and agricultural use. But unwanted rubbish such as dead leaves and other biodegradable waste items that cannot be recycled is conducted under controlled burning in open trenches. It helps reduce the overall waste material, though it is environmentally harmful so far as air composition and carbon content are concerned. The university is also exploring other disposal alternatives, such as enhanced composting and production of bioenergy, to minimize the environmental impact of open pit burning. In addition, regular monitoring and feedback from waste staff help identify inefficiencies in the disposal process and take remedial measures to improve sustainability and prevent waste accumulation on campus.

Non-Hazardous Waste Management

Organic waste generated at Brainware University like food waste, garden cuttings, and degradable waste will be collected periodically and composted for landscaping purposes as well as for agricultural activities within the university. Composting is the process of source segregation of organic waste, which is collected and segregated from source-placed green bins placed strategically across the university campus. The collected waste shall be treated in composting machines or simple pit composting to produce nutrient-rich compost that is used to nourish the soil and maintain campus foliage. It not only reduces the amount of organic waste, but also promotes sustainable farming practices and reduces the use of chemical fertilizers.

Dry waste, such as plastics, paper, cardboard, and packaging, shall be sorted and recycled. Dry waste bins special in blue colour are used to accumulate dry waste for separation effectively from other waste. Dry waste thus gathered is then passed to designated recycling companies that are experts in material reuse and processing. Plastics are recycled to become reusable as granules or other reusable materials, while cardboard and paper are utilized to create pulp for reuse in manufacturing. The institution is also working on activities for sensitizing personnel and students about the importance of waste segregation and recycling, which calls on them to minimize use of plastics and properly dispose recyclable materials. The overall strategy for managing dry and organic wastes contributes towards putting an end to landfill dependence, allowing a circular economy, as well as sustainable cleaner campus lifestyle.

Sanitary Waste Disposal

Sanitary waste, including napkins, will be incinerated for safe and efficient disposal by controlled combustion.

Hazardous Waste Management:

Hazardous waste, including motor oil and batteries, will be recycled by registered firms through special collection points for safe disposal.

Plastic Waste Management:

Plastic Waste Management is done to reduce, recycle, and dispose of the plastics. Single-use plastic alternatives, waste segregation, and awareness programs are promoted by the university, as per Plastic Waste Management Rules, 2016.

E-Waste Management:

Certified recyclers will collect and dispose of the e-waste in a safe manner. Repair, reuse, and safe disposal of data form a part of the policy, as per E-Waste Management Rules, 2016.

Biomedical Waste Management

Biomedical waste shall be segregated and disposed of through incineration and autoclaving as per Biomedical Waste Management Rules, 2016.

Awareness and Training:

The university promotes sustainability through education and sensitization initiatives, soliciting suggestions for enhancement.

Result

Waste in University is generated from banking complexes, cultural complexes, mass transit terminal, dwelling, cafeterias, and health complexes. The sources of waste are analysed, and waste collection facilities and disposal facilities are categorized.

Non-Hazardous Waste:

Waste receptacles in University are also color-coded to facilitate efficient waste sorting with blue receptacles to store dry waste and green receptacles to store organic waste. Garden waste and food wastes are organic wastes that are composted for improved landscaping and agricultural soil enrichment. Dry wastes such as plastics and paper are sorted and treated by licensed recycling agencies to ensure sustainability.

Sanitary Waste:

Used sanitary napkins are put into special sanitary bins in the girls' toilets and burnt on-site by a designated incinerator. Burning is carried out at high temperatures to achieve complete combustion, reduce the volume of waste, and minimize environmental contamination. The maintenance of the incinerator is provided from time to time for smooth functioning and compliance with health and safety standards. The ash produced from the process is safely disposed of based on environmental rules. Students are enlightened through education programs on sanitary waste disposal to ensure hygiene and protect the environment. Sanitary waste management by the university properly ensures cleanliness and prevents health hazards on campus.

Hazardous Waste:

Hazardous materials like motor oil, batteries, paint, chemicals, and solvents are collected and sorted properly at the waste collection points around the campus. The waste is picked up and loaded in specialized bins to prevent contamination and safe handling. It is then transported to licensed recycling facilities, where it is treated properly and disposed of as mandated by law. Batteries and motor oil are typically treated for recovery and recycling, and paints and chemicals are neutralized to eliminate hazardous ingredients. Regular training of personnel and students ensures proper handling and disposal of harmful substances to eliminate environmental and health risks and promote sustainable waste management practice.

Plastic Waste:

The university shall have a unit for recycling plastics where plastic bottles will be made into granules to be utilized in the production of new plastics to reduce usage of virgin plastic. The remaining plastic waste items like disposable cutlery and packaging materials will be pulped for plastic recycling into other products. The scheme discourages plastic pollution and promotes a circular economy by plastic recycling of waste into useful products. The university also conducts awareness drives to motivate students and staff to reduce plastic usage and plastic waste segregation accordingly. Partnership with licensed recycling companies ensures that materials that have been processed are reused efficiently, minimizing environmental degradation.

E-Waste Management:

There is an e-waste storage area in the university where old electronics such as computers, printers, mobile phones, and other electronics are kept. The e-waste is sorted carefully to identify reusable components from hazardous materials. Occasionally, the e-waste is sent to licensed recyclers for environmentally sound and safe disposal. Valuable material like metal is recycled and reutilized, while hazardous materials are treated according to the guidelines of e-waste management. The university also raises awareness regarding e-waste disposal to encourage students and faculty to engage in recycling and reduce environmental deterioration as a result of electronic waste.

Biomedical Waste Management:

Biomedical waste from concerned departments such as laboratories and health centers is segregated and collected with extreme caution in color-coded bins to prevent any contamination. The waste includes syringes, gloves, pathological samples, and medical dressings. A licensed recycling company, with an MoU with the university, collects and disposes of the waste at periodic intervals as per Biomedical Waste Management Rules, 2016. The company is careful to treat infectious and hazardous wastes by incineration or autoclaving to minimize environmental and health risks. Regular monitoring and training of staff guarantee compliance with safety and environmental policies in disposal and handling of biomedical waste.

Schedule for Collection and Transfer of Waste:

Amount of generation of the waste is estimated through regular monitoring and documentation such that the university would be able to keep track of the trend of the waste and target the areas for improvement. The selling price for recyclable rubbish, such as plastic, paper, and metal, is priced at market levels in order to have better waste control. It is a mechanism through which the university can measure revenue potential from waste recycling, consolidate waste frequency collection, and reduce total cost of disposal. The findings on waste tracking further help in optimizing resources and implementing improved waste controls across the campus.

Cleanliness and Hygiene Initiatives:

The University promotes cleanliness and environmental awareness in a large manner via NSS, Green Campus Committee, and other student initiatives. The university organizes various activities such as cleanliness drives, competitions, rallies, and workshops to make the campus community aware of reducing, reusing, and recycling waste. The activities engage the campus community actively, developing a culture of environmental responsibility. The university also takes special care to ensure disposal of waste generated during college events, such as festivals, seminars, and sports meets, in an appropriate manner by making arrangements for dedicated waste bins and volunteers to handle collection and segregation of waste. Special focus is laid in reducing single-use plastics during events, and recyclable waste is collected and disposed of by licensed recycling companies. On top of that, awareness drives, poster displays, and interactive sessions are organized to inspire pro-environmental behavior among employees and students, maintaining the commitment of the university towards maintaining a clean and sustainable campus.

3. Conclusion:

Brainware University uses a thorough waste management system covering non-hazardous, sanitary, hazardous, plastic, e-waste, and biomedical waste among other waste kinds. The university guarantees effective waste management by means of sorting, recycling, and disposal techniques in addition to good monitoring

and cooperation with approved businesses. Cleanliness and hygiene projects also help to build sustainability by involving staff and students in environmental stewardship, waste reduction, and recycling for a campus that is better, greener.

4. Acknowledgement

We are sincerely thankful to the esteemed Chancellor of Brainware University, West Bengal, for graciously offering us the required facilities and space as well as for supporting as well as for supporting the seed grant project (BWU/PRJ/SMG/23-24/003).

Competing interest: The authors declare no conflicts of interest, with no financial or personal connections influencing their work.

Funding: This study has received financial support from Brainware University or funding.

Legend to Figures

Fig 1:



References

1. Andeobu, L., Wibowo, S., & Grandhi, S. (2021). A Systematic Review of E-Waste Generation and Environmental Management of Asia Pacific Countries. *International Journal of Environmental Research and Public Health*, 18(17), 9051. <https://doi.org/10.3390/ijerph18179051>
2. Awasthi, A. K., Cheela, V. R. S., D'Adamo, I., Iacovidou, E., Islam, M. R., Johnson, M., Miller, T. R., Parajuly, K., Parchomenko, A., Radhakrishnan, L., Zhao, M., Zhang, C., & Li, J. (2021). Zero waste approach towards a sustainable waste management. *Resources, Environment and Sustainability*, 3, 100014. <https://doi.org/10.1016/j.resenv.2021.100014>
3. Baba-Nalikant, M., Syed-Mohamad, S. M., Husin, M. H., Abdullah, N. A., Mohamad Saleh, M. S., & Abdul Rahim, A. (2023). A Zero-Waste Campus Framework: Perceptions and Practices of University Campus Community in Malaysia. *Recycling*, 8(1), 21. <https://doi.org/10.3390/recycling8010021>
4. Kumari, T., & Raghubanshi, A. S. (2023). Waste management practices in the developing nations: Challenges and opportunities. In *Waste Management and Resource Recycling in the Developing World* (pp. 773–797). Elsevier. <https://doi.org/10.1016/B978-0-323-90463-6.00017-8>
5. Moqbel, S. (2018). Solid Waste Management in Educational Institutions: The Case of The University of Jordan. *Environmental Research, Engineering and Management*, 74(2), 23–33. <https://doi.org/10.5755/j01.arem.74.2.21037>
6. Ojuri, O. O., Olowoselu, A. S., Akinrele, J., Ayodele, F. O., & Jayejeje, O. O. (2024). Sustainable integrated solid waste management for a university campus – A case study of the Federal University of Technology Akure (FUTA), Nigeria. *Waste Management Bulletin*, 2(2), 161–170. <https://doi.org/10.1016/j.wmb.2024.04.004>
7. Oliveira, M. C., & Proença, J. (2025). Sustainable Campus Operations in Higher Education Institutions: A Systematic Literature Review. *Sustainability*, 17(2), 607. <https://doi.org/10.3390/su17020607>
8. Rodríguez-Guerreiro, M.-J., Torrijos, V., & Soto, M. (2024). A Review of Waste Management in Higher Education Institutions: The Road to Zero Waste and Sustainability. *Environments*, 11(12), 293. <https://doi.org/10.3390/environments11120293>

21

Securing the Digital Future : Cyber Law, Data Governance, and Emerging Technologies

Sourav Sadhukhan¹, Promita Dey¹

Assistant Professor, Department of Computational Sciences
Brainware University, Kolkata

Abstract

Digital transformation reconfigured economies, industries, and societies at a pace never seen before, fueled by advances in AI, cloud computing, big data, and blockchain. Although these innovations make processes more efficient, they bring severe legal and regulatory issues. As digital technologies spread everywhere, strong cyber law regimes and efficient data governance policies are now more essential than ever.

Cyber law regulates online interactions, covering data privacy, cybercrime, intellectual property rights, and cross-border data transactions. Laws such as the GDPR (EU), CCPA (US), and India's Personal Data Protection Bill focus on data security and user rights. Jurisdictional disputes and uneven enforcement, however, are still significant challenges. Cybercrime, such as ransomware attacks, identity theft, and deepfake technology, also makes regulation more difficult, requiring greater international cooperation.

Data governance helps organizations manage data ethically, securely, and transparently. Strong frameworks reduce risks of data breaches, disinformation, and algorithmic bias—principles like accountability, data minimization, and security compliance inform data management. Google, Facebook, and Amazon are among the companies that are increasingly under the spotlight for their data practices, with more regulatory scrutiny and corporate accountability.

New technologies pose new regulatory issues. Blockchain increases transparency at the cost of decentralized control. Decision-making algorithms driven by AI, applied in finance, healthcare, and law enforcement, could entrench biases and diminish privacy. Quantum computing poses threats to cryptographic security, and policymakers are reconsidering cybersecurity approaches.

Real-life examples of these issues are presented in case studies. The Cambridge Analytica-Facebook data scandal unveiled privacy breaches, the Colonial Pipeline ransomware attack made clear cybersecurity exposures, and China's stringent data

localization regulations proved the worldwide consequences of regulatory policy. These instances raise calls for more rigorous compliance policies and ethical online habits.

As digitalization speeds up, cyber law and data governance need to adapt. Governments, organizations, and individuals need to work together to create globally harmonized regulations, ethical AI standards, and strong cybersecurity defenses. The future of digital governance will be determined by technological innovation, regulatory innovation, and joint efforts to create a secure, transparent, and ethically governed digital ecosystem.

1. Introduction

Digital transformation has emerged as a shaping force in the 21st century, impacting the operations of businesses, governments, and people. The growing dependence on data-driven decision-making, automation, and internet-enabled services has opened up new avenues for economic growth, efficiency, and innovation. Yet, these developments have also posed serious risks and legal issues, calling for strong cyber laws and efficient data governance frameworks.

Data, collected, processed, and analyzed on a scale never seen before, is at the heart of digital transformation. Governments, companies, and citizens create and exchange huge volumes of information every day. This has created a two-edged reality: on the one hand, data makes for more efficiency and customized experiences, but on the other, it subjects users to cyber attacks, misuse of data, and violations of privacy. Consequently, there is a pressing need for legal and regulatory mechanisms to control the digital environment and make sure that technological progress is aligned with ethical, legal, and security concerns.

The scope of this shift is enormous. By 2025, the datasphere worldwide is projected to expand to 175 zettabytes, from 33 zettabytes in 2018. Organizations across industries are heavily investing in digital infrastructure, with spending on digital transformation technologies likely to total \$2.8 trillion by 2025. This digitalisation process has accelerated fast in the COVID-19 era, where working remotely, telemedicine, and online shopping have become a part of everyday life.

2. Four-dimensional digital transformation comprises:

- **Technology Integration:** Leaning on advanced technology like AI, IoT, cloud computing, and big data.
- **Business Process Optimization:** Refurbishing processes and operations to capitalise on the power of the digital.
- **Customer Experience Enhancement:** Designing unbroken, digitalised experiences over touchpoints.
- **Cultural and Organizational Change:** Encouraging innovation and agility in businesses to adopt the digital mindset.

As digital transformation reconfigures industries and societies, the regulatory and legal environment needs to follow suit. This chapter offers a detailed examination

of the pillars of cyber law, data governance principles, and challenges and opportunities from new technologies. Through a consideration of international regulations, ethical challenges, and case studies, we seek to illustrate the dynamic nature of digital transformation and its implications for law and governance.

2. Cyber Law: Foundations and Frameworks

2.1 The Role of Cyber Law in Digital Transformation

Cyber law regulates cyberspace activities to provide legal safeguards against hacking, identity theft, phishing, and data breaches. As cybercrimes against businesses, governments, and individuals increase, cyber law has come to encompass:

- **Data Protection & Privacy** – GDPR and CCPA laws protect personal data collection, processing, and storage with consent and openness.
- **Cybercrime Prevention** – Laws criminalize hacking, phishing, ransomware, and identity theft.
- **Intellectual Property (IP) Rights** – Copyright statutes safeguard digital products, trademarks, and patents.
- **Digital Evidence & Forensics** – Legal standards provide for admissibility of digital evidence used in cybercrime investigations.

The economic cost of cybercrime highlights the need for strong cyber law frameworks. Recent estimates put the economic cost of cybercrime at about \$6 trillion per year, with this figure projected to increase to \$10.5 trillion by 2025. High-profile cases include the 2021 Colonial Pipeline ransomware attack that affected fuel supplies throughout the eastern United States and the SolarWinds breach that impacted thousands of organizations across the globe, including several U.S. government agencies.

Cyber law is an indispensable weapon in upholding the integrity of online transactions and protecting user rights in an era of hyper-connectivity. With digital transformation gathering pace, these legal frameworks need to find a balance between protection and innovation, facilitating technological progress while controlling attendant risks.

2.2 Global Cybersecurity Regulations

Governments and international organizations have set up legal systems to manage cyberspace. Major legislation includes:

- **General Data Protection Regulation (GDPR) (European Commission, 2018)** – An international data privacy standard imposing strict consent requirements, data subject rights (such as the right to be forgotten), breach notifications, and fines of up to 4% of worldwide revenue for non-compliance.
- **California Consumer Privacy Act (CCPA) (California Legislature, 2018)** – Entitles California residents to rights on their personal data, such as access, erasure, and opt-out of data sales. Affects large companies with particular financial and data requirements.

- **Personal Data Protection Bill (India)** – A bill which focuses on consent of the user, classification of data types, and localization of certain data.
- **Budapest Convention on Cybercrime (2001)** – The first global treaty on cybercrime, promoting legal harmonization and international cooperation against cybercrimes.
- **China's Cybersecurity Law (2017)** – Requires localization of data, security checks, and enhanced state control, where national security comes first in managing data.

Some other significant regulations are Japan's Act on Protection of Personal Information, Brazil's General Data Protection Law (LGPD), and South Korea's Personal Information Protection Act (PIPA). These different strategies are the result of distinct cultural, political, and economic agendas in data protection and cybersecurity.

These attempts notwithstanding, jurisdictional disputes and enforcement issues remain, particularly as cybercrimes increasingly span international borders.

2.3 Challenges in Cyber Law Enforcement

Although cyber laws establish legal safeguards, their enforcement is hindered by a number of challenges:

- **Jurisdictional Disputes** – Cybercrimes transcend borders, making prosecution difficult. Russian hackers' attacks on U.S. companies are a case in point, raising legal uncertainties, extradition challenges, and diplomatic tensions.
- **Emergent Technological Innovations** – The law lags behind AI, IoT, deepfakes, and quantum computing, tending to be antiquated before adoption.
- **Privacy vs. Security** – Governments urge cybersecurity measures, but invasive surveillance compromises civil liberties, and debates rage about encryption and law enforcement access.
- **Regulatory Discrepancies** – Contrasting global data legislation compels organizations to deal with conflicting compliance needs, e.g., GDPR's right to be forgotten versus record-keeping legislation elsewhere.
- **Resource Gaps** – Poor countries usually lack cybersecurity infrastructure and talent, leaving them vulnerable to cybercrime.

One prominent instance is the Facebook-Cambridge Analytica scandal, where personal data of users was leveraged for political campaigns, underscoring the importance of stronger compliance and regulation. This attack, impacting potentially 87 million users, demonstrated extensive vulnerabilities in data protection policies and led to worldwide regulatory focus on social media companies.

The case of NotPetya malware, which caused over \$10 billion in damages across multiple countries in 2017, further illustrates enforcement challenges. Despite evidence suggesting state sponsorship, holding the perpetrators accountable proved nearly impossible due to attribution difficulties and jurisdictional limitations.

3. Data Governance: Policies and Best Practices

Data governance is the administration of data availability, integrity, security, and compliance in an organization. It is very important to make sure that data-driven systems are ethical, dependable, and legally compliant.

3.1 Principles of Data Governance

Successful data governance is founded on:

- **Accountability** – Specifically outline data ownership, stewardship responsibilities, and audit processes so that there are consistent and reliable data management.
- **Data Minimization** – Restrict data collection to what is necessary, regularly reviewing and deleting unnecessary information to minimize risk and comply with regulations such as GDPR.
- **Transparency & Compliance** – Be transparent with privacy notices, use informed consent, and keep adequate records to be trusted by customers, partners, and regulators.
- **Security & Risk Management** – Have strong technical, administrative, and physical security controls in place, along with ongoing risk assessments and incident response plans.
- **Data Integrity & Quality** – Maintain accuracy, reliability, and consistency via validation rules, cleansing routines, and quality checks.
- **Privacy by Design** – Incorporate privacy safeguards into all phases of product development and system design, actively mitigating risks from the beginning.

3.2 Real-World Implementation

Businesses like Apple, Google, and Microsoft have stringent data governance standards, but problems remain. Google was fined €50 million by GDPR for transparency. Apple uses privacy as a selling point. Banks like JPMorgan Chase spend a lot on compliance. Hospitals like Mayo Clinic focus on protecting patient data. Major problems are cultural resistance, legacy systems, silos, and gaps in skills. Successful governance needs executive advocacy, cross-functional engagement, and ongoing learning. Companies that embrace governance as a strategic facilitator instead of a regulatory drag are more successful.

4. Emerging Trends in Cyber Law and Data Governance

The digital world is changing at speeds never seen before, with developing technologies pushing new legal paradigms and government models. While companies and administrations adopt artificial intelligence (AI), blockchain, and quantum computing, cyber laws and data governance paradigms are required to meet new security, ethical, and regulatory challenges that arise.

4.1 Artificial Intelligence and Legal Considerations

AI is increasingly applied in predictive analytics, facial recognition, automated decision-making, and cybersecurity protection. Its rapid adoption has also raised legal and ethical issues in the following areas:

- **Algorithmic Bias & Discrimination** – AI can perpetuate biases in hiring, lending, and law enforcement, as witnessed in Amazon's AI hiring tool preferring male candidates. The EU's AI Act places stringent regulation on high-risk applications.
- **Data Privacy Infringements** – Facial recognition and AI surveillance cause privacy issues. San Francisco outlawed facial recognition for government use based on civil rights issues.
- **Liability & Responsibility** – AI autonomy makes it harder to attribute blame for injury, e.g., self-driving car crashes. The EU has considered AI personhood, but it is contentious.
- **Explainability & Transparency** – "Black box" AI resists legal transparency. GDPR provides a narrow "right to explanation," while NIST is crafting AI explainability standards.
- **Intellectual Property Rights** – AI content makes copyright and patents more complicated. The U.S. Copyright Office demands human authorship, and patent offices deny AI-listed inventors.

♦ **Case Study: AI and Bias in Law Enforcement**

In the US, research indicated that the facial recognition software misidentified minorities at significantly higher proportions, questioning the use of AI-based policing and racism. The National Institute of Standards and Technology (NIST) tested 189 facial recognition algorithms and discovered that false positives were between 10 to 100 times more probable for African American and Asian faces than Caucasian faces. Upon these revelations, significant corporations such as IBM, Amazon, and Microsoft declared moratoriums on law enforcement agencies being sold facial recognition technology. It has prompted the revision of policy and regulatory consideration of AI ethics, with more than 20 U.S. cities implementing prohibitions or prohibitive regulations for the use of facial recognition technology by government organizations.

4.2 Blockchain and Data Integrity

Blockchain technology holds the promise of decentralization, transparency, and security and is thus a revolutionary power in financial services, supply chain management, and healthcare. But it poses legal and governance issues:

- **Smart Contract Regulation** – These automatic contracts bring enforceability issues. The UK sees them as legally enforceable, and some states have passed legislation, but legal disputes and unforeseen consequences are still to be addressed.
- **Decentralization vs. Compliance** – Public blockchains do not have a central authority, which goes against regulations such as GDPR's "right to be forgotten." Solutions such as zero-knowledge proofs are developing to fill the gap, but complete compliance remains challenging.
- **Cryptocurrency & Financial Crime** – DeFi increases exposures to fraud and money laundering. FATF now applies the "travel rule," while regulatory reactions differ, from Japan's licensing model to China's crypto ban.

- **Tokenization & Securities Law** – Tokenized assets could be treated as securities under securities laws such as the SEC's Howey Test, leaving uncertainty. Specialized regulatory models have been developed by some nations, such as Switzerland and Singapore.

♦ **Case Study: El Salvador's Bitcoin Adoption**

El Salvador became the world's first country to make Bitcoin legal tender in 2021, sparking concerns regarding financial stability, regulatory control, and international monetary policy. The government rolled out the "Chivo" digital wallet and placed 200+ Bitcoin ATMs, but attracted IMF censure regarding concerns such as consumer protection and money laundering. Adoption was subdued, with just 20% of merchants utilizing Bitcoin despite government inducements. Technical problems and public distrust further made implementation more difficult, pointing to the regulatory, financial, and social issues of incorporating blockchain into conventional monetary systems.

4.3 Quantum Computing and Cybersecurity Risks

Quantum computing can potentially decrypt current encryption techniques, threatening the very existence of conventional cybersecurity infrastructure. Governments and companies are currently investing in post-quantum cryptography to protect sensitive information. The main issues are:

- **Shattering Cryptographic Security** – Quantum computing algorithms such as Shor's would undermine RSA and ECC encryption, potentially risking financial transactions and confidential communications. A 4,000-qubit quantum computer may take hours to break 2048-bit RSA encryption.
- **Legal and Policy Preparedness** – Cybersecurity legislation is behind the curve from quantum risk. The U.S. has begun initiatives such as NIST's post-quantum cryptography standards, but industry-specific regulations are lacking.
- **Transition Challenges** – Quantum-resistant cryptography migration is intricate and demands considerable resources and diligent implementation in domains such as banking and energy.
- **Quantum Advantage** – Quantum computing also increases security via sophisticated threat detection, generation of cryptographic keys, and quantum key distribution (QKD) for secure communications.

♦ **Real-World Impact: The Quantum Threat to Encryption**

Governments are currently investing in post-quantum encryption research, with IBM and Google among the organizations competing to create quantum-resistant cryptographic technologies. The U.S. National Institute of Standards and Technology (NIST) has been undertaking a multi-year assessment of post-quantum cryptographic algorithms and recently chose the first batch of quantum-resistant encryption standards. China, on the other hand, has spent more than \$10 billion on a National Laboratory for Quantum Information Sciences. The EU's Quantum Flagship initiative has committed €1 billion to the development of quantum

technology, including quantum-resistant cryptography. This international competition is a reflection of the strategic value of quantum-resistant security for national and economic security.

4.4 Data Sovereignty and Cross-Border Regulations

As nations tighten the reins on data, data sovereignty legislation is coming into place to control cross-border data transfers. Countries such as China, Russia, and India are introducing policies that:

- **Mandate Domestic Data Storage** – Nations require domestic storage of citizen data. Russia's legislation commands local storage, whereas Brazil's LGPD permits transfers subject to strict conditions, incrementing compliance expenses for multinationals.
- **Restrict Foreign Access** – The Data Security Law of China constrains foreign processing of sensitive information, compelling companies to enter joint ventures or operate distinct local entities.
- **Increase Government Surveillance** – Critics believe data policies allow state surveillance. Russia's SORM system facilitates government surveillance, and some Gulf states prohibit VPNs to limit digital access.
- **Create Market Entry Barriers** – Data localization functions as trade barriers, raising computing costs by 30-60% and decreasing GDP by up to 1.7%.

♦ Case Study: China's Data Localization Laws

China's Cybersecurity and Personal Information Protection Legislation imposes stringent data localization, mandating that companies such as Apple host user data on servers that can be accessed by the government. Apple's Guizhou data center and LinkedIn's market withdrawal demonstrate the difficult decisions available to companies in restrictive markets. These trends also emphasize the widening gap between open digital ecosystems and stringent data sovereignty policies.

5. Conclusion: The Future of Cyber Law and Data Governance

Digital transformation powers economic growth and innovation but poses substantial risks such as cyberattacks, data abuse, and conflicts with regulation. Overcoming such challenges demands effective legal and governance frameworks. Harmonization of global cyber law is necessary to counter cross-border cybercrime, but current efforts such as the Budapest Convention require greater participation and enforcement. AI and data ethics need to shift from voluntary standards to binding rules to counter bias, discrimination, and unethical monitoring. Initiatives such as the OECD AI Principles and UNESCO's AI ethics guidelines are a starting point, but implementation is uneven.

Governments need to address new emerging cyber threats ahead of time, most importantly, quantum computing-based risks. It is essential to invest in post-quantum cryptography and secure supply chains, as the SolarWinds hack uncovered vulnerabilities across interconnected systems. Security for critical infrastructure needs multifaceted measures to stay ahead of changing threats. Balancing technological advancement and data privacy is another challenge.

Privacy-preserving technologies such as homomorphic encryption and federated learning enable safe data analysis while maintaining user privacy. Regulatory sandboxes allow for controlled experimentation, which ensures compliance without hindering technological innovation.

No less significant is the promotion of digital literacy and awareness. Learning about cybersecurity, data privacy, and digital rights enables citizens to make sound choices and actively contribute to policy formulation. Digital governance will increasingly become the driving factor in framing economies and societies of the future in the years ahead, calling for collaborative action, ethical policy design, and pro-active technological defenses.

References

1. **European Commission. (2018).** *General Data Protection Regulation (GDPR)*. Retrieved from <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32016R0679>
2. **California Legislature. (2018).** *California Consumer Privacy Act (CCPA)*. Office of the Attorney General. Retrieved from <https://oag.ca.gov/privacy/ccpa>
3. **World Economic Forum. (2021).** *The Future of AI Regulation*. Retrieved from <https://www.weforum.org>
4. **National Institute of Standards and Technology (NIST). (2020).** *Cybersecurity Framework*. Retrieved from <https://www.nist.gov/cyberframework>
5. **United Nations. (2021).** *Cybersecurity and Human Rights: Challenges in the Digital Era*. Retrieved from <https://www.un.org>
6. **Accenture. (2023).** *Digital Transformation Index: Global Trends and Industry Benchmarks*. Retrieved from <https://www.accenture.com/insights>
7. **International Telecommunication Union. (2022).** *Global Cybersecurity Index*. Retrieved from <https://www.itu.int/gci>
8. **PwC. (2022).** *Digital Trust Insights Survey: Navigating the Digital Risk Landscape*. Retrieved from <https://www.pwc.com/digitaltrustinsights>
9. **Financial Action Task Force (FATF). (2022).** *Updated Guidance for a Risk-Based Approach to Virtual Assets and Virtual Asset Service Providers*. Retrieved from <https://www.fatf-gafi.org>

22

Cyber Law and Data Governance in the Age of Digital Transformation

¹Ms. Anudeepa Gon, ²Dr. Kaushik Chanda, ¹Mr. Shubhadip Nandi, ¹Mr. Soumya Roy

¹Assistant Professor, Department of Computational Sciences, Brainware University, India

²Associate Professor, Department of Computational Sciences, Brainware University, India

Abstract

Digital transformation is reshaping industries, governments, and societies, fundamentally altering how data is generated, stored, processed, and shared. As organizations embrace emerging technologies such as artificial intelligence (AI), cloud computing, block chain, and the Internet of Things (IoT), they face new challenges related to cyber security, legal compliance, and data governance. Cyber law and data governance are critical components in managing these challenges, ensuring that digital innovations are implemented securely, ethically, and in accordance with regulatory frameworks.

Cyber law encompasses legal principles and regulations that govern digital activities, protecting against cybercrime, data breaches, intellectual property violations, and unauthorized access to sensitive information. As cyber threats continue to evolve, governments and regulatory bodies worldwide have introduced stringent legal measures to address cyber security risks. Regulations such as the General Data Protection Regulation (GDPR), the California Consumer Privacy Act (CCPA), and other national and international laws set legal standards for data protection, privacy rights, and compliance obligations for organizations handling personal and sensitive data. Compliance with these laws is essential to avoid legal liabilities, financial penalties, and reputational damage.

Data governance, on the other hand, involves establishing policies, processes, and frameworks to ensure data accuracy, security, privacy, and ethical use. Effective data governance frameworks help organizations manage data integrity, enhance decision-making, and mitigate risks associated with poor data management. Key elements of data governance include data classification, access controls, data lifecycle management, and accountability structures. Organizations must align their data governance strategies with regulatory requirements to ensure compliance and safeguard customer trust.

The convergence of cyber law and data governance is vital for organizations navigating digital transformation. As data-driven decision-making becomes central to business operations, organizations must strike a balance between leveraging

data for innovation and complying with legal and ethical obligations. This requires proactive risk management, continuous monitoring of evolving cyber threats, and alignment with global regulatory frameworks. Additionally, organizations must address challenges such as cross-border data transfers, jurisdictional conflicts, and the increasing use of AI-driven automation, which raises ethical and legal concerns related to bias, transparency, and accountability.

Emerging trends in cyber security and data governance are shaping the future of digital transformation. The adoption of block chain for secure transactions, zero-trust security models for enhanced protection, and AI-driven compliance automation are redefining how organizations safeguard data. Moreover, the growing emphasis on digital ethics and corporate social responsibility is pushing organizations to adopt transparent and responsible data governance practices.

Keywords: Digital Transformation, Cyber Law, Data Governance, Cyber security, Regulatory Compliance, Data Privacy, Risk Management

1. Introduction

The rapid advancement of digital technologies has significantly transformed industries, economies, and societies. Organizations across various sectors are embracing digital transformation to enhance efficiency, drive innovation, and improve customer experiences. However, as businesses increasingly rely on digital platforms, cloud computing, artificial intelligence (AI), and big data analytics, they are exposed to new challenges and risks related to cyber security, legal compliance, and data governance. Cyber threats, data breaches, and privacy concerns have intensified the need for robust legal frameworks and governance structures to protect sensitive information and ensure responsible digital practices.

Cyber law plays a crucial role in regulating digital interactions, addressing cybercrime, and ensuring compliance with data protection regulations. Laws such as the General Data Protection Regulation (GDPR), the California Consumer Privacy Act (CCPA), and sector-specific regulations establish guidelines for data security, privacy rights, and ethical data usage. Non-compliance with these legal requirements can lead to severe penalties, financial losses, and reputational damage.

Simultaneously, data governance is essential for managing data integrity, security, and ethical use. Organizations must implement policies and frameworks to oversee data access, classification, and lifecycle management while aligning with regulatory mandates. Effective data governance not only strengthens cybersecurity but also enhances decision-making and business continuity.

The convergence of cyber law and data governance is critical for organizations navigating the complexities of digital transformation. This paper explores the intersection of these domains, highlighting key legal considerations, governance strategies, and emerging trends that shape the future of secure and compliant digital ecosystems. Understanding the role of cyber law and data governance will enable organizations to mitigate risks, build digital trust, and maximize the benefits of technological advancements in a rapidly evolving digital landscape.

2. Background

2.1 Evolution of Digital Technologies

- Advancements in the internet, cloud computing, artificial intelligence (AI), big data, blockchain, and the Internet of Things (IoT) have transformed industries.
- Organizations leverage these technologies for efficiency, innovation, and customer engagement.

2.2 Emergence of Cyber Law

- Cyber law was developed to regulate digital activities, address cybercrime, and protect intellectual property.
- Early laws focused on electronic communications, while modern regulations emphasize data protection, cybersecurity, and privacy rights.
- Examples include the **General Data Protection Regulation (GDPR)** in the EU and the **California Consumer Privacy Act (CCPA)** in the US.

2.3 Need for Data Governance

- Organizations generate vast amounts of data, requiring structured management to ensure integrity, security, and ethical usage.
- Data governance establishes policies and frameworks for data classification, storage, access control, and compliance.

2.3 Intersection of Cyber Law and Data Governance

- Compliance with cyber laws requires strong data governance policies to ensure data privacy, security, and ethical use.
- Issues such as cross-border data transfers, jurisdictional conflicts, and evolving cyber threats necessitate an integrated approach.

2.4 Challenges in the Digital Era

- Increasing cyber threats, data breaches, and sophisticated cyber attacks require organizations to adopt proactive security measures.
- Legal and regulatory variations across different countries create complexities in compliance.
- AI-driven automation and data analytics introduce ethical concerns, including bias, transparency, and algorithmic accountability.

2.5 Importance of Compliance and Risk Management

- Businesses must align with legal frameworks to avoid penalties, reputational damage, and operational disruptions.
- Implementing cyber security best practices and data governance strategies enhances trust and resilience in digital operations.

2.6 Future Trends and Considerations

- Growing emphasis on **block chain** for secure data transactions and **zero-trust security** models for enhanced protection.
- Increased global collaboration in establishing unified data protection laws and cyber security standards.

- The role of corporate social responsibility (CSR) in promoting transparent and ethical data governance. Digital transformation has reshaped industries by integrating technology into all aspects of business operations. However, it also raises critical concerns in **cyber law and data governance**, influencing various real-life applications across sectors. Below are key impacts in different domains:

3. Digital Transformation: Cyber Law and Data Governance and Impact of different real life application

Digital transformation has reshaped industries by integrating technology into all aspects of business operations. However, it also raises critical concerns in cyber law and data governance, influencing various real-life applications across sectors. Below are key impacts in different domains:

3.1. Financial Services (Banking & FinTech)

Impact:

- **Regulatory Compliance:** Digital banking and cryptocurrency platforms must comply with laws like GDPR (EU), CCPA (California), and AML (Anti-Money Laundering) regulations.
- **Cybersecurity Threats:** Increased risk of cyberattacks, leading to legal consequences for data breaches.
- **Consumer Data Protection:** Stricter KYC (Know Your Customer) and fraud detection mechanisms.

Real-life Example:

- The **Equifax Data Breach (2017)** exposed sensitive data of 147 million users, leading to a \$700 million settlement.

3.2. Healthcare (Digital Health & Telemedicine)

Impact:

- **Data Privacy Regulations:** Laws like HIPAA (USA) and GDPR mandate strict protection of patient data.
- **Cybersecurity Concerns:** Vulnerabilities in digital health records (EHR) could lead to identity theft or fraud.
- **AI & Ethical Concerns:** AI-based diagnostics and robotic surgeries must comply with legal and ethical guidelines.

Real-life Example:

- The **WannaCry Ransomware Attack (2017)** crippled NHS (UK) hospital systems, disrupting healthcare services.

3.3. E-Commerce & Digital Marketplaces

Impact:

- **Consumer Protection Laws:** Platforms must ensure compliance with data protection regulations (GDPR, CPRA).
- **Cross-Border Data Transfer:** Companies handling global transactions face complex compliance challenges.
- **Cyber Frauds & Digital Payments:** Laws combat fraudulent transactions, chargebacks, and unauthorized access.

Real-life Example:

- **Amazon & GDPR Fines:** Amazon was fined €746 million (2021) for improper data processing practices.

3.4. Smart Cities & IoT (Internet of Things)**Impact:**

Public Surveillance & Privacy: Laws regulate the use of facial recognition and AI-driven monitoring.

Cybersecurity Risks: Hacked IoT devices can compromise national security.

Data Ownership & Usage: Cities must ensure ethical use of citizen data while implementing smart infrastructure.

Real-life Example:

- **San Francisco Facial Recognition Ban (2019)** – The first U.S. city to ban police use of facial recognition due to privacy concerns.

3.5. Social Media & Digital Platforms**Impact:**

- **Misinformation & Legal Liability:** Platforms are legally bound to remove harmful content (e.g., Section 230 debates in the U.S.).
- **User Data Monetization:** Companies like Meta (Facebook) face scrutiny for using personal data without proper consent.
- **Cyberbullying & Harassment Laws:** Legal measures protect users against online abuse and cyber threats.

Real-life Example:

- **Cambridge Analytica Scandal (2018):** Facebook faced a \$5 billion fine for misusing user data in political campaigns. Cyber law and data governance are crucial in the digital age, ensuring legal compliance, data security, and ethical technology use. Governments worldwide continue to refine regulations to mitigate risks while supporting innovation.

4. Models Applied in Cyber Law for Digital Transformation

I. GDPR Compliance Model – Ensures data privacy, user rights, and strict data protection laws in the EU.

II. NIST Cybersecurity Framework (CSF) – U.S.-based model for identifying, protecting, detecting, responding, and recovering from cyber threats.

III. COBIT (Control Objectives for Information and Related Technologies) – IT governance model ensuring risk management and compliance with financial regulations like SOX.

IV. ISO/IEC 27001 (ISMS) – International standard for information security, helping businesses secure sensitive data.

V. Zero Trust Security Model – Requires strict authentication and continuous verification to prevent unauthorized access.

VI. Data Governance Maturity Model (DGMM) – Framework for managing data security, accuracy, and compliance with laws like GDPR and CCPA.

VII. AI & Ethical Compliance Models – Ensures fairness, transparency, and accountability in AI-driven decisions, aligning with emerging AI laws.

5. Challenges in Cyber Law and Data Governance in Digital Transformation

Regulatory Compliance Complexity

- Different countries have varying data protection laws (GDPR, CCPA, HIPAA, etc.).
- Businesses must adapt to multiple legal frameworks, increasing compliance costs.

Data Privacy & Protection

- Unauthorized data collection and breaches risk legal action.
- Ensuring transparency and consent in data usage is challenging.

Cyber security Threats

- Rising cyber attacks (ransomware, phishing, data breaches) threaten compliance.
- Businesses must implement robust security frameworks like NIST and Zero Trust.

Cross-Border Data Transfers

- Laws like GDPR restrict data transfers across regions.
- Companies struggle with legal approvals and secure international data exchange.

AI & Ethical Data Use

- AI decision-making may lead to bias and legal issues.
- Lack of clear AI governance frameworks poses ethical concerns.

User Rights & Digital Sovereignty

- Individuals demand more control over their data (right to be forgotten, data portability).
- Governments impose strict regulations to protect national digital assets.

Legal Enforcement & Jurisdiction Issues

- Cybercrimes often involve multiple countries, making enforcement difficult.
- Lack of global coordination in cyber law complicates prosecution.

Cloud & IoT Security Risks

- Data stored on cloud services may face jurisdictional legal issues.
- IoT devices increase vulnerabilities, requiring stricter governance policies.

Cost of Compliance & Implementation

- Small and medium businesses struggle with compliance costs.
- Maintaining cyber security and legal compliance requires ongoing investment.

Lack of Awareness & Skilled Workforce

- Many organizations lack expertise in cyber law and governance.
- Training and awareness programs are needed to ensure compliance.

6. Proposed System and key components of Cyber Law and Data Governance

A. Legal Compliance and Monitoring Engine

- AI-driven legal compliance checker for **real-time law updates**.
- Automated tracking of data **privacy laws** and **cyber security regulations**.
- Integration with legal databases for regulatory intelligence.

B. Data Governance Framework

- Data Classification Engine: Categorizes data based on sensitivity and access levels.
- Data Lifecycle Management: Automates data retention and disposal as per regulations.
- Access Control & Encryption: Ensures secure data sharing and storage.

C. Cyber security Infrastructure

- Threat Intelligence Module: AI-based detection of cyber threats and vulnerabilities.
- Incident Response System: Automated alerts and remediation mechanisms.
- Zero-Trust Architecture: Identity-based security controls and multi-factor authentication.

D. Digital Forensics & Audit System

- Log Analysis & Anomaly Detection for cybercrime investigations.
- Blockchain-based Audit Trails for immutable record-keeping.
- Automated Evidence Collection for legal proceedings.

E. Compliance Reporting & Analytics

- Automated Risk Assessments for compliance gaps.
- Real-time Dashboards for regulators and organizations.
- Regulatory Reporting Automation to avoid penalties and legal actions.

6.1. Implementation Strategy

a. Assessment Phase – Analyze existing laws, frameworks, and risks.

b. System Development – Build AI, blockchain, and cybersecurity modules.

c. Integration – Connect the system with legal databases, corporate IT systems, and regulatory bodies.

d. Testing & Validation – Conduct legal, security, and compliance tests.

e. Deployment & Training – Roll out the system and train stakeholders.

6.2 Implementation Strategy

Phase	Key Actions	Expected Outcomes
Phase 1: Assessment & Policy Formulation	Conduct audits, consult stakeholders, draft new policies	Comprehensive cyber law framework
Phase 2: Infrastructure Development	Establish regulatory bodies, upgrade cybersecurity infrastructure	Operational legal & tech systems
Phase 3: Technology Integration	Deploy AI, blockchain, zero-trust security	Enhanced enforcement & protection
Phase 4: Public-Private Partnerships	Engage industry players, create compliance incentives	Strengthened ecosystem resilience
Phase 5: International Collaboration	Align with global standards, sign agreements	Seamless cross-border governance

7. Future Research Directions in Cyber Law and Data Governance Transformation

- **AI & Machine Learning for Compliance** – Investigate AI-driven legal interpretation, automated audits, and predictive regulatory analytics.
- **Blockchain for Data Integrity & Compliance** – Explore blockchain for smart contracts, decentralized governance, and immutable legal evidence storage.
- **Privacy-Enhancing Technologies (PETs)** – Research federated learning, differential privacy, and homomorphic encryption to enhance data security.
- **Global Cyber Law Harmonization** – Study cross-border regulatory alignment and interoperability of data protection frameworks like GDPR and CCPA.
- **Quantum Computing & Cyber Law** – Assess the impact of quantum threats on cryptographic laws and explore quantum-secure legal frameworks.
- **Cybercrime Prevention & Digital Forensics** – Develop AI-powered forensic tools to counter deepfake crimes, AI-generated attacks, and cyber fraud.
- **Ethics & Human Rights in Cyber Governance** – Examine AI ethics, digital rights, and the impact of mass surveillance on personal privacy.
- **Regulatory Sandboxes & Policy Experimentation** – Research controlled environments for testing new cyber laws and AI-driven regulatory enforcement.

8. Conclusion

Cyber Law and Data Governance Transformation is crucial in ensuring legal compliance, data security, and ethical digital governance. With evolving cyber threats and regulatory complexities, future advancements in **AI, block chain, privacy-enhancing technologies, and quantum security** will play a vital role in shaping robust legal frameworks. Global collaboration, ethical considerations, and adaptive policies will be essential in navigating the digital landscape effectively. Ongoing research must focus on **enhancing cyber security, automating compliance, and harmonizing international regulations** to create a secure and legally sound digital ecosystem.

References

1. P. Page, P. Knowles, and R. Mitwicki, "Distributed Governance: A Principal-Agent Approach to Data Governance -- Part 1 Background & Core Definitions," arXiv preprint arXiv:2308.07280, Aug. 2023. [Online]. Available: <https://arxiv.org/abs/2308.07280>.
2. S. R. Julakanti, N. S. K. Sattiraju, and R. Julakanti, "Data Protection through Governance Frameworks," arXiv preprint arXiv:2502.10404, Jan. 2025. [Online]. Available: <https://arxiv.org/abs/2502.10404>.

3. K. L. Tan, C. H. Chi, and K. Y. Lam, "Analysis of Digital Sovereignty and Identity: From Digitization to Digitalization," arXiv preprint arXiv:2202.10069, Feb. 2022. [Online]. Available: <https://arxiv.org/abs/2202.10069>.
4. A. Haque, A. B. M. A. AlIslam, and M. A. Rahman, "GDPR-Compliant Blockchains—A Systematic Literature Review," IEEE Access, vol. 8, pp. 111654-111675, 2020. [Online]. Available: <https://ieeexplore.ieee.org/document/9115931>.
5. M. Singh, S. Rajan, and S. K. Peddoju, "A Survey of Cybersecurity Frameworks for Digital Transformation," IEEE Access, vol. 9, pp. 132166-132194, 2021. [Online]. Available: <https://ieeexplore.ieee.org/document/9566721>.
6. S. Pearson, "Privacy, Security and Trust in Cloud Computing," in Privacy and Security for Cloud Computing, S. Pearson and G. Yee, Eds. London: Springer, 2013, pp. 3-42. [Online]. Available: https://link.springer.com/chapter/10.1007/978-1-4471-4189-1_1
7. A. Cavoukian, "Privacy by Design: The 7 Foundational Principles," Information and Privacy Commissioner of Ontario, Canada, 2009. [Online]. Available: <https://www.ipc.on.ca/wp-content/uploads/resources/7foundationalprinciples.pdf>. M. Hildebrandt, "Law as Information in the Era of Data-Driven Agency," The Modern Law Review, vol. 79, no. 1, pp. 1-30, 2016. [Online]. Available: <https://onlinelibrary.wiley.com/doi/10.1111/1468-2230.12165>.
8. C. C. Wood, "Data Protection: Governance, Risk Management, and Compliance," in Information Security Management Handbook, 6th ed., H. F. Tipton and M. Krause, Eds. Boca Raton, FL: Auerbach Publications, 2007, pp. 491-508. [Online]. Available: <https://www.taylorfrancis.com/chapters/mono/10.1201/9781420067081-40/data-protection-governance-risk-management-compliance-charles-wood>.
9. M. E. Porter and J. E. Heppelmann, "How Smart, Connected Products Are Transforming Companies," Harvard Business Review, vol. 93, no. 10, pp. 96-114, Oct. 2015. [Online]. Available: <https://hbr.org/2015/10/how-smart-connected-products-are-transforming-companies>.
10. M. L. Markus and M. Rowe, "Digital Transformation in Practice: What Are the Four Domains of Digital Transformation?," in Proceedings of the 50th Hawaii International Conference on System Sciences, 2017, pp. 4917-4926. [Online]. Available: <https://scholarspace.manoa.hawaii.edu/bitstream/10125/41789/1/paper0612.pdf>.
11. R. K. Yin, Case Study Research and Applications: Design and Methods, 6th ed. Thousand Oaks, CA: SAGE Publications, 2018. S. Alter, "Work System Theory: Overview of Core Concepts, Extensions, and Challenges for the Future," Journal of the Association for Information Systems, vol. 14, no. 2, pp. 72-121, Feb. 2013. [Online]. Available: <https://aisel.aisnet.org/jais/vol14/iss2/1>.
12. G. S. Day and P. J. H. Schoemaker, "Driving the Digital: How to Transform Your Organization," Harvard Business Review Press, 2019. S. L. Jarvenpaa and B. Ives, "The Global Network Organization of the Future: Information Management Opportunities and Challenges," Journal of Management Information Systems, vol. 10, no. 4, pp. 25-57, 1994. [Online]. Available: <https://www.tandfonline.com/doi/abs/10.1080/07421222.1994.11518002>.

-
13. A. McAfee and E. Brynjolfsson, *"Big Data: The Management Revolution,"* Harvard Business Review, vol. 90, no. 10, pp. 60-68, Oct. 2012. [Online]. Available: <https://hbr.org/2012/10/big-data-the-management-revolution>.
 14. G. G. G. Van der Pijl, *"Digital Transformation and Its Impact on Cybersecurity,"* Journal of Strategic Security, vol. 13, no. 4, pp. 1-16, 2020. [Online]. Available: <https://scholarcommons.usf.edu/jss/vol13/iss4/1>.

23

Pertinence of Customary Ethics in Compliance to the Human Rights Law Under the Constitution of India at Workplace

Avimannu Das

Research Scholar, School of Law, Brainware University, Kolkata

Abstract

Part 3 of the Constitution of India enlists certain fundamental rights that is considered to be one of the most essence as well as an integral mechanism, in ensuring a good governance to the Indian society.

The inclusion of the segment of the fundamental rights has been clearly interpreted by a number of Jurists, in the subject of Jurisprudence, where there have been a demonstration of heterogeneous notions and thoughts, where the interpretation of law have been focused and highlighted in a much broader aspect.

It has been held to the fact that India is a categorical companion towards the judicial system that were followed by the Anglo Saxons. It has also been held to the fact that the practice was also an adoptive mechanism towards the British empire, during the reign of Her Majesty Queen Victoria, in the era of 1730's, when the empire have adopted some of nations and have taken it in the form of a collective of commonwealth. That the sub theme of the paper, would be highlighting the fundamental rights, the constitutional mechanism and last but not the least the customs and the moral habits that is to be preserved by a social being, when he is the sole figurehead of making his movement a step forward towards the advancement. Traditional ethics are regarded as the spinal cord, that is the plinth, while shattering the society through specific advancements, by bridging up the stagnant at one position. In the contemporary period, its seen that there has been a wider multiplication of the community, where a number of multiple human characters are performing their role into societal progress, there has also been a break of the chain, where the philosophy of the human mindset is getting relocated, by breaking all it's cultural, psychological and linguistic barriers. There has also been a wider demand of the societal being. People are being united in all fields, simultaneously, there has also been an emergence of new legislation through it's own legislative frameworks that is acting as a supreme guardian of the society, with an aim of healing from any kind of civil action tantamount to brutality, hamper, act of barbarity, and last but not

the least a serious threat to peace. Therefore, the customary norms, the traditional ethos, and the contemporary legislation would be given a much more emphasis on it in the ongoing exploratory work.

Keywords : Ethics, Customs, Human Rights

1. INTRODUCTION

Human Rights law is considered to be one of the most integral phenomena, in defending the natural rights of a human, when a person is making a footstep towards this planet, as it's regarded that a human is a living being, who is holding a good prudence in all spheres of the society, the dignity and the individuality held by him, is considered under the category of a person, the command possessed in him, is the feature of administering the society, he is also a knowledgeable man, with a well acquaintance of norms and regulations, and also the code of conduct possessed by him.

Looking on to the synonym of the frame of the code of conduct, it can be traced out that the code of conduct have got it's emergence from the traditional ethics, which is holding a parallel meaning of the customary norms that is acquired by an individual at it's initial footstep to the beautiful planet. That since from the very beginning of it's innings, humans are being groomed on how to hold a dignified rank in the civil society, that is having a massive widespread culture and habits from the North Pole to the South Pole.

That Conventional ethics are none other than a system that is well chained by the provisions that has been established under the rule of law and that is to be taken with a well and with a due diligence for further eradication of any kind of complexities in the upcoming times. That the Conventional or the customary ethics are simply regarded to be a synonym with the human rights law that is an uncodified law, which is standing on it's own, having a major back up with the Constitution of India, where a vital specification of the moral principles has been given a major impact and that is to be well possessed further in the upcoming times. That the full chapter would be highlighting the relevancy of the traditional norms at the workplaces in India in compliance to the human rights law, where partial focus of the Indian Constitution has also been given.

2. LITERATURE RIEVIEW :

As it have been regarded to the fact of the concerned issue that human rights are consider worthy as an integral phenomena, in regard to the safeguard of the natural rights that have been guaranteed by the Constitution of India, where there have also been a compliance with the conventional ethics and the norms. Conventional norms are nothing but the routine tendency that are being adopted by a human being, when he is at the very beginning of his innings.

Thus, several scholars, have pointed out their philosophical thoughts and ideas of the above concerned facts in various frame of their own thoughtful, projecting the contemporary issue in a big deal.

The chapter on human rights in accordance to the Constitutional provision has been prudentially expounded on various segment of law. A number of researchers has propounded several juristic ingredients while exploring upon the work of Fundamental rights that has been guaranteed by the Indian Constitution.

3. MATERIALS AND METHODS :

The researcher while conducting the research work has done a comparative research work. Basically, the research work has been conducted through reference of certain periodicals, electronic books, journals, electronic magazines, and some other electronic data through certain specified websites.

Here, the researcher has explored upon the subject of the Pertinence of the Human Rights law, in compliance to the traditional ethics under the Constitution of India at workplaces,. Here, the researcher have taken references from eminent jurists, and also referred certain case laws from various law point, in interpreting the subject.

While conducting the research work, the researcher has referred secondary sources of data and that too there has been a combination of the different methodologies, those were certainly competent enough in several fields of Jurisprudence.

From the above study it has been traced out that the above researchers basically showed their prudence in the wider knowledge and the interpretation of the rule of the law, but among them none had mention about the rights of an individual that would be a mechanism of good governance in the society. As per comparison to the above research work, here, the researcher would be exploring upon the relevancy of the study on the human rights law that is having a vital and also a broader relation with the traditional ethics, which is having a stand on it's conventional ethics and norms, beneath the Constitution of India, that the researcher, while going for a deeper exploration has also given a major throwing of the light of the human rights law and practices at it's workplaces too. .

4. A BRIEF FACTUAL ANALYSIS UPON THE HUMAN RIGHTS LAW AND IT'S PROVISIONS AND APPLICABILITY, IN A ROUTINE OF HUMAN LIFE

Broadly defined, human rights are those rights that are regarded as the fundamental rights as well as inalienable rights that is certainly an essence for life as a human being.

Human rights are always possessed by each and every individual in the society, irrespective on the grounds of an individual's race, religion, sex, etc.

Eminent jurists like A.V. Dicey, Jean Jacques Rosseau, John Austin, and Roscoe Pound stated in their debate that Human Rights are those rights that are always inherent in one's nature, without which it is impossible for an individual to survive as a human being. Human rights are a basic freedom that certainly allow an individual for its further progress in the upcoming future (*Paranjape, (2016) "Study on Jurisprudence and Legal theory."* 8th edition, Central Law Agency, Allahabad, India.)

A study from Sandersons and Morgan has been traced that though these rights are not being created through any legislative mechanism but it resembles itself as

a natural right. Any civilized nation can make it an authentication through their recognition. The study also pointed out that these rights cannot be a subject in the procedure of correction and amendment even. It should be a legal obligation for an individual in safeguarding the human rights that is a certain inclusion of the legal duty to show its respect as well as also a tribute to the nation. (Upadhyay (2016), "Administrative Law.", 10th edition, Central Law Agency, Allahabad.)

In the contemporary times it has been marked that the members of the United Nations have taken up in committing to preserve, safeguard, and defend the rights of the human being in accordance to the procedure that has been framed by the law for assuring of a good governance to the society. International concern on Human Rights has been enshrined in the charter of the United Nations and that has been taken into consideration as a contemporary innovation, though it is said that there has not been any sort of legislative mechanism in regard to Human Rights but still there has been certain international covenants that acts as a major tool of implementation of these rights for practice in one's day to day life. (Paranjape, (2016) "Study on Jurisprudence and Legal theory." 8th edition, Central Law Agency, Allahabad, India.)

The International Covenant on Civil and Political Rights and the International Covenant on Economic Social and Cultural Rights are the two major provisional tools that acts as a medium of practice of a good governance in the society as a whole, in company to the charter of the United Nations and also the United Nations Declaration of Human Rights.

It is said that since the human rights are not created by any legislation but they are resembled through the natural rights. It is a certain obligation for the United Nations (UN) in giving them a specified recognition, in concern with the facts that the subject of human rights do not have a procedure of amendment and alteration ((Kapoor SK (2017), "Public International Law and Human Rights." 21st edition, Central Law Agency, Allahabad.).

The members of the United Nations have dedicated themselves in regard to promotion and respect for and also an observance of the human rights as well as also their elementary prerogative. The international concern with the human rights has been enshrined in the United Nations is not a contemporary alteration. That it has been widely remarked that a person whose rights has been violated and has been then conceived, it is regarded of not only of those personally and has been directly aggrieved but of everyone.

That the legal principle "*ignorantia juris non excusat.*" has been derived from the Roman law, where it stated that a person who is contravening the legal provisions implemented by the state shall be liable for penalty, even if found that the person has no knowledge to it. In one of the statement of Thomas Jefferson (eminent jurist), it has been pointed out that the ignorance of law is an obvious accountable for a person, who contravenes it while moving beyond (Kapoor SK (2017), "Public International Law and Human Rights." 21st edition, Central Law Agency, Allahabad.).

In the contemporary times, literally a number of legal books both federally and also on a state level takes into consideration that every individual has a well knowledge of law. Based on the doctrine of the rule of lenity, it has been stated that the courts should be obliged in interpreting the laws that are ambiguous in nature and often possessing a complex meaning, be it criminal, civil as well as commercial matter, in favour of both the parties, whether on behalf of the state or on behalf of the defence.

Over the years, the Supreme Court of the United States often spoke upon the issue of the ignorance of the law. Pointing upon the case of *Barlow vs. United States*, in the year 1833, the fact held that there has been a seizure of 85 barrels of sugar, which the accused petitioner, Joseph Barlow was in an attempt to export under a falsified denomination of the sugars that are well refined, whereas, on the other side, the petitioner contended that there was no such falsified denomination, that the court did not take into consideration of the statement of the accused petitioner, rather presumed that the sugar he was exporting to some other part of the city was unrefined and he was in an intention of committing certain fraud action through forged documents that was a specific consequence of forfeiting the Government. The question that came up was whether ignorance of law in forfeiture case can be excusable or non excusable? On the other side, the study of jurisprudence concluded their statements on the above questions in different way with the same law point both in criminal as well as civil matter, held that “*ignorantia juris non excusat.*” i.e. Ignorance of law is certainly an accountable for a person, who willfully or unwillingly contravening the statutory obligations along with its specified provisions defined in the charter. Beside that the court also interpreted in a bonafide manner that permitting of such excuses in civil as well as in criminal matter would certainly result to the occurrence of danger in the society and that certainly breaks down the legislative mechanism, processed by the administrative machine in ensuring a good governance towards the society. And this failure of the mechanism goes against the provisions of the rule of law propounded by AV Dicey.

In India, the laws are well interpreted and has also been simple and unambiguous. And the core of actions of an individual is certainly in accordance to the newly implemented acts, and if a person contravenes any of the provisions of the statutes than that may amount to be non excusable by the state, i.e. “*Ignorantia juris non excusat.*” (*Upadhyay (2016), “Administrative Law.”, 10th edition, Central Law Agency, Allahabad.*)

Custom is simply interpreted to the fact that is a routine practice to the society and that is been basically adopted, by an individual, since it's birth. It's defined to be a regular practice, as interpreted by Professor Allen, that custom is a legal and a social phenomenon that accelerates up by some power of the inherent in society, forces partly of reason and necessity and partly of suggestion and limitation, from the point of interpretation, to the fact that custom is simply a feature of a human being, that is a social phenomenon obtained by any individual from it's family having a long usage, by obtaining it's force.

Custom is regarded to be one of the oldest form of law- making, it's regarded as a study of the ancient law, exhibiting that in a primitive society, the humans were governed by some uncodified rules that got it's occurrence from the birth of any being.

Also held to the fact that the lives of the individuals were accelerating in a very spontaneous way, in accordance to it's evidentiary nature, where it has been perceived that the procedure of the way of thinking and dealing with the regular function is considered as one of the most convenient mode of conduct.

5. CONFIGUREMENT OF CONVENTIONAL MORALITY AT WORKPLACES

Custom is regarded to be one of the oldest form of law- making, it's regarded as a study of the ancient law, exhibiting that in a primitive society, the humans were governed by some uncodified rules that got it's occurrence from the birth of any being.

To be held with the interpretation and the fact that customs are none other than a long establishment usages or the modes of behavior, that refer primarily to practices that are configured day to day, in our regular practices. Eminent philanthropist Raveendra Hariharan Dharmarajan, regards to the fact that conventional morality and norms usually starts from the very first innings, when a human steps in this beautiful planet. His feelings as well as his emotional understandings are gradually a mirror to it. That conventional moralities are basically those moralities that helps an individual in growing with more prosperity. Every men are a human being first at it's very first identity, second, he is a person, who is holding a professional identity, at his own sphere of living and earning (*GHALI -BOUTROS BOUTROS, "Provisions and Principles of Human Rights Law and Practices."*, 29th edition, Pearson Publishers, Oxford University press).

That a value- judgment is always being fixed to it. Conventional norms should always be followed to it, with it's past, where it's considered to be a vested norm upon every individual since it's birth.

A society mainly comes into existence, with a possession of an enormous societal broad themes that certainly implements several parameters in creating the society to be widely enlarged along with the spread of it's cultural community and also to promote a societal integrity and also a to preserve the multinational diversity, where by the objective is certainly making the citizens to act in a cohesive way, by breaking the discrimination which is a bar for societal progression. (*Austin John, (2003), "Law as the command of sovereign."*, *Study on Jurisprudence and Legal Theory*, 8th edition, Central Law Agency, Allahabad.) Thus to preserve the societal progression, it is considered to be one of the most integral primary task that is to be functioned by every social being, in order to make the society united and also to remain free from all encumbrances that arises from the discrimination or from the discriminatory practices, which is certainly a bar towards a continuous societal progression.

That as it has been discussed above that there has been a day to day amendment and also a day to day emergence of newly enacted statutory legislations, in order

to ensure the society, a good governance, whereby there is a maintenance of the tranquility and peace, that every day it has been a routine work of the parliament to keep a watch on the implementation procedure along with the proper adjudication and also a proper interpretation of the Honorable Supreme Court, where all the persons from **8 to 80's** are entitled to preserve and safeguard their rights that has got guaranteed under the **CONSTITUTION OF INDIA**. Just to keep an example on **POSH (PREVENTION OF SEXUAL HARASSMENT AT WORKPLACES) and POCSO (PROTECTION OF CHILDREN FROM SEXUAL AND OTHER OFFENCES)**, that the History of India reveals that in the earlier times, the legislation that was made were true, and was also absolute in it's stricture but it somehow failed to keep an eye on those sectors or upon those segments that were prone towards atrocities, i.e evil atrocities and they have been basically categorized under **women, children, and other vulnerable sections of the society.**

6. CONCLUSION

Article 21 of the Indian Constitution is regarded as one of the vital mechanism in safeguarding the interest of the public at large. Thus, apart from the provisions of the Constitution of India and also enactment of the protection of Human Rights Act, 1993 it has propounded an updated landmark that certainly gave a warm salutation and also a prestigious greeting to each and every individual in the society. However, it one cannot certainly comment that the dedication and the devotion through hard work has fringed cause of its specific defects and limitations that has been interpreted widely in a statutory format.

That in literal meaning it is said that a person who has been an ignorant in the field of law is certainly be non excusable in the terms of the legal dais. The meaning has been derived from the Latin Maxim "*Ignorantia legis neminem excusat.*" that is a synonym to the legal jargon "*Ignorantia Juris non excusat.*", where there is a general interpretation that a person who is unaware with the legal provisions in the civil society would certainly be bound to be kept isolated from the civil society. Thus, by drawing a major conclusion to the fact that there has not been a room for doubt that in the above said case the learned Judicial Officers has given a clear cut statement through interpreting that a major number of people, who are being uneducated, as well as non versed with the subject of the law. Therefore, in pertinence with the above facts the Learned Court has absolved those persons who has been charged for breaking the rule of law.

That in the upcoming times, based upon the contemporary scenario, the inquisition can be done on how to adopt a new framework policy, that would be creating an awareness among the common people at large.

References

1. Paranjape, (2016) "Study on Jurisprudence and Legal theory." 8th edition, Central Law Agency, Allahabad, India.
2. Upadhyay (2016), "Administrative Law.", 10th edition, Central Law Agency, Allahabad, India.
3. Pandey J.N. (2018), "Constitutional Law of India.", 55th edition, Central Law Agency, Allahabad, India.
4. Kapoor SK (2017), "Public International Law and Human Rights." 21st edition, Central Law Agency, Allahabad, India.
5. Dicey AV, "Rule of Law.", Administrative Law., 10th edition, Central Law Agency, Allahabad, India.
6. GHALI -BOUTROS BOUTROS, " Provisions and Principles of Human Rights Law and Practices.", 29th edition, Pearson Publishers, Oxford University press.
7. MILNE, " Modern theory of Human Rights.", 4th edition, Central Law Agency, Allahabad, India.
8. Okin Moller Susan, "Theory of Human Rights Law and it's principles and provisions of governance, in the modern society.", 6th edition, Pearson Publishers, Oxford University press.
9. Basu, " Public International Law and Human Rights Law and Practices in India.", 23rd edition, Eastern Book Company Publishing House, Kolkata, India.
10. Halsbury, " Public International Law and Human Rights Law and Practices in India.", 23rd edition, Eastern Book Company Publishing House, Kolkata, India.
11. Salmond, "Study on Jurisprudence and Legal theory." 8th edition, Central Law Agency, Allahabad, India.



Taurean Publications

Kolkata ▪ New Delhi

Email : taureanpublicationskolkata@gmail.com

Website : www.taureanpublications.in

Rs.500.00

