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**CHAPTER**

# A Review on Fuzzy Economic Order Quantity Model under Shortage

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**Abstract.** Fuzzy set theory has a remarkable progress in the field of research. It initiates many areas in both practical & theoretical studies. It is really useful for several people engaged in research and development including medical researchers, mathematician, businessman, social scientists, natural researchers etc. This field of mathematics has introduced new life into technical and scientific fields that have been undeveloped for a long period. Thousands of scholars are operating and working with fuzzy set theory and presented a lot of research papers. In this paper latest review of existing literature & numerous types of fuzzy EOQ inventory models under shortage situation. It assists to categorize how the concept of fuzzy sets theory has been applied in inventory models which motivate researchers to concentrating on new technique in study of inventory control models in fuzzy environment. In this review, we study desirable constraints of existing models in fuzzy environment under shortage of supplies. A lot of effort is attempted to deliver the latest review of existing literature of inventory and fuzzy models. The purpose of the work is to obtain a continuous and comprehensive assessment of existing literature and recognize upcoming research guidelines. This review helps other researchers to draft an outcome during the situation of short supplies. This will also help to manage inventory according to the situation & reduce the loss during shortage of supplies, this review also helps to reduce loss with proper inventory management in real-life applications and marketable products.

**Keywords:** Optimization, Inventory parameters, EOQ model, Partially backlogging, Fuzzy inventory model, Defuzzification.

## INTRODUCTION

Today's free-trade area atmosphere needs production to design, development, test, manufacturing, and organize most reliable goods in fewer time at low budget. For accomplishing this, billions of dollars are being expended annually all over the world to develop consistent and well-organized products. For this, problems related to inventory are very common in maintenance service, manufacturing, and corporate dealings generally. Different models and methods have been planned to deal with different kind of inventory issues. Usually, EOQ (Economic Order Quantity) model deals with constant assessment of inventory complications. However, various costs are consumed by an organization to keep a necessary level of inventory are called relevant costs. An effective organization of inventory helps in reducing costs and to assurance a smooth process of any organization.

Perishable goods are very normal in our day-to-day lives. From study reports, the goods that turn into rotten, depreciated, expired, etc. over the time period time are called deteriorating goods. These items are divided into two classes. First type contains those substances that decay, defective or elapsed over the time. For e.g., as milk products, meat products, fruit & vegetables, medicines etc. Second type refers those products that losing partial or full value over the period due to change in technology, fashion, trend, occasions & festival. For e.g., seasonal goods, software, smart phones, fashion and so on.

EOQ (Economic Order Quantity) model is used to calculate the minimum order quantity of an inventory from purchaser/vendor's perspective. The purpose of this model is to ensure that the right amount of stock quantity is ordered and solves the problems related to blockage of funds and extra storing cost. From this a

# Application of Efficient Naturally Occurring Clay Mineral for Fuchsin Basic Dye Removal



Chandra Mohan, Neeraj Kumari, Ruby Jindal, and Rajni Gautam

**Abstract** Due to toxic nature of dyes, they are known as objectionable type of pollutant. When dye molecules are present in water bodies, they can cause adverse effect on human being as well as marine species. In present study, adsorption study of triphenylmethane dye, Fuchsin Basic, was done using Montmorillonite (Mt), a naturally occurring clay mineral by varying pH, contact time and initial concentration. The result revealed that 101 mg/g dye was adsorbed at pH 9 within 20 min of contact time. The structural changes of Mt before and after adsorption of dye were studied by XRD and FT-IR techniques.

**Keywords** Pollutant · Triphenylmethane · Fuchsin Basic · Kinetic · Isotherm

## 1 Introduction

More than 1,00,000 dyes are commercially available in the markets, and more than  $8 \times 10^5$  tons of dyes are generated annually. It was estimated that approximately 20% of dye production is discarded directly into the water resources [1]. The dyes like basic, acidic, reactive, direct, disperse and azo dyes are generally used by various industries like textile, paper and printing industries. Out of these dyes, basic dyes (also called cationic dyes) are considered more toxic as they interact with the negatively charged cell membrane. They enter into cell after interacting and concentrate in cytoplasm. The dyes are toxic in nature due to their recalcitrant nature and complex structure due to which they make water bodies inhibitory for aquatic as well as human lives [2]. Most of the dyes are bright colored due to which they can be noticed even when present in very small concentration. Presence of these colored complexes in aquatic resources has a direct impact on photosynthesis phenomenon and disturbs aquatic life, food chain and ecosystem [3].

The techniques used for water treatment are categorized into three categories: chemical, biological and physical methods. Chemical methods include oxidation,

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
  
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**Advances in Functional and Smart Materials** pp 219–223

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## First Principle Investigations of Half-Metallicity in $\text{Co}_2\text{YZ}$ ( $Y = \text{Sc}, \text{Y}; Z = \text{P}, \text{As}, \text{Sb}, \text{Bi}$ )

[Ananya Shankar](#), [Preetisha Goswami](#), [Archana Tripathi](#), [Ruby Jindal](#) , [Rajni Gautam](#), [Neeraj Kumari](#), [Himani Yadav](#) & [Sheetal Tyagi](#)

Conference paper | [First Online: 31 October 2022](#)

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### Abstract

The well-known half-metallic properties along with the electronic structure of series  $\text{Co}_2\text{YZ}$  ( $Y = \text{Sc}, \text{Y}; Z = \text{P}, \text{As}, \text{Sb}, \text{Bi}$ ) were calculated by generalized gradient approximation of the density functional theory (DFT). The lattice parameter in the magnetic phase was optimized for both  $\text{Cu}_2\text{MnAl}$  and  $\text{Hg}_2\text{CuTi}$  structures to determine

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# Boundary Layer Flows - Modelling, Computation, and Applications of Laminar, Turbulent Incompressible and Compressible Flows

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## ADVERTISEMENT

### Abstract

This study, a work used to distinguish the dispersion patterns of air pollutants, is designs particularly NO<sub>x</sub> because of vehicular and modern sources over a quickly creating metropolitan city, Nagpur (21.15° N, 79.09° E), India, during winter and summer representative months, that is, January and April respectively in 2009. Utilizing the emission variables of industry and various vehicles, 1 km x 1 km high-resolution Gridded Emission Inventory (GEI) has produced over Nagpur city. Here, two PBL schemes form WRF model viz., local (MYJ) and non-local (YSU) schemes considered for obtaining the PBL as well as meteorological parameters. Both the schemes MYJ and YSU representing the boundary layer parameters are reasonably well and measured for generating the input parameter for AERMOD model. During the winter and summer month's fundamentally unique scattering patterns of NO<sub>x</sub> have been observed. After carefully examining the NO<sub>x</sub> concentration from the AERMOD model, the reasonable well-by integrated YSU schemes of WRF were found to be superior to the other schemes. The current review advocates the utility of the created GEI of NO<sub>x</sub> with coupled AERMOD-WRF offline model for air quality appraisal over Nagpur.

### Keywords

gridded emission inventory

air quality

AERMOD

PBL schemes

WRF model

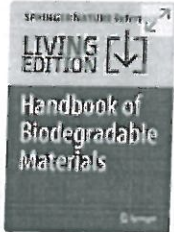
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### Chapter sections

## 1. Introduction

Air pollution is a not unserious risk to the climate influencing human's health [ , , ], and horticulture and normal biological systems [ ]. There are many wellsprings of air pollution, viz., usual sources, transportation, horticultural, and generation of power and industrial industries. According to World Health Organization (WHO) standards, among many Indian urban communities with populace of over a million, air contamination levels surpassed the edge. It is revealed by WHO [ ] that nearly 500,000 premature deaths are in India due to only indoor air pollution. Mesoscale atmospheric flows play significant character in dispersion of air pollutants, local air quality problems, and transference [6 , , , , , ]. Emission estimates and trends during 1990 to 2000 and its implications over Delhi have been reported [ ]. AERMOD [ , , ], a Gaussian plume air dispersion model with explicit representation of PBL processes, is widely being used for the assessment of air pollution dispersion of various pollutants and estimation of ground-level concentrations (GLC) as well. WRF-AERMOD coupling is employed for the methodology to study the dispersion patterns of PM<sub>10</sub> over Pu [ ]. Gurjar et al. [ ] have evaluated emission and air quality in selected mega-cities of different countries. Mohan et al. [ ] implemented AERMOD dispersion model in standalone mode for the exposure assessment of particulate matter pollution over Delhi. Goyal et al. [ ] have developed grid-based



**Handbook of Biodegradable Materials** pp 1–24

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## Electrically Conducting Smart Biodegradable Polymers and Their Applications

[Meena Bhandari](#), [Dilraj Preet Kaur](#), [Seema Raj](#), [Tejpal Yadav](#),  
[Mohammed A. S. Abourehab](#) & [Md Sabir Alam](#)

Living reference work entry | [First Online: 22 September 2022](#)

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### Abstract

Smart biomaterials are designed on the principle of intrinsically conducting polymers. Conducting polymers based on polypyrrole (PPy), polylactic acid (PLA), poly(3,4-ethylenedioxythiophene) (PEDOT), and polyaniline (PANI) exhibit an excellent response to electrical conductivity. Several strategies are involved in biodegradable conducting polymers synthesis. This chapter summarizes recent breakthroughs in the synthesis and design of biodegradable and

  
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biocompatible polymers with better electrochemical responsiveness and could be used as substrates, dielectrics, conductors, or semiconductor materials in electronics. These polymers also find distinctive biomedical applications such as electronic medical equipment, surgical implants, drug delivery, tissue engineering, cancer application, etc.

#### Keywords

**Biodegradable polymers**      **Biocompatible**

**Conducting polymers**      **Biomedical applications**

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#### Abbreviations

**CNT:** Carbon nanotubes

**CPCs:** Conducting polymer containers

**CPs:** Conducting polymer

**CQDs:** Carbon quantum dots

**DD:** Drug delivery

**GEM:** Gemcitabine

**LED:** Light-emitting diodes

**NLC:** Nano lipid carrier

  
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# COVID 19 PANDEMIC : A FLAMBOYANT SPARK AGAINST HUMAN HEALTH AND LIFE STYLE

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# CORONAVIRUS: PREVALENCE AND VACCINATION

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## Introduction

The recent outbreak of coronavirus 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), first case of COVID-19 was reported on December 31, 2019, in Wuhan city, China. Since 2019 human race has been continuously struggling with a life-threatening pandemic disease and it has rapidly spread worldwide, around 167,958,998 confirmed cases with 3,492,673 deaths reported globally till 27 May 2021. (WHO, 2021). The covid-19 characterized by pneumonia that leads to respiratory failure, in the severe condition it may cause multiorgan failure and death. SARS-CoV-2 uses angiotensin-converting enzyme 2 as a receptor to enter human cells. Angiotensin-converting enzyme 2 (ACE2) has been found to act as a host receptor for viral entry, SARS-CoV-2, and this initiates the infection stage. ACE2 shows a broad pattern of expression in the human body viz. heart, gastrointestinal system, kidney, and type II alveolar cells in the lungs. The mild symptoms of COVID-19 include cough, fatigue, dyspnoea, and fever but in advance stages it may cause severe acute respiratory syndrome (SARS) and finally multiple organ failure has been reported.<sup>1,2</sup> In present article is focused on pathophysiological mechanism of SARS-CoV-2 virus and available treatment of coronavirus.



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# SCIENCE OF ENVIRONMENT

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**Chapter**  
**13****ENVIRONMENTAL IMPACTS OF INDUSTRIAL WASTE  
AND WASTEWATER TREATMENTS****CHANDRA MOHAN<sup>1</sup> & JENIFER ROBINSON<sup>2\*</sup>**<sup>1</sup>Asst. Prof., SBAS, K R Mangalam University, Gurugram 122103, India.<sup>2</sup>Research Scholar, SBAS, K R Mangalam University,  
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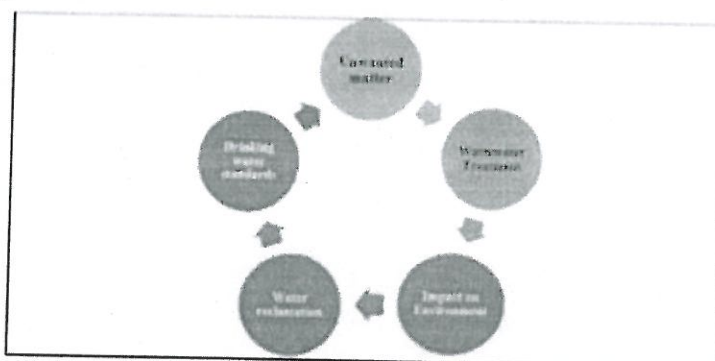
Corresponding author: Chandra Mohan.

**ABSTRACT**

Wastewater treatment, a practice which is done to remove unwanted matter from the water that is discharged from the various sources. Wastewater is first converted into an effluent using various constructions like sewage treatment plant, industrial wastewater treatment plant or industrial drains, and then sent back to the water cycle, a biogeochemical cycle which explains about the constant flow of water in the universe. Before reaching the water cycle, a study should be done to make sure that the effluents do not create much impact on the environment. Water recycling or Water reclamation is the process of converting sewage into water fit for reuse for various purposes.

This article will compare the water reclamation system in India and Oman and the environmental impacts of waste and wastewater treatment plants. The commonly used processes or frameworks will be discussed in terms of chemical and biological methods which are in practice to convert wastewater into reclaimed water to be used in various sectors like agricultural fields, irrigation of crops and garden plants, replenish the groundwater and surface water, for domestic purposes, to reduce water scarcity and finally to reach the drinking water standards of India and Oman.

**KEYWORDS:** Contaminants, Effluents, Wastewater Treatment Plants, Environmental Impacts, Biogeochemical Cycle.

  
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## ABOUT THE EDITORS



Dr. M.Z.A. Khan

Dr. M.Z.A. Khan obtained his M.A. (1984), M.Phil. (1986) and Ph.D. (1990) in Geography from M.L. Sukhadia University, Udaipur (Rajasthan). He has been awarded with Gold Medals (M.A. & M.Phil.) and UGC-NET. At present Dr. Khan is working as Senior Associate Professor in Geography at P.C. Department of Geography, Government Arts College, Kota (Raj.). Convener, Board of Studies in Geography since 2010 at University of Kota, Kota. Dr. Khan is engaged in research and teaching for more than three decades. He has published a number of Research Papers/Articles in various journals, proceedings and edited books. He has actively participated in many National and International Seminars/Conferences pertaining to the subject. He has successfully convened a UGC sponsored National Seminar and completed UGC sponsored Major Research Projects and Minor Research Projects. Dr. Khan has also been supervising research work leading to the award of the Ph.D. degree in Geography. 31 M.Phil. Dissertations, 6 M.A. Dissertations and 17 Research students have been awarded Ph.D. under the supervision of Dr. Khan. He has been serving on the Boards of Studies and Boards of Examiners of several Universities.



Dr. Sunil Kumar Verma

Born on May 18, 1982 in Kurbara, Neem Ka Thana, Rajasthan, India, Dr. Sunil Kumar Verma, M.A. (Geography) M.Sc. (RS & GIS), CSIR and UGC NET / JRF, SET, Ph.D., is an active and dynamic researcher and Ph.D. Supervisor who is currently working as a Lecturer (PGT) in Department of Geography, JNV, Longding, Arunachal Pradesh, India. In Oct. 2011, University of Kota, Kota awarded him Ph.D. He has been teaching Geography for the last 13 years and has devotedly worked at several reputed colleges located at Sikar, Churu and Sri Ganganagar. He has also published 11 books and more than 35 research papers and articles in national and international peer-reviewed multi-disciplinary research journals. He has also attended 34 National and 21 International Seminars and Conferences. He is also a life member of NAGI and RCA.



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Volume – III

(Degradation of Environment –II  
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# Heavy Metal Toxicity and their Effects on Human Health: A Review

Ms. Deepshikha Jain  
Dr. Chandra Mohan

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## Abstract :

The main source of heavy metals is the crust of earth. In performing metabolic functions, they are however required by living creatures in trace amounts. Heavy metals are considered hazardous due to their high solubility. Metals are discharged into the environment through both natural and manmade processes, mostly involving mining, industrial activities and automobile emissions. Heavy metal toxicity primarily depends upon their concentrations and oxidation state, which is responsible for physiological and bio-toxic consequences. Discharged heavy metals pollute the environment by leaching into the underground water, deposition in the aquifers, causing water and soil contamination. When these metals come in contact with living creatures, they form stable bio-toxic compounds with proteins, enzymes and DNA molecules, thus, varying their functioning and they are unable to participate in bioreactions. This study examines the impact and hazardous effects of heavy metals, which includes arsenic, chromium, cadmium, and lead on human health.

**Keywords:** Heavy metals, toxicity, contamination, human health, environment.

## 1. Introduction:

Heavy metal contamination is a major environmental issue that the modern world is dealing with.

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# Chapter 16

## Graphene-Based Materials for Water Treatment and Purification

Neeraj Kumari

K. R. Mangalam University, Gurugram, India

Meena Bhandari

K. R. Mangalam University, Gurugram, India

### ABSTRACT

*The supply of clean and safe water in an adequate amount and sustainable way is a global challenge as the presence of toxic organic and inorganic contaminants in water bodies has become one of the most alarming issues. The technologies used for the treatment of water and its desalination remain ineffective in removing the contaminants, especially contaminants present in trace concentration, and was not feasible in disseminated water treatment system globally. Recently, a lot of efforts have sought to enhance various physico-chemical properties of nanomaterials to overcome the shortcoming of technologies. The chapter revealed different technologies for treating wastewater, challenges, and issues faced during treatment and potential applications of advanced materials. The main emphasis is given to the role of graphene-based nano-adsorbents. Under the umbrella of nanotechnologies, different approaches have been discussed for the fabrication of graphene oxide-based nano-adsorbent along with the interaction of contaminants with graphene oxide.*

### INTRODUCTION

Planet Earth is no longer functioning in the way as it used to be earlier due to the impact and influence of humans. Homo sapiens are the principal drivers for the change of climate. Anthropogenic activities produce an impact on the environment, and the environment, in turn, impacts humans. 97% of Earth is covered with water yet only 3% is available for drinking purposes as rest of it is stored in the form of polar ice or in the sea. Human interferences affect the quality of ground and surface water as well as the

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natural water cycle. Potable water with good quality is essential for hu

is mainly responsible for maintaining of its fixed proportion and management. Interference of humans alters the distribution, quantity, and quality of water resources which is highly essential not only for survival but also for the production of food (Cosgrove and Loucks, 2015). Degradation of water quality is a great threat to humanity, especially in developing countries. The presence of the unwanted entities which impact human health as well as the environment leads to pollution (Sasakova et al, 2018). Industrialization, population explosion, increased standard of living, urbanization, growing GDP and economic development, religious ceremonies performed at river ghats, inefficient water management, and losses during the distribution lead to the increased water contamination and exploitation of water resources as well as a scarcity of water. Phenomena like climate change also impact the distribution of water. Pollution of water bodies affects certain organisms living in water and disturbs biodiversity. Innumerable physical, chemical, and biological impurities make water unfit for drinking (WHO, 2017). Globally 12% of people are using unsafe drinking water. Almost half of the population (nearly 47%) face water scarcity for at least a month a year. By 2050 this number will increase to 52% (United Nations World Water Development Report, 2018; Boretti and Rosa, 2019). Every year 730 million sewage wastes are being discharged into the water bodies or rivers. 90% of sewage in developing countries are added into the water bodies (Mekonnen and Hoekstra, 2016, Wada et al, 2016).

Water is essential for every activity but majorly 72% of it is used for agriculture. 16% of water is utilized for households' purposes and industries use 12% of water withdrawals (UN-Water 2021). As per estimation, 7.5 litres of water per person per day is needed for drinking and making food. 50 liters of water per day per person is required for washing clothes, maintaining personal hygiene, and for house cleaning, etc. (Howard and Bartram, 2003). Water availability per capita at the national level is expected to diminish by 40 to 50% by 2050 due to the fast population increase and economic demand (Data, 2010).

Clean Water Act established in 1972 emphasizes the need for control and restoration of chemical, physical, biological integrity of water present in the water bodies. This is the reason that providing clean and safe drinking water to all is one of the sustainable developmental goals proclaimed by the United Nations (Dinka, 2018). More than 2 billion people are being affected by the scarcity of water and problems related to water pollution. This number would increase up to 3.9 billion in future (Nicolai et al, 2014).

## PROBLEMS AND CHALLENGES WITH GROUND AND DRINKING WATER

The effluents discarded from industry, sewage, farming, and household activities lead to water pollution. The impurities that can be present in water include the inorganic ones (Al, As, Mn, Ni, fluorides, nitrites, dissolved solids, etc.), organic impurities (volatile organic compounds, fertilizers, pesticides, trihalomethanes etc.), biological or microbial impurities. The presence of biological impurities results in the appearance of water-borne diseases such as polio, cholera, typhoid fever, dysentery, and infectious hepatitis while the presence of chemicals may result in acute nausea, vomiting, skin ailments, hypertension, cardiotoxicity, fetal abnormalities, damage to liver, brain, and kidney or lead to carcinogenicity (Bayantong et al, 2021).

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Elsevier Series in Advanced Ceramic Materials

2022, Pages 15-39

### Chapter 2 - Recent advances in structural ceramics

Dilraj Preet Kaur, Seema Raj, Meena Bhandari

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#### Abstract

Structural ceramics are the high-tech engineering ceramics that can withstand high mechanical, thermal, tribological stresses, corrosive environments, and high temperatures. Initially only oxide ceramics such as alumina ceramics, zirconia ceramics, etc., garnered attention but over the years the advancements in the processing techniques have expanded the scope of structural ceramics to carbides, nitride, silicides, borides, and their composites. Generally these ceramics show excellent mechanical properties in extreme environments and high temperatures, but low fracture toughness, brittle nature and high sensitivity towards structural flaws, cracks, and pores always posed a limitation to their applications. However, the recent advances in the materials such as nanocomposite ceramics, reinforced, toughened ceramics (such as  $\text{Al}_2\text{O}_3$  and mullite reinforced by SiC particles, nano zirconia toughened alumina, SiC toughened  $\text{Al}_2\text{O}_3$ , SiAlON, etc.) have exhibited markedly improved bending strength and fracture toughness, grain refinement, and self-crack-healing ability. These recent advances have increased the potential and functionality of structural ceramics manifolds allowing to design materials with tailored behavior profile. These ceramics are commercially being used in many applications like gas turbines, welding nozzles, heat exchangers, heat pipes, valves, cutting tools, turbocharger, crucibles, dentistry, bone and joint replacement prostheses, etc., to name a few.

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



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# A normal coordinate analysis of Sr<sub>2</sub>BO<sub>4</sub> crystals (B = Ti, V, and Mn)

Neenu Saini <sup>a, b</sup>, Ruby Jindal <sup>a</sup>  , Archana Tripathi <sup>c</sup>Show more Outline |  Share  Cite<https://doi.org/10.1016/j.matpr.2021.06.015>

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## Abstract

Theoretical calculations on the Raman and infrared (IR) vibrational modes in the tetragonal structure of the Ruddlesden-Popper (RP) phase Sr<sub>2</sub>BO<sub>4</sub> (B = Ti, V, and Mn) have been done in this paper. The Raman and IR vibrational modes have been investigated using Wilson's GF matrix method for the Sr<sub>2</sub>BO<sub>4</sub> (B = Ti, V, and Mn) compounds having space group I4/mmm and symmetry D<sub>4h</sub><sup>17</sup> by analyzing the normal coordinates. The measurements of the zone centre vibrational modes have been calculated including three stretching and six bending force constants. In this work, the infrared frequencies for the Sr<sub>2</sub>MnO<sub>4</sub> compound in phase I4/mmm have been assigned first and foremost. There is an extremely strong concurrence between the observed Raman and IR vibrational modes and our calculated results. To determine the role of interatomic forces in the calculated Raman and IR vibrational modes, the potential energy distributions for the Sr<sub>2</sub>BO<sub>4</sub> (B = Ti, V, and Mn) compounds have also been investigated.

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## Keywords

Ruddlesden-Popper phase; Raman modes; Infrared modes; Phonons; Lattice dynamics

  
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**Dr. Prem Lata Meena**, is working as an Assistant Professor in Department of Polymer Science at Bhaskaracharya College of Applied Sciences, University of Delhi, New Delhi. She obtained her Ph.D. in Chemistry from University of Delhi. Dr. Meena has more than 10 years of research and teaching experience in the field of chemistry and currently she is teaching in Department of Polymer Science, Bhaskaracharya College of Applied Sciences. She published several research papers and book chapters in National and International journals. She has also been Awarded in the (Innovation Project) at University of Delhi and also received best paper awards in a few International Conferences.

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In time immemorial, there was an emotional connection between nature and humans. Human beings received nature's bounty with the greatest gratitude. As a result of population growth and material development, an endless exploitation of nature has begun. Our sacred river now takes the form of a dirty drain. As temperatures continue to rise, the snow on the mountains melts, threatening the survival of the earth. Pollution exists today in a variety of deadly forms that challenge the very existence of human civilization. Whose reflection the author Kaushal Kumar has tried to express through this book. He has excellent academic background. He has Cleared Joint CSIR-UGC NET-JRF and GATE. He bagged top awards presented by the Department of Science and Technology (DST) named Augmenting Writing Skills for Articulating Research-AWRSAR. Presently he is pursuing doctoral studies from Mahatma Gandhi Central University, Bihar on Plant Virus and its impact on Plant ecology. His specialisation and research interest are Plant Virology, Quantum Biology, Ecology.



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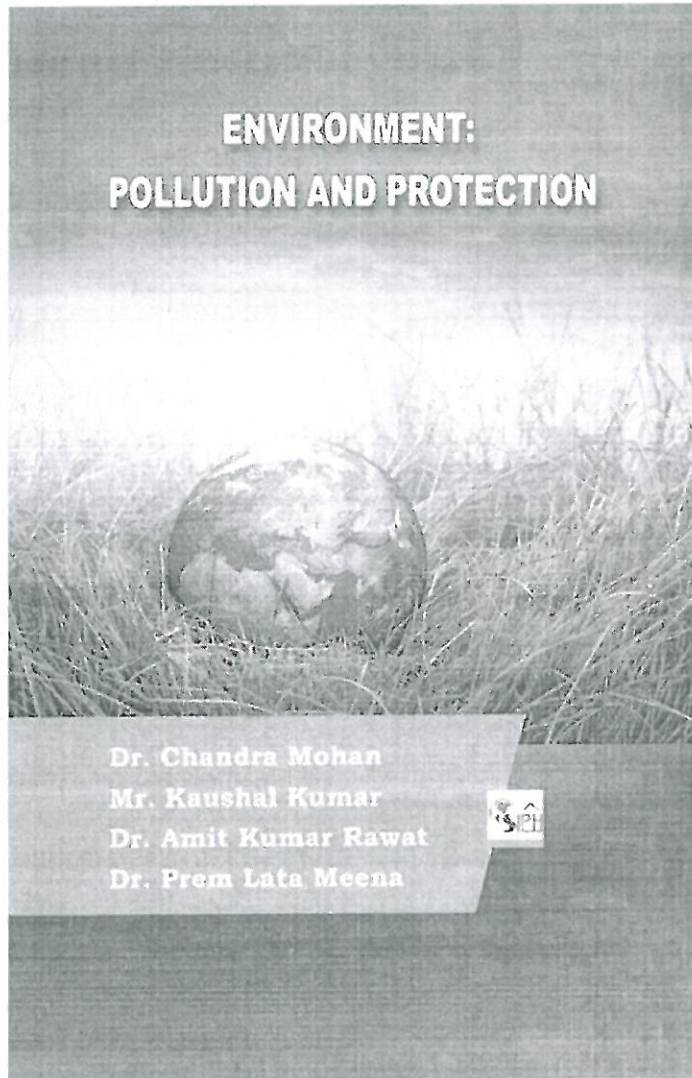
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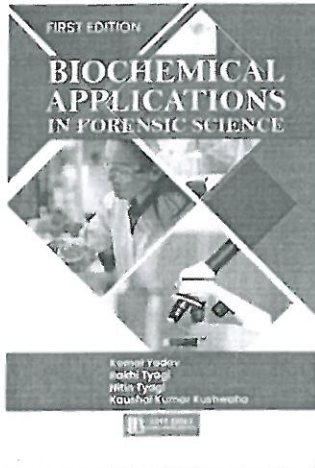
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Dr. M.Z.A. Khan obtained his M.A. (1984), M.Phil. (1986) and Ph.D. (1990) in Geography from M.L. Sukhadia University, Udaipur (Rajasthan). He has been awarded with Gold Medals (M.A. & M.Phil.) and UGC-NET. At present Dr. Khan is working as Senior Associate Professor in Geography at P.G. Department of Geography, Government Arts College, Kota (Raj). Convenor, Board of Studies in Geography since 2010 at

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**Dr. Sunil Kumar Verma**

Born on May 16, 1962 in Kurbars, Neem Ka Thana, Rajasthan, India. Dr. Sunil Kumar Verma, M.A. (Geography), M.Sc. (MS & GIS), CUIR and UGC-NET / JRF, SET, Ph.D., is an active and dynamic researcher and Ph.D. Supervisor who is currently working as a Lecturer (PCT) in Department of Geography, JNU, Lucknow, Arunachal Pradesh, India. In Oct. 2011, University of Kota, Kota awarded him Ph.D.

He has been teaching Geography for the last 13 years and has reportedly worked at several reputed colleges located at Sikar, Churu and Sri Ganganagar. He has also published 11 books and more than 35 research papers and articles in national and international peer reviewed multi-disciplinary research journals. He has also attended 34 National and 21 International Seminars and Conferences. He is also a life member of NACI and RGA.



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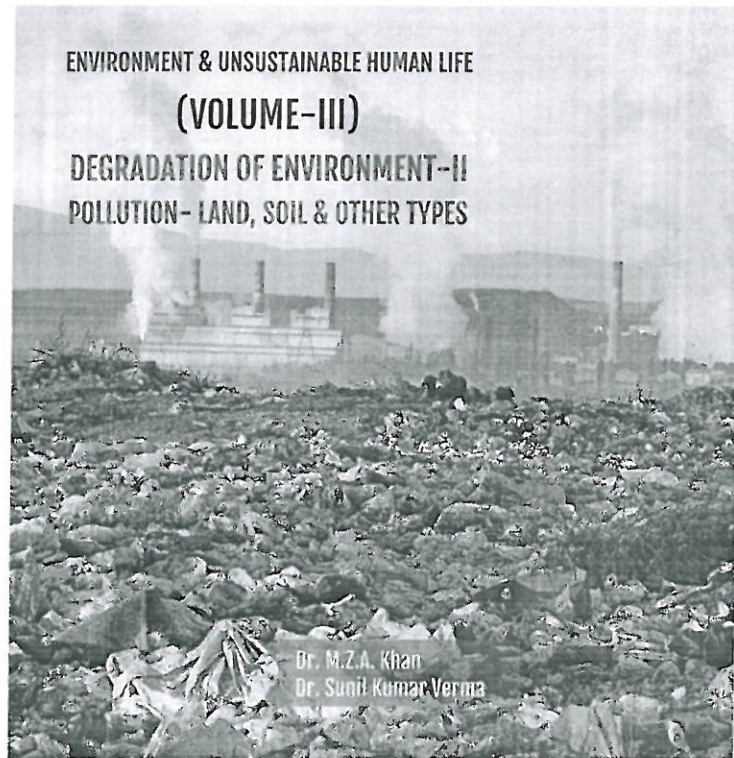
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# Heavy Metal Toxicity and their Effects on Human Health: A Review

Ms. Deepshikha Jain  
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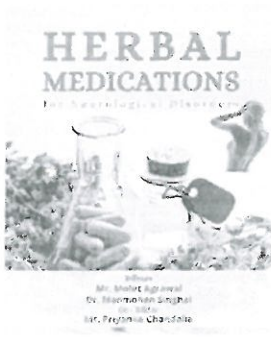
**Keywords:** Heavy metals, toxicity, contamination, human health, environment.

## 1. Introduction:

Heavy metal contamination is a major environmental issue that the modern world is dealing with.

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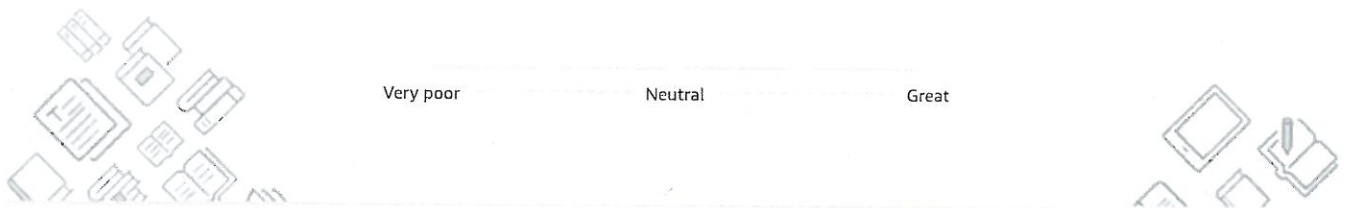
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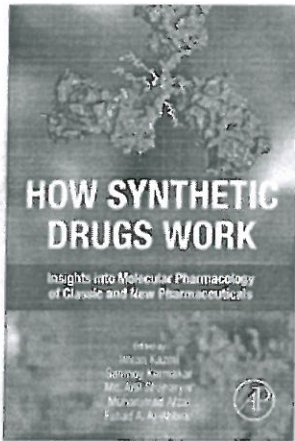
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## Chapter 11

# Mechanism of action of antidepressants

Kuldeepak Sharma<sup>1</sup>, Ankush Sundriyal<sup>2</sup>, Aanchal Loshali<sup>2</sup>,  
Mohit Agrawal<sup>3</sup>, Chinnabonia Gopala Krishna<sup>4</sup> and Yogendra Singh<sup>5</sup>

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### Introduction

Major depressive disorder (MDD) is more prevalent in individuals that lack close intimate relationships, are unmarried, separating, or widowed. There has been no discernible variation in the occurrence of MDD across races or socioeconomic classes. MDD in most behaviors is distinguished for at least 2 weeks by poor mood or by lack of appetite or enjoyment. Depression is also marked by sleep and eating disorders and memory and energy deficiencies. Guilt, loss of interest, and suicidal tendency are popular. In stressed patients, coronary heart disease, diabetes, and strokes tend to be more likely, and depression could make the estimate for patients with a variety of medical conditions considerably worse.

Depression incidence varies widely across societies and continents. Previous studies have shown a 12-month incidence of depression of 0.3% in Czech Republic, 10% in the United States, 4.5% in Mexico, 5.2% in West Germany, and a lifetime of depression in Czech Republic of 1.0%, 16.9% in the United States, 8.3% in Canada, and 9.0% in Chile.<sup>1,2</sup>

### Pathophysiology of major depression

We have understood the pathophysiology of major depression substantially in the last decade. MDD is thought to have a multifactorial etiology that includes biological, genetic, environmental, and psychosocial causes. Besides, the older

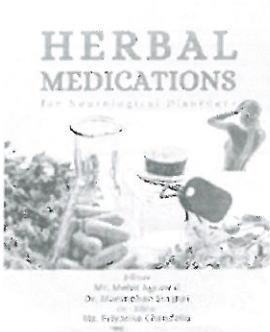
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theory that depression genetics has a deficiency of activity or volume of monoamines (a monoamine hypothesis), neurotrophic, and endocrine influences play an important part (the neurotrophic hypothesis).<sup>3</sup> Histological experiments, literature on structural and functional brain imagery, genomic discoveries, and steroid research all show complicated MDD pathophysiology with significant opioid therapy consequences. As alternative pathways have been suggested for understanding brain volume reduction in depression glucocorticoid neurotoxicity, glutamatergic toxicity, declined neurotrophic factor, and lower neurogenesis.<sup>4</sup>

### Monoamines and other neurotransmitters hypotheses

The past 50 years have seen the dominance of “monoamine theory,” which indicates that the pathogenesis and maintenance of depressive symptoms are motivated by a reduction in essential serotonin level, noradrenalin and likely dopamine levels.<sup>5</sup> Depression seems to be associated with major downstream consequences of changes in the signals of serotonin or norepinephrine in the brain (or both). The majority of antidepressants induce amine signaling changes. DAG (diacylglycerol); 5-hydroxytryptamine (5-HT), serotonin; IP3, tri-phosphate inositol; maoamine oxidase; NET (norepinephrine transporter); PKC (protein kinase C); PLc, phospholipase C; serotonin-transporter (SERT), AC, adenylyl cyclase, cREB, cAMP reaction element-binding (protein).<sup>6,7</sup> For several years it has been known to be linked with depression in a group of patients with reserpine medication and is known to deplete monoamines. Depressed patients reacting to serotonergic antidepressants, including fluoxetine, are often rapidly recovering from tryptophan-free diets that constitute a precursor to serotonin synthesis. Genetic experiments provide more data to support the monoamine hypothesis. For the promoter area of the serotonin carrier gene, a functional polymorphism occurs that controls the sum of the transporter protein. Subjects that are homozygous to the (short) allele may be most vulnerable to major depression and suicidal behavior. Furthermore, homozygotes for the allele will less often respond to serotonergic antidepressants and withstand them. By contrast, 1-Allel subjects appear to be more stress tolerant and are more likely to respond to serotonergic antidepressants. To date, first-line antidepressant products are only selective serotonin reuptake inhibitors (SSRIs) and norepinephrine reuptake inhibitors. Finally, the perhaps most compelling evidence supporting the theory is that monoamine is shown to be having a major impact on monoamine systems with all the available antidepressants. The synaptic availability of 5-HT, noradrenalin, or dopamine tends to improve all groups of antidepressants. Tentative attempts have not been successful to date in designing antidepressants that function on other neurotransmitter systems. However, the lack of universal effectiveness and a 2–3 weeks clinical latency associated with antidepressants potentiating monoamine, however, contributed to the assumption that monoamine defects



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## Chapter - 1

# Treatment Strategies of Herbal Medicines Used Against Tardive Dyskinesia

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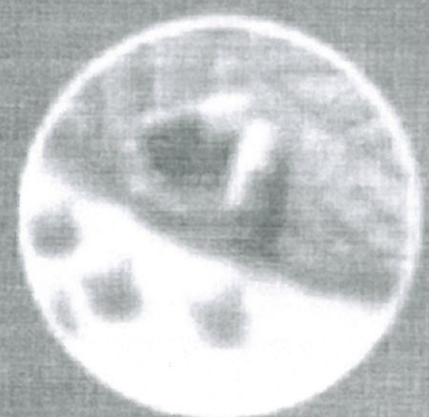
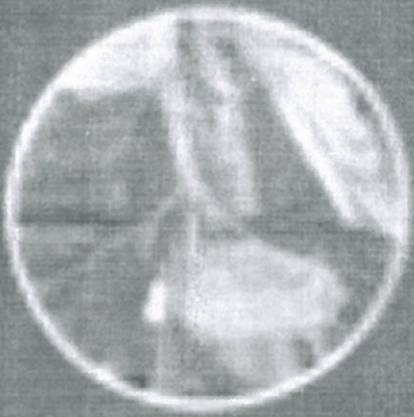
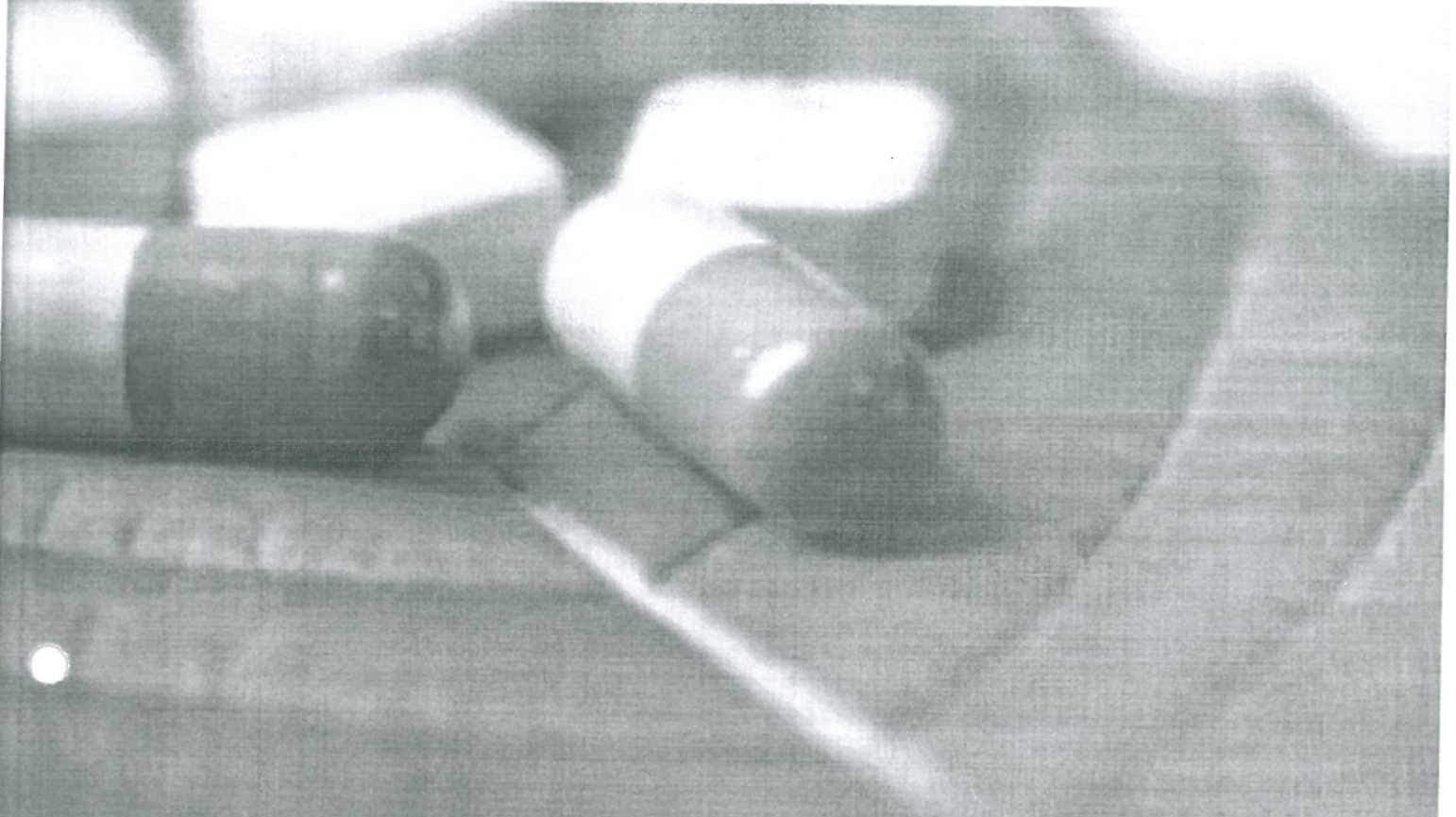
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### Abstract

Tardive dyskinesia (TD) is a syndrome. Tardive syndromes are a group of hyperkinetic and hypokinetic movement disorders that occur after some delay following exposure to dopamine receptor blocking agents such as antipsychotic and anti-emetic drugs. It can emerge after prolonged exposure to dopamine receptor blocking agents (DRBAs). The condition occurs in approximately 15%-30% of those on long-term dopamine agonist. The severity of these disorders ranges from mild to disabling or even life-threatening recognized tardive phenomenology's that may occur in isolation or in combination with each. There is wide range of other. Recognition of the various tardive phenomenology's may not only lead to early diagnosis but also to appropriate therapeutic intervention, and the need for most patients to continue taking the offending drug, makes understanding the epidemiology difficult and unreliable. For the first-generation antipsychotics, 50% of patients develop tardive dyskinesia after 10 years of medication treatment and can be unmasked after dose reduction; older age is a risk factor. Mechanism is unknown. Medication that causes tardive dyskinesia - for first generation (5-6% per year, second generation antipsychotics (4-5% per year) and Anti-emetics: metoclopramide (should not be used for longer than 3 months), prochlorperazine, chlorpromazine. Treatments include reducing or discontinuing the medication that's causing tardive dyskinesia, using prescription therapy to reduce the symptoms of tardive



# Tailor-Made Polysaccharides in Drug Delivery

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Amrit Kumar Nayak  
Md Saquib Hossain





## Tailor-Made Polysaccharides in Drug Delivery

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### Chapter 13 - Uses of tailor-made plant starches in drug delivery

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#### Abstract

Starch is well-known category of natural polymers being extensively explored in pharmaceutical industry and mainly obtained from different plant parts and organs. To maximize the utility of starches as excipients to develop various drug delivery dosage forms, their functional properties can be modified by chemical modifications, i.e., oxidation, esterification, etherification, cross-linking, grafting, and so on. Chemically modified starch materials have been found capable of meeting the requirements of pharmaceutical excipients. The present chapter provides details on various chemical modifications of starches and the uses of chemically modified starch materials as pharmaceutical excipients in various drug delivery formulations.

  
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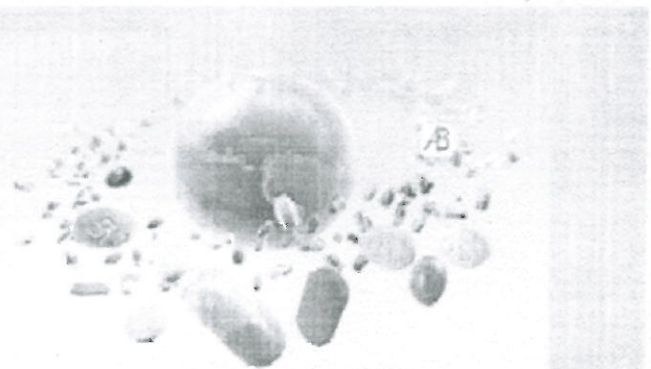
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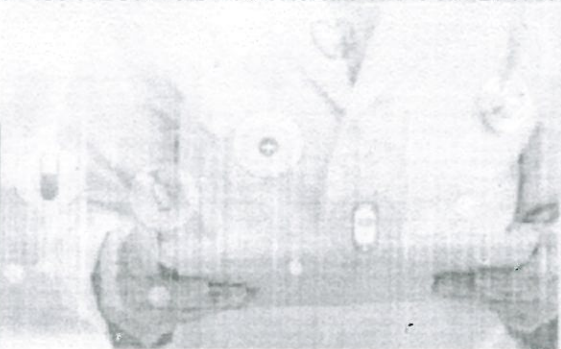
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# 6.

## Role of Nutraceuticals in Prevention of Cancer

Priyanka Chandolia\*

Mohit Agrawal\*\*

Dr. Mithilesh Singh\*\*\*

Cancer is becoming a more prevalent health worldwide problem, attributed to high mortality rate, more urbanism, and associated with changes in environmental conditions and personality. It is a disease that causes independency in growth signals, apoptosis evasion, persistent angiogenesis, inability towards anti-growth signals, unlimited replications possibilities, genomic disruption, metastasis, and also promote tumor inflammation with tissues proliferation. Furthermore, the conversion of a healthy cell into an oncogens (cancerous cells) involves the alteration of certain genes at various stages of initiation, development, and stimulation. Although a single factor cannot signify

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cancer predisposition, a combination of factors puts some individuals at increased risk. Although most high-risk cases have a hereditary basis, food choices may have an impact on health outcomes. Several studies have suggested that regular intake of fruits and vegetables minimize the chances of colon cancer in both men and women. Diet, which includes a higher consumption of vegetables, grains, fruits, legumes and other phyto-estrogen-enrich foods, as well as a high-fiber, low-fat diet, are all crucial in reducing colon cancer, as well as other cancers such as breast, prostate, and lung cancer, that are more common in developed countries. Dietary compounds might help to impede cancer from progressing to the intrusive and metastatic phases, as well as minimizes the risk of secondary consequences and changes the behaviour of cancer that has already progressed.

Nutraceuticals are the natural remedies, bio-active products that have been extracted or purified from foods and are offered therapeutic values and have been shown to have beneficial properties or offer immunity against various cancer diseases. "Nutraceuticals" are the mixture of two words that combines with keywords: "nutrient" (a nutritional food) and "pharmaceutical" (a medicinal drug). They are said to possess many therapeutic benefits and have good physical impact on humans. Furthermore, there is another concept, which includes the study of relationship between nutritious environment and genomic process and phrased as "Nutri-genomics". It gives a scientific understanding of phytochemicals that improves the health of the humans through modifying gene expression or structure. This causes changes in the onset, development, and evolution of several diseases. As a result, nutrigenomics plays a critical

The book is a valuable resource for all those who are interested in the field of oncology. It provides a comprehensive overview of the current state of research and practice in this field, and is a must-read for all those who are involved in the care of cancer patients. The book is written in a clear and concise style, and is easy to read and understand. It is a valuable resource for all those who are interested in the field of oncology.

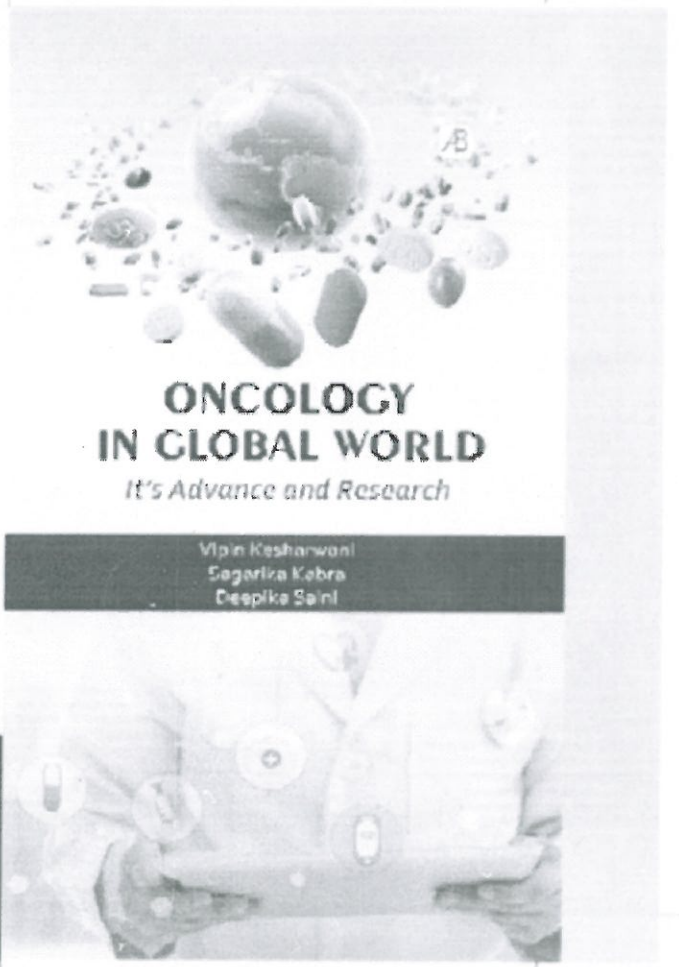
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# 4.

## Immunotherapy to Treat Cancer

Dr. Mithilesh Singh\*

Mohit Agrawal\*\*

Priyanka Chandolia\*\*\*

### Cancer Immunotherapy

Immunotherapy can be used for treatment of various diseases like cancer by using certain components of a person's immune system. It is basically accomplished by the following ways:

- ❖ By stimulating defence mechanisms of immune system naturally so that it can work smarter to terminate cancer cells.
- ❖ By using synthesised compounds that are similar to immune system which strengthen or restore immune system's ability.

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## Chapter - 3

### Ethnopharmacological Significance of Nitrogen Containing Heterocyclic Compounds

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# Chapter - 3

## Ethnopharmacological Significance of Nitrogen Containing Heterocyclic Compounds

Dr. Ramadevi Kyatham, Dr. Raju Bathula, Dr. Sadanandam Palle,  
Dr. Jyothi Vantikommu, Dr. S. Hemalatha and Mohammad Arif Pasha

### Abstract

Heterocyclic compounds have a role in most fields of sciences such as medicinal chemistry, biochemistry also another area of sciences. More than 90% of new drugs contain heterocycles and the interface between chemistry and biology, at which so much new scientific insight, discovery and application is taking place is crossed by heterocyclic compounds. Compounds derived from heterocyclic rings in pharmacy, medicine, agriculture, plastic, polymer and other fields. Most active heterocycles that have shown considerable biological actions as anti-fungal, anti-inflammatory, anti-bacterial, anti-convulsant, anti-protozoal, anti-allergic, herbicidal, anti-cancer activity. Heterocyclic compounds are a highly valuable and unique class of compounds. Different heterocyclic analogues have been evaluated for their diverse biological activities. Heterocyclic compounds are present in abundance in our surroundings. They owe their importance in the biological system due to uniqueness in their structural skeleton parts. They are naturally found in nucleic acid, vitamins, anti-biotics, hormones etc. Nitrogen containing heterocyclic compounds are an important class of heterocyclic compounds that has paid significant contribution towards medicinal chemistry. This review highlights the trends in the use of nitrogen-based moieties in drug design and the development of different potent and competent candidates against various diseases. This review shall give researchers access and detailed understanding on various application of a novel heterocyclic subsidiary into diverse areas for new process or application. In this study, we will understand the biologically active heterocyclic compounds, biological importance of nitrogen-containing heterocyclic compounds and pyridine containing medicinal agents. The number of novel N-heterocyclic moieties with significant physiological properties and promising applications in medicinal chemistry is ever-growing. Pyrimidine is one of the most important



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Chapter



### Carbon Allotropes-Based Nanodevices

#### Graphene in Biomedical Applications

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#### ABSTRACT

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# 14 Carbon Allotropes- Based Nanodevices: Graphene in Biomedical Applications

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## 14.1 INTRODUCTION

Carbon is a nonmetallic, tetravalent element that is also a building block of life on earth. The unique property of self-binding and binding other elements results in the formation of structurally diverse compounds possessing varied physical and chemical properties. The applicative importance is well observed in versatile technical drug applications (Figure 14.1).

Material scientists have succeeded in tailoring the structural and functional properties of existing materials to create new and modified versions by altering synthetic routes [1]. The two naturally occurring carbon allotropes are graphite with  $sp^2$  hybridized and diamond with  $sp^3$  hybridized carbon networks. Graphite is soft, ductile and conductive, whereas diamond is hard and insulating; thus, they show unique opposing properties. In 1985, the first synthetic carbon allotrope, zero-dimension (0D) fullerene was discovered by Kroto et al. [2], followed by one

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Chapter



### C-Dot Nanoparticulated Devices for Biomedical Applications

By Ritesh Kumar ([/search?contributorName=Ritesh Kumar&contributorRole=author&redirectFromPDP=true&context=ubx](/search?contributorName=Ritesh+Kumar&contributorRole=author&redirectFromPDP=true&context=ubx)), Gulshan Dhamija ([/search?contributorName=Gulshan Dhamija&contributorRole=author&redirectFromPDP=true&context=ubx](/search?contributorName=Gulshan+Dhamija&contributorRole=author&redirectFromPDP=true&context=ubx)), Jamilur R. Ansari ([/search?contributorName=Jamilur R. Ansari&contributorRole=author&redirectFromPDP=true&context=ubx](/search?contributorName=Jamilur+R.+Ansari&contributorRole=author&redirectFromPDP=true&context=ubx)), Md. Noushad Javed ([/search?contributorName=Md. Noushad Javed&contributorRole=author&redirectFromPDP=true&context=ubx](/search?contributorName=Md.+Noushad+Javed&contributorRole=author&redirectFromPDP=true&context=ubx)), Md. Sabir Alam ([/search?contributorName=Md. Sabir Alam&contributorRole=author&redirectFromPDP=true&context=ubx](/search?contributorName=Md.+Sabir+Alam&contributorRole=author&redirectFromPDP=true&context=ubx))

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Chapter

## Synthesis Approaches for Higher Yields of Nanoparticles

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### ABSTRACT

In recent years, synthesis of metallic nanoparticles (MNPs) by the green route has become a center of attention for researchers around the globe. MNPs synthesized by the green route possess unique characteristic features like ease of availability, cost-effective, eco-friendly, non-toxicity, and safe for high reactivity. Apart from these salient features they don't require high temperature, pressure, hazardous reagents, stabilizing, or capping agents. One of the most promising areas of green synthesis is the use of organisms in particular parts of plants, for example, roots, shoots, leaves, stems, flowers, barks, and seeds, their extracts as well as natural biopolymers. MNPs synthesized by plants are more stable as well as their

  
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## The Transgender Status In India With Special Reference To The Transgender Persons Act, 2019: Legal And Medical Lacuna

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In India, the Transgender Persons (Protection of Rights) Act, 2019, is a significant piece of legislation with the dual objectives of empowering and protecting transgender people. It was passed in order to acknowledge and defend the rights of transgender people and to combat the prejudice and marginalisation they experience in a variety of spheres of life. According to the Act, a transgender person is someone whose gender does not correspond to the gender assigned at birth, including intersex people and Tran's men and women. It recognises the freedom for people to choose their own gender and offers a legal framework for that recognition and safety. The Act's main clauses are shown below.

### Key Provisions:

- **Identification of a transgender person:** A transgender person is one whose gender does not correspond to the gender assigned at birth, according to the Act. It encompasses those who identify as transgender, intersex, genderqueer, and with socio-cultural identities like kinnar and hijra.
- **Unfair Treatment:** The Act forbids denial of service as well as other forms of discrimination and unfair treatment against transgender people.
- **Right to be included:** Each transgender person has the right to live with and be a part of their household. A competent court may order the placement of the transgender person in a rehabilitation facility if the individual's immediate family is unable to care for them.
- **Jobs and employment matters:** No public or private organisation has the right to discriminate against transgender people in hiring, advancement, or other employment-



# The Role of Genetic, Genomic, and Breeding Approaches in the Fight Against Fungal Diseases in Wheat 12

Antul Kumar, Anuj Choudhary, Radhika Sharma, Harmanjot Kaur, Khushboo Singh, Baljinder Singh, and Sahil Mehta

## Abstract

Wheat is a major, widely cultivated staple cereal food resource, representing almost 200 million ha of agricultural areas. It is regarded as the second most important cultivated crop, equally consumed in different forms. In recent years, enormous progress in genomic advancement in fungal disease resistance has partially solved the problem throughout the globe. The landraces, conventional varieties, and wild species (primary, secondary, and tertiary gene pools) have been explored in search of resistant genes. Wheat's cosmopolitan distribution and changes in global climatic conditions exposed the crop to various strains of fungal pathogens. Conventional and advanced breeding techniques provide a platform for identification and introgression of potential genes that help to combat the fungal disease exploits. Furthermore, the use of new genomic techniques such as marker-assisted breeding, RNAi editing, genome editing, speed breeding tillage, and so on empowers the harnessing of new rust-resistant genes. The chapter highlights the importance of potential donors of fungal resistance alleles in breeding strategies and new emerging techniques. Moreover, translational

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approaches are also essential to achieve long-term durable resistance along with the variable resistance nature of fungal pathogens.

### Keywords

Wheat · Productivity · Fungal diseases · Markers gene *Lr78*

### Abbreviations

AFLPs	Amplified fragment length polymorphisms
BAC libraries	Bacterial artificial chromosome libraries
CAPS	Cleaved amplified-polymorphic sequence
CASS	Chromosome arm-specific sequencing
DArT markers	Diversity arrays markers
DHs	Doubled haploids production
dsRNA	Double-stranded RNA
FST	Flow sorting technology
GM crops	Genetically modified crops
GS	Genomic determination
GWAS	Genome-wide association studies
HIGS	Host-induced gene silencing
MABS	Marker-assisted backcrossing
MAS	Marker-assisted selection
MNs	Meganucleases
NGS	Next-generation sequencing technologies
PM resistance genes	Powdery mildew resistance genes
PtCNB	Calcineurin B
PtCYC1	Cyclophilin
PtMAPK1	Mitogen-activated protein kinase 1
QTL	Quantitative trait locus
R gene	Resistance genes
RFLPs	Restriction fragment length polymorphism
RNAi	RNA interference
S genes	Susceptibility genes
SIGS	Spray-induced gene silencing
SNPs	Single nucleotide polymorphism
SSD	Single-seed-descent
SSRs	Simple sequence repeats
STS	Sequence targeted site
TILLING	Targeting induced local lesions in genomes
WGS	Whole-genome shotgun approach
ZFNs	Zinc-finger nucleases



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# ENGINEERED NANOMATERIALS FOR SUSTAINABLE AGRICULTURAL PRODUCTION, SOIL IMPROVEMENT AND STRESS MANAGEMENT



Edited by  
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# Potential environmental and human health implications of nanomaterials used in sustainable agriculture and soil improvement

# 17

Atul Loyal<sup>1</sup>, S.K. Pahuja<sup>1</sup>, Pankaj Sharma<sup>2</sup>, Arvind Malik<sup>3</sup>, Rakesh K. Srivastava<sup>4</sup>, Sahil Mehta<sup>5</sup>

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## 1. Introduction

Humans are living on this planet for millions of years; they along with other organisms have witnessed the copious major and minor changes in our planet. The world and the society that today we see were not the same before as assessed in terms of demography and topography. The domestication of plant systems by human beings happened to be a major evolutionary success that improved their lifestyle from hunters and gatherers to civilized fellows. This event further stimulated a shift in human dependence from the flora, fauna, and geographic location to plant systems. Domestication brought a paradigm shift in their life from nomadic to settled ones. Humans started collecting some grasses and unknowingly through their seeds, which led to their dissemination and dispersal. As a result, their area and plant population increased in the next season/year, and by seeing this, humans applied their conscience and repeated the same process in other plants that were later known as crops. The story of the domestication of agricultural crops is somewhat similar in almost all the human civilizations of that time. Further, with the advent of science and technology, humans followed the practice of artificial selection and eventually replaced the wild form of several crops with the high-yielding domesticated forms (Bongaarts, 2009).

The science of agriculture has progressed and evolved at a very slow but constant pace. During the colonial times, the fruit trees, vegetables, and various field crops

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# Role of nanocomposites in sustainable crop plants' growth and production

# 7

Antul Kumar<sup>1</sup>, Harmanjot Kaur<sup>1</sup>, Anuj Choudhary<sup>1</sup>, Kanika Mehta<sup>2</sup>,  
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## Abbreviations

ABA	Abscisic acid,
Ag NPs	Silver nanoparticles,
Ag NPs	Silver nanoparticles,
Al <sub>2</sub> O <sub>3</sub>	Aluminum oxide,
AlN	Aluminum nitride,
Au NPs	Gold nanoparticles,
BN	Boron nitride,
CNFs	Carbon nanofibers,
CNTs	Carbon nanotubes,
Cu	Copper,
Cu NPs	Copper nanoparticles,
DNA	Deoxyribonucleic acid,
dsRNA	Double-stranded RNA,
ETS	Electron transport system,
Fe	Iron,
Fe <sub>2</sub> O <sub>3</sub>	Iron oxide,
Fe <sub>2</sub> O <sub>3</sub> NPs	Iron oxide nanoparticles
Hg	Mercury,
FeO NPs	Ferrous oxide,
IAA	Indole acetic acid,
MgO NPs	Magnesium oxide nanoparticles,
MS media	Murashige and Skoog medium,
Na <sup>+</sup> /K <sup>+</sup> ratio	Sodium/potassium ratio
NPs	Nanoparticles,
PGPR	Plant growth—promoting rhizobacteria,
PS II	Photosystem II,
QDs	Quantum dots,
RNA	Ribonucleic acid,

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## Chapter-2

### Honouring Student Diversity in Higher Education Institutions

<sup>1</sup>Dr. Tania Gupta

#### *Abstract*

*India is often referred to as a 'diverse' nation owing to its myriad regions, languages, classes, castes, ethnicities, and knowledge systems. Besides challenges of inclusion for students from various diverse social backgrounds at the entry level through admissions in the HEIs, there are further impeding challenges in the classroom. Achieving a varied and inclusive campus climate can be facilitated by promoting diversity and inclusivity at all levels of the HEI, including the faculty and administration. All students, irrespective of their diverse backgrounds, need cultural and socio-emotional support networks to succeed on university/college campuses, but they are particularly crucial for students who belong to marginalized and disadvantaged groups. Institutional leadership must ensure promulgating policies and ensure well-established enabling mechanisms to provide these students with a support system tailored to their requirements. HEIs should also provide financial assistance to students from low-income backgrounds, bridging the need gap. In addition, it is the responsibility of every HEI to transform and develop a disability-inclusive education system. The National Education Policy 2020 (NEP 2020), emphasizes that curriculum, pedagogy, and examination reforms must cater to 'respect for diversity; and the local context.*

*Keywords: Ethnicity, Disadvantaged Groups, Gender, Higher Education, Marginalization, Race, Social Inclusion, Student Diversity, Student Support.*

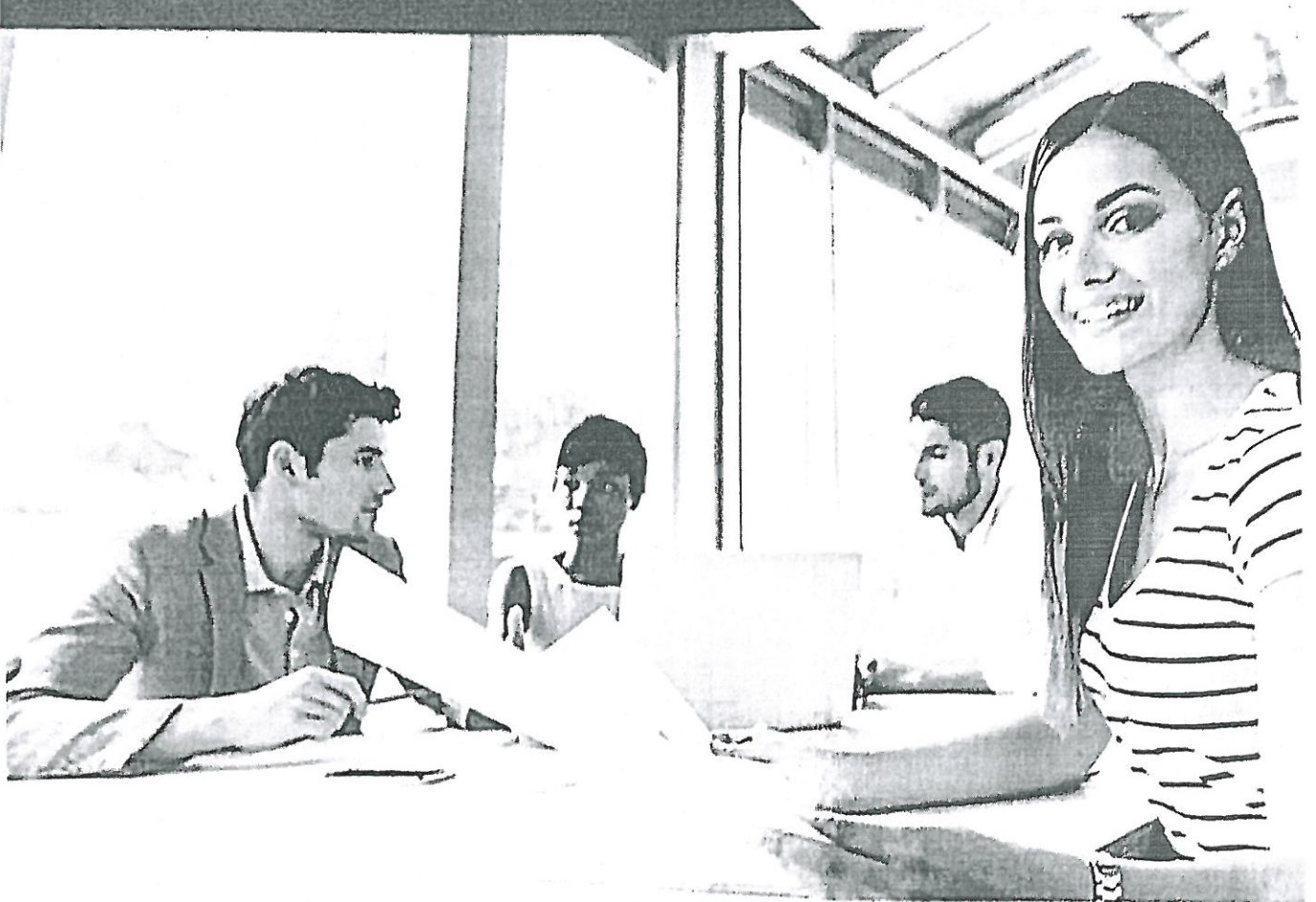
#### **Introduction**

There has been a phenomenal expansion in India's higher education sector. According to the most recent All India Survey of Higher Education Report, 1,043 universities, 42,343 colleges, and 11,779 stand-alone institutions make it one of the largest higher education sectors in the world (AISHE, 2019–20). According to significant research conducted in the year 2019 by the Brookings Institution entitled 'Reviving Higher Education in India', the number of institutions has increased in India by more than 400 percent since 2001, with much of the development taking place in the private education sector. To accommodate India's sizable youth population and expanding college-age cohort, the capacity of Higher Education Institutions (HEIs) has been expanding rapidly.

---

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# Challenges of Women Entrepreneurship



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Dr. Tania Gupta

Dr. Anjana Rao

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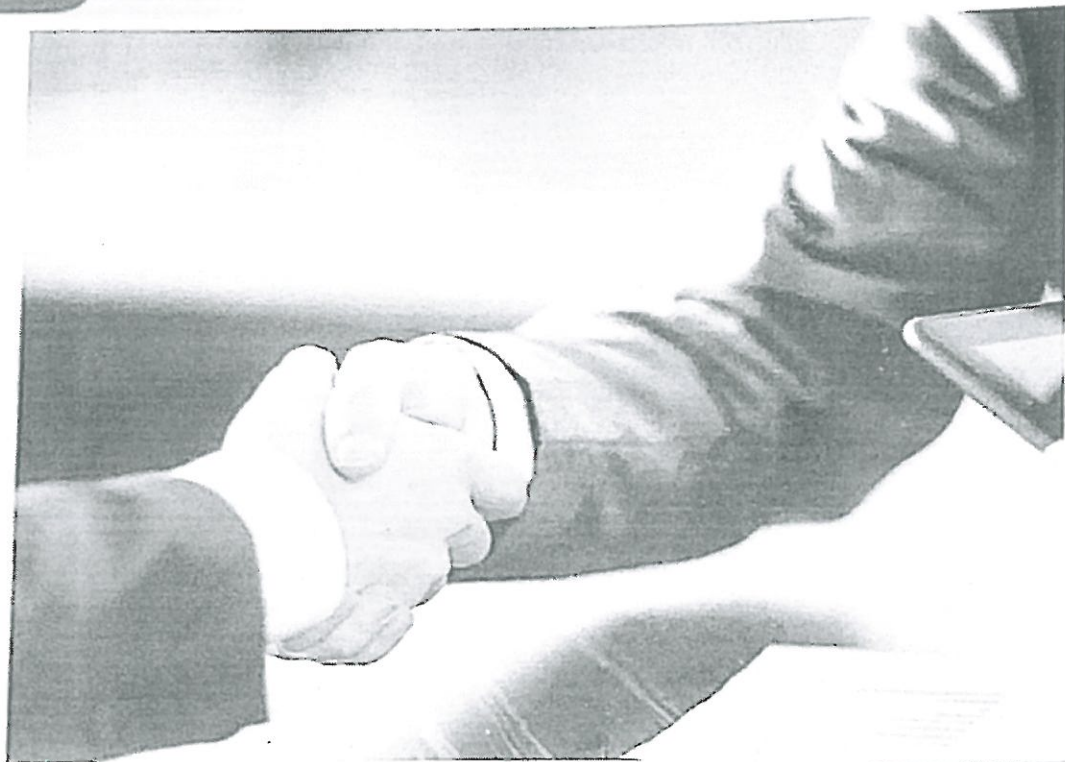
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# HUMAN VALUES & PROFESSIONAL ETHICS



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Dr. Ghanshyam Vatsa

Dr Garima Bhardwaj



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AUTHORS

Dr. Tania Gupta  
Dr. Ghanshyam Vatsa  
Dr. Garima Bhardwaj



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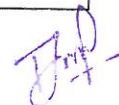
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# WOMAN'S ROLE IN 21ST CENTURY



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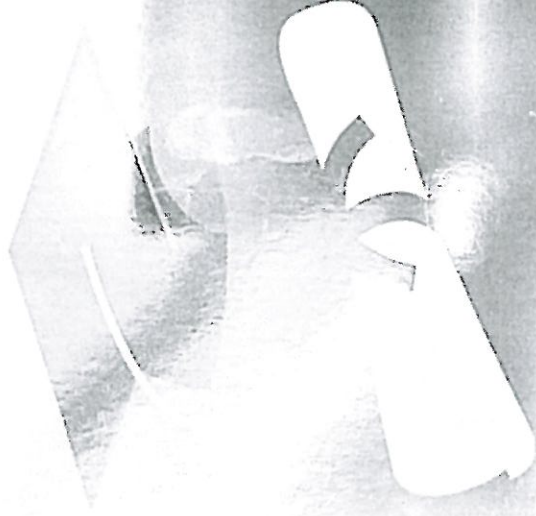
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# Managing Quality in Higher Education Institutions



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# Managing Quality in Higher Education Institutions

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## Chapter-1

### Total Quality Management in Teacher Education Institutions: An Explorative Study

Dr. Sanjay Kumar & Dr. Tanja Gupta

#### Abstract

This chapter is an explorative study of Total Quality Management (TQM) in relation to teacher education institutions. TQM is a philosophy as well as a set of guiding principles that represent the foundation of a totally quality improving organization. The principles of TQM have been successfully adopted in the field of higher education by developed countries such as Japan, USA and UK. Still the application of TQM in higher education institutions of India is questionable and the implementation is not very effective in comparison to other service sectors. This chapter talks about the evolution of Total Quality Management, Total Quality Management in Education, Deming's quality approach to education, Baldrige's quality criteria for education and Total Quality Management in teacher education institutions, rather modifications can be done to suit the teacher education institutions for achieving the best results. Even in industry and business, there is no rigid or single model of Total Quality Management. Depending on the situations prevailing in each organization, the principles of Total Quality Management are applied. Therefore, the principles of the Total Quality Management can be adapted in general to the advantage of the teacher education institutions to improve the quality of the teacher education.

**Keywords:** *Improvement, Quality Control, Quality Assurance & Total Quality Management.*

#### Introduction

Total Quality Management is a philosophy as well as a set of guiding principles that represent the foundation of a continuously improving organization. The principles of TQM have been successfully adopted in the field of higher education by developed countries such as Japan, USA and UK. Leading technical institutes in India, such as the Indian Institute of Technology, practice the TQM philosophy. Still the application of TQM in higher education institutions of India is questionable and the implementation rate is not very effective in comparison to other service sectors. Naik (2001) has strongly suggested that

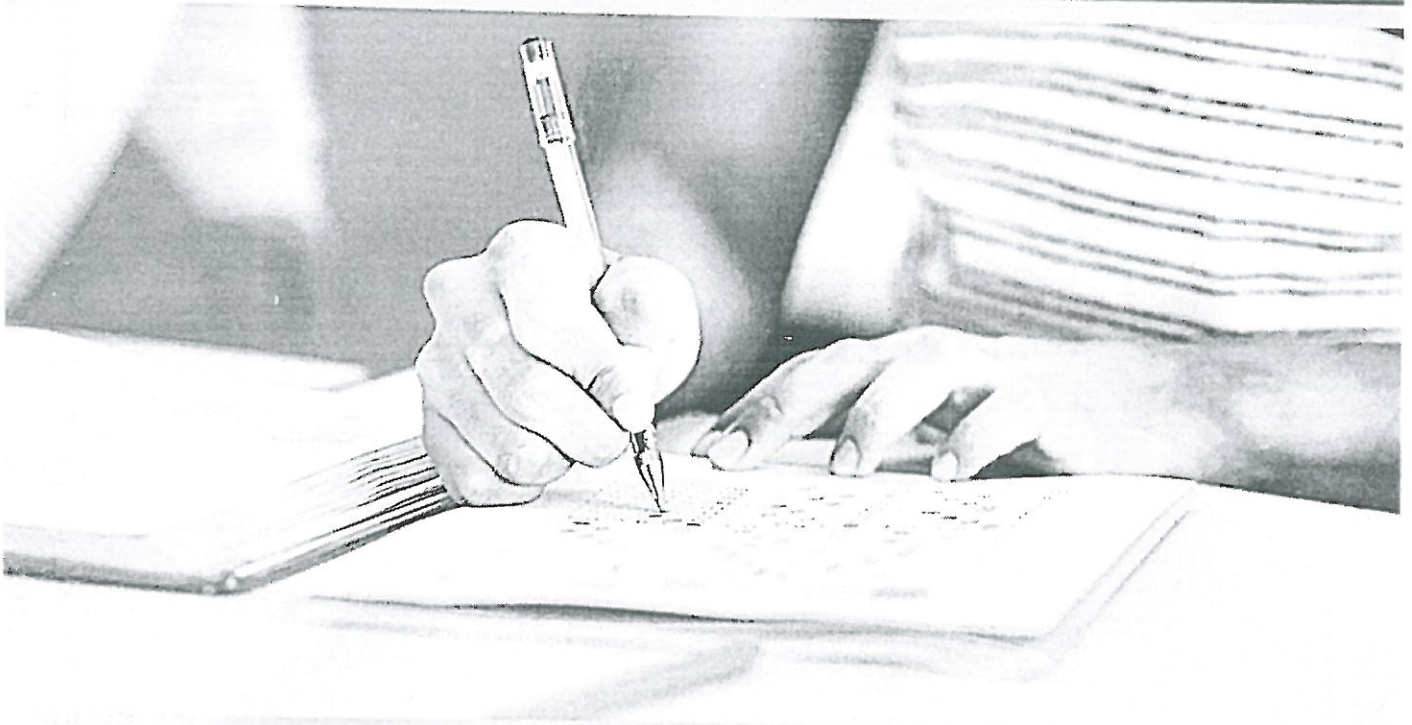
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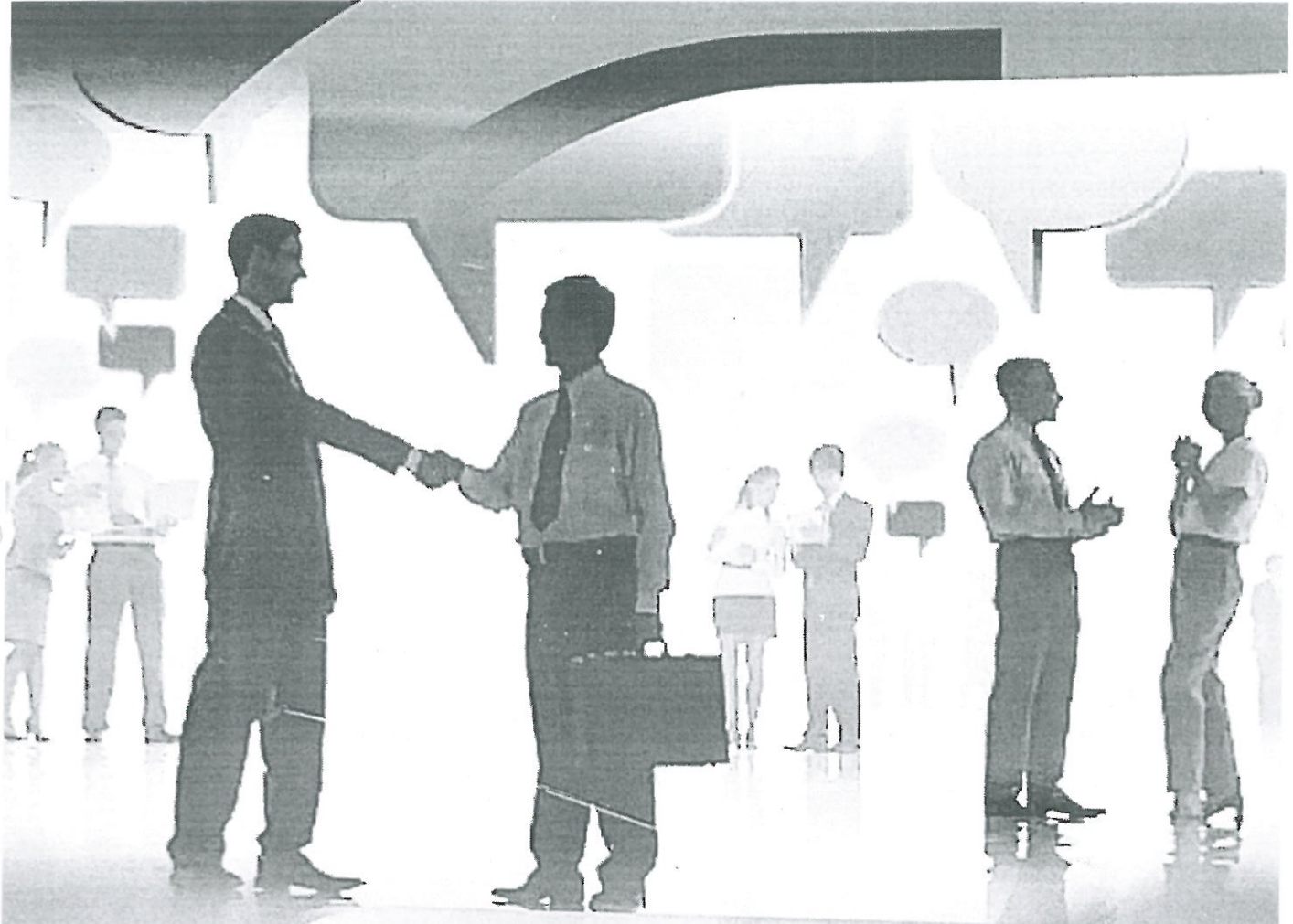
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**Ghanshyam Vatsa**  
**Dr. Tania Gupta**  
**Dr. Danesh Dinyar Chinoy**



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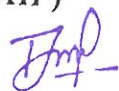
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THEORY AND PRINCIPLES OF EDUCATION



# THEORY AND PRINCIPLES OF EDUCATION

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Dr. Tania Gupta is Professor & Dean, School of Education and Dean, Student Welfare K. R Mangalam University, Haryana, India. She earned her doctorate in Education (Ph.D.) and Master in Education (M.Ed.) from Panjab University, Chandigarh. Her other professional qualifications include UGC NET Education, M.A. (Economics) and Post Graduate Diploma in Educational Planning and Management (PGDEPM). During her variegated professional experience of 20 years from school to university level, she has ceaselessly endured demonstrating exemplary leadership in creating the best learning environment and fostering a vibrant organizational culture with robust ethos, professional ethics, teamwork, discipline and safety, creativity and innovation. She has been the founder Editor of various journals in education. There are several research papers, edited books, book chapters and patents published to her credit. Her specialization and research interests include education policy, higher education, and economics of education, teacher education, inclusive education, educational leadership and management. She is Vice Chairperson, Council for Teacher Education Foundation (CTEF), Delhi NCR Chapter & North Zone President, and Council for Teachers' Professional Development (CTPD).



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# RESEARCH METHODOLOGY

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Dr. Mohd. Shaikhul Ashraf, Dr. Ch. Sandeep, Dr. Sybina N S

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# RESEARCH METHODOLOGY

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# CLASSROOM TEACHING- LEARNING STRATEGIES

For Creating an Inclusive Culture in Education



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**Kavitha N Gupta**

**Kavitha N Karun**

Inclusion is a culture that welcomes all individuals irrespective of their differences. Inclusive education is a means of transforming society by ensuring equity in education and equity through education. The realization of the Sustainable Development Goals of Inclusion (SDG4) is only possible when the wider spectrum of exclusion is meaningfully interpreted and practices are framed to include all those who have been excluded from the process of education. Inclusive teaching is a range of intentional strategies that give engaging, meaningful, relevant, and accessible learning experiences.

Teachers are the cornerstone of building inclusive classrooms. The experiences that inclusive practitioners have gathered from research and classroom experience, need to be shared and reflected to educate the teacher fraternity to lead the initiatives of inclusion. This book is an effort to suggest some ways of inclusive strategies that may help in creating an inclusive culture in classrooms. The book covers chapters under different sections including removing barriers in learning, learning through collaboration, cognitive strategies, and the use of art sports, and games.



**Tania Gupta** earned her doctorate in Education (Ph.D.) and Master in Education (M.Ed.) degree from Panjab University, Chandigarh. Her other professional qualifications include UGC NET (Education), M.A. (Economics) and Post Graduate Diploma in Educational Planning and Management (PGDEPM).

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**Kavitha N Karun** has been working in the field of teacher education for more than 16 Years. She has teaching experience in both graduate and post graduate levels. Presently working as an Assistant Professor, Army Institute of Education, Greater NOIDA (under aegis of Army Welfare Society & affiliated to Guru Gobind Singh Indraprastha University, New Delhi). She has done her Ph.D. in Education from School of Pedagogical Sciences, Mahatma Gandhi University, Kottayam. M.Ed (Elementary Education) from Regional Institute of Education, Mysuru. M.Phil (Education) from Alagappa University, M.Sc Psychology from Madras University. MA in Politics and International Relations from School of International Relations, Mahatma Gandhi University. She has other qualifications including PG Diploma in Counselling, UGC -NET in Education and Political Science.

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# Classroom Teaching- Learning Strategies

For Creating an Inclusive Culture in Education

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### A Review on Security Frameworks and Protocols in the Internet of Things

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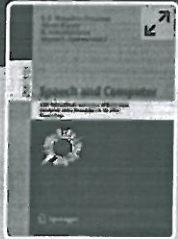
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## Study of Speech Recognition System Based on Transformer and Connectionist Temporal Classification Models for Low Resource Language

[Shweta Bansal](#) , [Shambhu Sharan](#) & [Shyam S. Agrawal](#)

Conference paper | [First Online: 10 November 2022](#)

**704** Accesses

Part of the [Lecture Notes in Computer Science](#) book series (LNAI, volume 13721)

### Abstract

Sequence-to-sequence methods have been extensively used in end-to-end (E2E) speech processing for recognition, translation, and synthesis work. In speech recognition, the Transformer model, which supports parallel computation and has intrinsic attention, is frequently used nowadays. This technology's primary aspects are its quick learning efficiency and absence of

sequential operation, unlike Deep Neural Networks (DNN). This study concentrated on Transformer, an emergent sequential model that excels in applications for natural language processing (NLP) and neural machine translation (NMT) applications. To create a framework for the automated recognition of spoken Hindi utterances, an end-to-end and Transformer based model to understand the phenomenon classification was considered. Hindi is one of several agglutinative languages, and there isn't much information available for speech/voice recognition algorithms. According to several research, the Transformer approach enhances the performance of the system for languages with limited resources. As per the analyses done by us, it was found that the Hindi-based speech recognition system performed better when Transformers were used along with the Connectionist Temporal Classification (CTC) models altogether. Further, when a language model was included, the Word Error Rate (WER) on a clean dataset was at its lowest i.e., 3.2%.

#### Keywords

**Connectionist Temporal Classification**

**CTC model**

**Low-resource language**

**Speech recognition**

**Transformer**

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**Advances in Thermal Sciences** pp 161–172

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## A Comprehensive Study of an Ejector System and Its Applications: A Review

[Abhishek Kulkarni](#), [Surendra Kumar Yadav](#)  & [Arvind Kumar](#)

Conference paper | [First Online: 10 November 2022](#)

**374** Accesses

Part of the [Lecture Notes in Mechanical Engineering](#) book series (LNME)

### Abstract

The review aims to give a writing overview of the examination endeavors achieved in the case of an ejector geometry framework. An ejector is a device used to increase the delivery rate of a fluid. They are used in the refrigeration cycle and the rocket engines as well. It is difficult to understand the flow characteristics of the fluids and the thermodynamic properties of the streams. They can be understood using some computational techniques and tests. The mathematical models for the

flow of the fluids inside the ejector are least observed since it is difficult to investigate a fast-moving stream of the fluids inside the ejector. Ejectors have many applications, where heat transfer takes place at a higher rate and helps create the vacuum. This review paper examines the construction and working, applications, and new advances related to the ejectors. Furthermore, it is observed that there is a special need to investigate various aspects of the ejector.

### Keywords


**Ejector****Working fluids****Geometry optimization****Mathematical modeling****Applications**

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**Advances in Thermal Sciences** pp 91–102

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## Impact of Titanium Oxide-Based (TiO<sub>2</sub>) Nanofluid on Parabolic Trough Solar Concentrating Collector

[Shri Ram Bhardwaj](#), [Surendra Kumar Yadav](#)  & [Arvind Kumar](#)

Conference paper | [First Online: 10 November 2022](#)

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Part of the [Lecture Notes in Mechanical Engineering](#) book series (LNME)

### Abstract

Parabolic trough solar concentrating collector (PTSC) system is proficient in all solar applications such as power generation, steam, water heating, and air heating. This work was conceded for the study of nanofluids which are nascent fluid that has given away the growth in the thermal properties over the past decade. Nanofluids have made great potential in the field of nanotechnology for thermal engineers. The present work investigates the

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effects of variation of titanium oxide nanoparticles concentration on the efficiency of a nanofluid-based parabolic trough solar concentrating collector with the usage of high-reflective mirror trough. Nanofluids blend primarily the base fluid (water, in this study) with the nanoparticles of the size micro or millimeter and display characteristic features than that of conservative fluids employed. At 110 lph mass flow rate, the percentage change in overall thermal efficiency was found to be increasing with increase in concentration of nanoparticle, i.e., 42.5% at 0.01% of TiO<sub>2</sub>, 59.17% at 0.1% of TiO<sub>2</sub>, and 62.28% at 0.15% of TiO<sub>2</sub> in comparison to the water. On the other hand, with an increase in mass flow rate (i.e., 160 lph), the percentage variation in overall thermal efficiency was found to be 26.47%, 41.06%, and 66.37% at 0.01%, 0.1%, and 0.15% of TiO<sub>2</sub> nanoparticles, respectively, when it is compared to the water being used as working fluid. The study indicated that the overall performance of the PTSC improves with an enhancement of mass flow rate and nanoparticle concentration.

#### Keywords

**PTSC****Nanofluid****Titanium oxide****Solar energy**

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## Phase Transformation Analysis of Fe-Substituted Cr<sub>2</sub>O<sub>3</sub> Nanoparticles Using Rietveld Refinement

Jarnail Singh, Pankaj Bhardwaj, Raj Kumar, Lavraj, Chand, Kanchal Kumar & Manoj Verma

Conference paper | [First Online: 31 October 2022](#)

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Part of the [Lecture Notes in Mechanical Engineering](#) book series (LNME)

### Abstract

In this present report, effect on iron (Fe) substitution on the structural properties of chromium oxide (Cr<sub>2</sub>O<sub>3</sub>) nanoparticles has been investigated in detail. Simple and cost-effective co-precipitation technique was used to synthesize Fe-substituted Cr<sub>2</sub>O<sub>3</sub> nanoparticles at various Fe-concentrations. Structural properties of as-prepared nanoparticles were examined using X-ray diffraction (XRD) technique and Fourier transform infrared (FTIR) spectroscopy. XRD results demonstrated that crystal structure remains single phase up to x = 0.20 of Fe-content. Single-phase Cr<sub>2</sub>O<sub>3</sub> nanoparticles crystallize in rhombohedral crystal structure with space group. Beyond x = 0.20 of Fe-content into Cr<sub>2</sub>O<sub>3</sub> nanoparticles, formation of secondary phase in the form of iron oxide (Fe<sub>2</sub>O<sub>3</sub>) has been initiated. Both Cr<sub>2</sub>O<sub>3</sub> and Fe<sub>2</sub>O<sub>3</sub> materials crystallize in same corundum structure with same space

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**Advances in Functional and Smart Materials** pp 281–290

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## A Detailed Investigation of Structural and Optical Properties of CTAB-Assisted Cr<sub>2</sub>O<sub>3</sub> Nanoparticles

[Jarnail Singh](#) , [Mayank Dotiyal](#), [Pankaj Bhardwaj](#), [Prabhakar Bhandari](#), [Kaushal Kumar](#), [Saurav Dixit](#) & [Vikram Verma](#)

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### Abstract

Surfactant-assisted co-precipitation has been employed to synthesize chromium oxide (Cr<sub>2</sub>O<sub>3</sub>) nanoparticles. CTAB (cationic surfactant) was used in synthesis of nanoparticles of chromium oxide (Cr<sub>2</sub>O<sub>3</sub>). The concentrations of surfactants were tailored from 2 to 10 wt%. X-ray diffraction (XRD), field emission scanning electron microscopy (FESEM), fourier-transform infrared

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spectroscopy (FTIR), and Raman spectroscopy techniques were performed to demonstrate the structural properties. The crystallite size of the CTAB-assisted Cr<sub>2</sub>O<sub>3</sub> nanoparticles was found to be decreasing as the surfactant concentration increased up to a critical concentration value, determined using the Scherrer's formula. The induced lattice strain in the nanoparticles was attributed to the shifting of the XRD peaks. The structural structure of the produced nanoparticles was confirmed as rhombohedral by the FT-IR and Raman spectra, as well as the XRD patterns. UV-Vis spectroscopy was used to evaluate the optical properties. The optical band gap energy of as-prepared nanoparticles at different CTAB-contents was determined using the Kubelka-Munk (K-M) technique, and revealed that the optical band gap energy of CTAB-assisted Cr<sub>2</sub>O<sub>3</sub> nanoparticles was increasing as crystallize size decreases.

#### Keywords

**Surfactant**    **Rietveld refinement**    **Particle size**

**Band gap**


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
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**Advances in Functional and Smart Materials** pp 211–217

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## Effect of Additive on Flowability and Compressibility of Fly Ash

[Kaushal Kumar](#) , [Rishabh Arora](#), [Jarnail Singh](#), [Sarah Khan](#), [Lavesh Mishra](#), [Prabhakar Bhandari](#), [Saurav Dixit](#) & [Chander Prakash](#)

Conference paper | [First Online: 31 October 2022](#)

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### Abstract

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prepared combination have been determined. The addition of coarse bottom ash particles to finer fly ash particles improves the flowability as well as compressibility features. The extensive analyses also investigate the possibilities of transporting of ash through pipeline is better way.

Keywords

**Fly ash**    **Bottom ash**    **Flowability**

**Compressibility**    **Rheology**

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**Advances in Functional and Smart Materials** pp 119–127

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## Synthesis and Characterization of Highly Transparent and Superhydrophobic Zinc Oxide (ZnO) Film

[Ashish Jaswal](#), [Kamal Kishore](#), [Amarjit Singh](#), [Jarnail Singh](#) ,  
[Saurav Dixit](#), [Kaushal Kumar](#) & [Manoj Kumar Sinha](#)


Conference paper | [First Online: 31 October 2022](#)

**329** Accesses | **18** Citations

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### Abstract

This work represents the synthesization and functionalization of zinc oxide (ZnO) nanoparticles/films and investigated its superhydrophobic and optical properties. ZnO nanoparticles were prepared by precipitation method using sodium hydroxide (NaOH) as a precipitating agent. The functionalization of the ZnO nanoparticles was carried out to tailor its hydrophilic


  
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nature to hydrophobic. Mercaptotrimethoxysilane (MPMS) was also used for further modification of ZnO nanoparticles. Functionalized ZnO nanoparticles then mixed with polystyrene were passed through the rolling machine at a temperature of 200 °C. The required thin film was achieved after pressing the rolled thick film at 150 °C and 90 MPa. A scanning electron microscope was used to study the morphology of superhydrophobic film (SHF). The contact angle of the SHF was measured with the help of a tensiometer. Evaluation of optical properties of the prepared ZnO film was carried out using UV–visible spectrophotometry. An atomic force microscopy technique was used to illustrate the roughness of the film. Characterizations of SHF revealed that the film possesses the high optical transparency in visible range, which is almost similar to the bare glass. The antireflective film has provided an average transparency of 91.5%, comparable to the bare glass substrate 92% at a wavelength range of 320–750 nm. Moreover, this transparent and superhydrophobic film shows an average roughness of 27 nm with the highest water contact angle of 157°. The weight percentage of ZnO and MPMS found to significantly influence the contact angle, which governs the thin film's superhydrophobicity.

#### Keywords

**Superhydrophobic**      **Contact angle**      **Transmission**  
**Surface roughness**      **Nanoparticles**      **Zinc oxide**

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**Advances in Functional and Smart Materials** pp 79–91

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## Comparative Study of Concrete Cylinders Confined Using Natural and Artificial Fibre Reinforced Polymers

[Priyanka Singh](#), [Saurav Dixit](#) , [Margel Taso](#), [Kaushal Kumar](#), [Jarnail Singh](#), [Krystyna Araszkievicz](#), [Nikolai Ivanovich Vatin](#) & [Chander Prakash](#)


Conference paper | [First Online: 31 October 2022](#)

**342** Accesses | **12** Citations

Part of the [Lecture Notes in Mechanical Engineering](#) book series (LNME)

### Abstract

Fibre reinforced polymers are light, corrosion resistant, and resilient, thereby creating a boom for the future technical knowhow in means of transportation ranging from roadways, railways, and airways. Use of natural fibre by mankind can be dated back since ages ago like building materials. Polymers' invention in the early

  
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nineteenth century opened new doors for a researcher to use natural fibre. Synthetic fibre, for example, glass fibre, usage has skyrocketed fibre. More usage of synthetic fibre leads to pollution during its manufacture and recycling shifting the need to use from synthetic to natural fibre. This generated newfound interest in the new ways of natural fibre and to be neck-to-neck of the synthetic fibres. Nowadays, it is being used in aerospace and building industry. Here, the testing has been done to calculate confinement modulus and strength, thereby plotting load vs deflection and axial stress versus axial strain. Comparison has been carried out between confinement modulus and strength when they are fully and partially warped.

#### Keyword

**Fibre reinforcement polymers**      **Concrete**

**Construction management**      **Buldings**

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## Effect of Annealing Temperature on Phase Transformation of NiCr<sub>2</sub>O<sub>4</sub> Nanoparticles and Evaluated Its Structural and Magnetic Properties

[Jarnail Singh](#) , [Pankaj Bhardwaj](#), [Ravi Kumar](#), [Kaushal Kumar](#), [Saurav Dixit](#) & [Vikram Verma](#)

Conference paper | [First Online: 31 October 2022](#)

**338** Accesses | **2** Citations

Part of the [Lecture Notes in Mechanical Engineering](#) book series (LNME)

### Abstract

Tetragonal nickel chromite (NiCr<sub>2</sub>O<sub>4</sub>) nanoparticles were synthesized using the wet chemical method and investigated their structural and magnetic properties at different annealing temperatures. Structural properties of as-prepared were determined using X-ray diffraction (XRD), Fourier-transform infra-red (FTIR) spectroscopy,

  
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and Raman spectroscopy technique. XRD results demonstrated that NiCr<sub>2</sub>O<sub>4</sub> nanoparticles annealed at 800 and 900 °C led to the multi-phase compound formation of rhombohedral chromium oxide (Cr<sub>2</sub>O<sub>3</sub>) and tetragonal NiCr<sub>2</sub>O<sub>4</sub> phase. However, a complete transformation of multi-phase to single NiCr<sub>2</sub>O<sub>4</sub> tetragonal phase was achieved at 1000 °C. Raman and FTIR spectra also confirmed the formation of a single nickel chromite phase at an annealing temperature of 1000 °C. Some weak traces of characteristics modes of Cr<sub>2</sub>O<sub>3</sub> phase were demonstrated at the lower annealing temperature. Magnetic properties of NiCr<sub>2</sub>O<sub>4</sub> nanoparticles at different annealing temperatures were determined using a vibrating sample magnetometer (VSM). Multi-phase compound nanoparticles exhibited a mixed antiferromagnetic and paramagnetic behavior, whereas single-phase compound was ascribed to paramagnetic ones only.

#### Keywords

**Phase transformation**    **Nanoparticles**    **Chromite**

**Paramagnetic**    **Multi-phase compound**


**Spinel structure**

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## Role of Machine Learning in Healthcare Sector

Mitanshi Rastogi<sup>a</sup>, Dr. Meenu Vijarania<sup>b</sup>, Dr. Neha Goel<sup>c</sup>

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### Abstract:

Healthcare sector is an important and crucial industry as it offers help to several people. It also contributes to the local economy. Various technologies like ML, DL are contributing a lot in revolutionizing the healthcare sector. The benefits offered by these technologies are endless. Healthcare sector deserves special attention as it is related to the lives of human. Any type of delay can be hazardous. It has been seen that machine learning and deep learning techniques prove to be very advantageous in predicting and diagnosis of disease at an early stage. The objective of this research paper is to analyze the growth and importance of data science in healthcare. This paper explores the work done in the healthcare sector with the help of machine learning and deep learning techniques like SVM, Naïve Bayes, ANN, KNN, Decision Tree, CNN and many more.

**Keywords:** Machine Learning, Decision Tree, Regression, Naïve Bayes, Support Vector Machine.

### 1. Introduction

Machine Learning is a branch of artificial intelligence, and study of systems that can learn from data. According to Arthur Samuel (1959) "Machine Learning is a field of study that gives the computer the ability to learn without being explicitly programmed." Machine learning algorithm has mainly three components: representation, evaluation and optimization.

Many organizations with enormous amount of data are using machine learning algorithms to retrieve the valuable information. The purpose of examining the

data gathered in diverse areas changes with the different business domains such as stock market, military, image processing, speech recognition, handwriting recognition, education, construction.

The ML techniques have proven its worth in wide range of applications. Few application areas of machine learning depicted in the Fig 1:

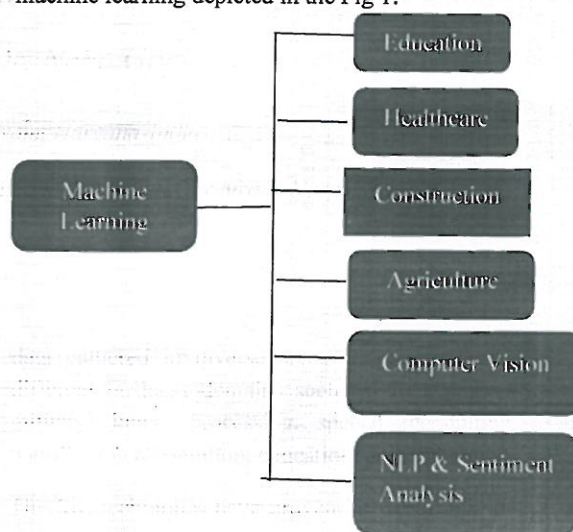


Fig. 1-Application areas of Machine Learning

Advances in machine learning are very helpful for applications – such as in education by transforming and updating teaching learning pedagogy and research; by enhancing safety and lowering costs in the construction and energy sector; by efficient decision making and prognosis of disease at an early stage done efficiently in healthcare. Machine learning algorithms are being used in different phases of agriculture- predicting crops, soil properties, weather, weed detection by assessing satellite images. In sentiment analysis, machine learning identifies and analyses the text for "optimistic", "non-optimistic" or "equitable" along



**Proceedings of the Third International Conference on Information Management and Machine Intelligence** pp 431–443

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## A Review on Congestion Control Using Routing Technique and Machine Learning

S. Hassija , Y. Arora, K. Tripathi & M. Vijarania

Conference paper | [First Online: 04 August 2022](#)

**395** Accesses | **1** Citations

Part of the [Algorithms for Intelligent Systems](#) book series (AIS)

### Abstract

Congestion is the biggest problem for all kind of communication network. When multiple users send the data or packets to each other in a network then traffic of data/packets increases in a network then congestion problem occur. To solve the congestion problem, use routing protocols and machine learning techniques.

Mobile Ad hoc Network (MANET) associate with real time applications. MANET is use to improve the real time structure for optimization of energy efficiency,

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fundamental objectives that deploy in resource limited environment. To the congestion problem implement decision tree approach from machine learning.

Implement multipath algorithm to save the energy of data transmission. In this comprehensive literature to identify the critical problems and discuss the contribution.

Keywords

**Congestion control**

**Machine learning**

**Routing technique**

**IOT**

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# Emerging Computing Paradigms: Principles, Advances and Applications

Editor(s): Umang Singh, San Murugesan, Ashish Seth

First published: 11 July 2022

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**A holistic overview of major new computing paradigms of the 21st Century**

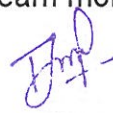
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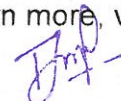
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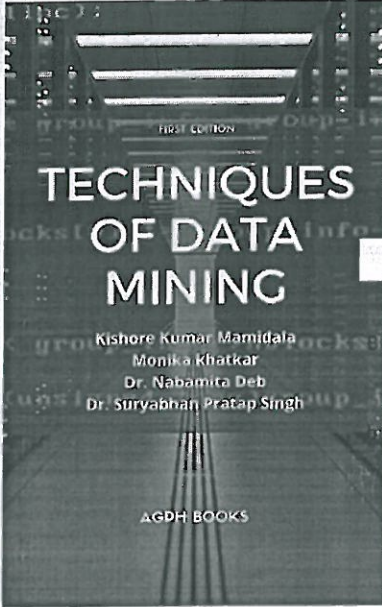
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Data mining can be viewed as a result of the natural evolution of information technology. This book is an introduction to a young and promising field called data mining and knowledge discovery from data. The material in this book is presented from a database perspective, where emphasis is placed on basic data mining concepts and techniques for uncovering interesting data patterns hidden in large data sets. The implementation methods discussed are particularly oriented toward the development of scalable and efficient data mining tools. It then covers in a chapter-by-chapter tour the concepts and techniques that underlie classification, prediction, association, and clustering. An important motivation for writing this book was the need to

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# Smart Electrical Grid System

Design Principle, Modernization, and  
Techniques

Edited by  
Krishan Arora, Suman Lata Tripathi and  
Sanjeevikumar Padmanaban



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# 3 Flexible Load and Renewable Energy Integration with Impact on Voltage Profile of a Large Size Grid.

*Bhavesh Vyas and Vineet Dahiya*  
K. R. Mangalam University

*M. P. Sharma*  
Rajasthan Rajya Vidyut Prasaran Nigam Limited (RVPN)

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## 3.1 INTRODUCTION TO EXISTING SCENARIO

Due to the incorporation of high renewable energy resources, the prerequisite of reactive power reimbursement of the grid changes, as per load variations consuming the power. It indirectly affects the voltage and power factor for grid operations. It results in frequent breaking down/shutdown of conventional power plants, addition of distributed generation in power system [1–5]. Thus, disparity in grid operations strategy has led to multiple system effects and deterioration of power system. To maintain interconnected high-voltage network with the grids of other states, they have to be dynamically planned, or as confined by the utilities. Therefore, the work plan as per the literature available due to the latest research or that based on IEGC,

DOI: 10.1201/9781003242277-3

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## Profitability Visualization in Catalog Management System

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## Profitability Visualization in Catalogue Management System

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In the past few years, the number of products has increased exponentially on e-commerce. Retailers, wholesalers have struggled to keep pace with the rise in the bulk of products. This research intends to carry out the possibilities for deciding the product to be used for promoting business or brand on any e-commerce platform. The most difficult task for a seller is to decide which products should be considered for selling on various online platforms. The method presented in this paper determines which product from a given category should be promoted on an online e-commerce platform, which further increases the brand value or product's online face value. By analyzing the pattern of which product has the highest buyer or inclination towards the particular product, the model employed in this research for visualizing the product is successfully recorded and assessed using the data visualization tool Tableau. This model can be considered as an innovation in sustainable development goals.

### Introduction

With the changing trend of data, data visualization (1) is an important process to support people for well understanding of the problem. Data visualization is a substantial method to Catalogue Management System, which shows the importance of data in a visual form. By using data visualization, people can easily find the association between a product and its appropriate growth or profit.

Catalogue Management System, the model designed and described in this paper is developed using PHP, code igniter framework. The aim behind this model is to ease the work for any retail and wholesale organization. It can be of vital use to gather a vast volume of data for visualizing the products or the data and its relevant growth to maximize profit. This model is designed to store all catalog-related information under one roof like retail price, wholesale price, amazon price, website price, the actual price of all kinds of products. It is a kind of inventory that is maintained for storing or keeping records of all kinds of suppliers-related information or prices, to deliver excellent products to the customer and a further quantity of the sold product can also be tracked. In short, it is a platform for procuring data or product-related information.

Visualizing a product (2) and its profitability is very much crucial as it helps in getting knowledge about the relationship of the product with the business (3). It also caters, that

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# Prediction of Home Loan Status Eligibility using Machine Learning

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## Abstract

Getting a home loan and checking the eligibility is not so straightforward process, it is time-consuming for both the housing finance company and the customer who takes the home loan. A lot of time is wasted on the completion of the entire process. Even using an online application does not ease the process as many details are required such as Gender, Marital Status, Education, Dependents, Self Employed or not, Loan Amount, Loan Amount Term, Credit History, Property Area, and Loan Status. The loan status is the target data and others are its parameter through which some output and pattern can be obtained. The company also collects information about the area urban, semi-urban, rural wants customer wants its property. Overcome this issue machine learning is extremely helpful to automate the process to check the eligibility of customers but the fundamental issues that are used over several years do not care about the outliers and machine learning models, which results in less accuracy and affects the overall performance of the model. To reduce this issue the project uses a data cleaning technique for removing null, missing, and repeated values before applying the bivariate and multivariate analysis which helps to categorize the type of data whether it is numerical or categorical for understanding some unique relations and patterns which will help to increase performance and increase the accuracy as well as precision of the model. The machine learning algorithm contains many techniques like Random Forest, decision tree, and many others, but in the project, the two best classification models that are Logistic Regression, and Gradient boosting are used. Logistic Regression is a type of supervised learning which helps for better classification and predicts a discrete value and gradient boosting removes the error and mistakes of the previous model and helps improve overall performance. For automation of the process for eligibility of the customer, a dataset is collected by the housing finance company, then hidden trends and patterns are found which helps build a robust machine learning model. Evaluate the performance of the model performance metrics such as accuracy, precision, and f1 score are used. The use of evaluation methods helps to produce the best model which is best to check the eligibility and make this process easier, hassle-free, and convenient. The project uses multiple techniques and multiple methods which makes it a differentiating factor when compared with other models. The use of modern technology not only saves time but also helps in changing the traditional methods and bringing the revolution to improve without compromising the time. Automation also reduces the data cleaner without outliers giving the perfect model which the company wants and can also be further used to change dependents factor for the easy-going process of checking the background details of customers to avoid the chance of getting fraud.

## Keywords:

Linear Regression, Logistic Regression, Data Cleaning, Univariate Analysis, Bivariate Analysis, Evaluation Metrics.

## 1. Introduction

The project aims to make a predictive modeling system that helps housing finance companies such as Dream Housing Company to check the eligibility criteria of the person which helps in determining whether the person is eligible for a home loan or not. The finance company has its presence in rural, semi-urban, and urban areas. The customer applies for the home loan and the company checks the eligibility of the loan. The company wants to automate the process of the loan eligibility process based on customer details provided by the customer while filling out an online form. Some of the details are taken such as Gender, Marital Status, Education, Number of Dependents, Income, Loan Amount, Credit History, and many others. For automating the process, the company has provided a dataset to identify the customer segments which are eligible for loan amounts. The automation process helps to find the hidden pattern and build a robust model. Trends and Patterns are used for Predicting the Loan Status of the candidates. It lasts the evaluation of the model is done with the help of evaluation metrics such as accuracy, Recall, and F1 Score. The project uses univariate and bivariate analysis for categorizing the type of data. The data is categorized into two types of categorical data such as male/female and numerical data such as co-applicant income, credit-card history, etc. The project uses two machine learning for getting a good precision score and accuracy. Two machine learning classifying models are used such as logistic regression which helps for better classification and predicts a discrete value [1]. The second model is the gradient boosting model which removes the error and flaws of logistic regression and helps to improve accuracy, performance, and function as improving elements of the model. Using the new automation technology process can be shortened and make the process easier for both customers as well as a finance company. The use of modern technologies such as artificial intelligence, machine learning algorithms reduces the workload and provides a better understanding for everyone, and provides reliable results as compared to manual and traditional approaches [2].

## 2. Machine learning Technique

A Machine Learning software algorithm was proposed to build a robust and efficient software algorithm that classifies individuals based on characteristics such as gender, education, number of dependents, marital status, employment, credit score, loan amount, and other factors to determine whether they are eligible for a loan or not. While it is the first line of command, it will surely reduce the workload of all other bank workers because the process for identifying client segments and those who are qualified for a loan amount will be automated, allowing them to target those clients individually [4]. And if the loan applicant fits the eligibility conditions for loan approval based on those aspects, this will be indicated. Metrics including accuracy, precision, and f1 score are used to assess the model's performance [5]. The application of evaluation methodologies aids in the development of the optimal model for determining eligibility and making the procedure more simple, quick, and efficient. The machine learning method includes a variety of techniques such as Random Forest, decision tree, and others, but in this project, the two best classification models used are Logistic Regression and Gradient Boosting [6]. As it is easier to compare develop and deliver the most accurate predictive analysis, logistic regression is


  
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# Unfolding the network dataset to understand the contribution of features for detecting malicious activities using AI/ML

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# A Simple Miniaturized Flower Patch Antenna using Meander Lines for X & K Bands

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### Abstract

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- III. Patch Design Steps
- IV. Evolution of Antenna Structure
- V. Antenna Design Analysis

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##### Abstract:

This paper proposes an Ultra-Wide Band antenna with multiple bands for satellite and radar communications. A miniaturized meander antenna is proposed, and its design is presented and simulated. The design incorporates a flower type patch antenna and a half planar ground surface using metamaterial. The antenna has a substrate size of 20mm x 20mm with a total thickness of 1.588 mm. By using FR4 epoxy as substrate, antenna resonates at 10.77GHz and 19.00GHz. This paper addresses a simple design methodology for the multiband microstrip patch antenna by using meander lines. This paper also shows the effects on the use of meander lines on the patch antenna. The antenna, so designed suggests a unique structure in which slot is used to propagates multiband frequencies. In this technique, a rectangular MPA is designed, then circular slot is imposed on top of the radiating patch. The results such as return loss, surface charge density, radiation pattern is obtained and discussed. The antenna is simulated on HFSS and results like gain, VSWR, radiation efficiency and radiation pattern are investigated.

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# A Simple Miniaturized Flower Patch Antenna using Meander Lines for X & K Bands

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**Abstract**—This paper proposes an Ultra-Wide Band antenna with multiple bands for satellite and radar communications. A miniaturized meander antenna is proposed, and its design is presented and simulated. The design incorporates a flower type patch antenna and a half planar ground surface using metamaterial. The antenna has a substrate size of 20mm x 20mm with a total thickness of 1.588 mm. By using FR4 epoxy as substrate, antenna resonates at 10.77GHz and 19.00GHz. This paper addresses a simple design methodology for the multiband microstrip patch antenna by using meander lines. This paper also shows the effects on the use of meander lines on the patch antenna. The antenna, so designed suggests a unique structure in which slot is used to propagate multiband frequencies. In this technique, a rectangular MPA is designed, then circular slot is imposed on top of the radiating patch. The results such as return loss, surface charge density, radiation pattern is obtained and discussed. The antenna is simulated on HFSS and results like gain, VSWR, radiation efficiency and radiation pattern are investigated.

**Keywords**—Metamaterials, Compact Antenna, 5G, meander line, miniaturization, slot.

## I. INTRODUCTION

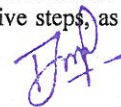
Due to the skyrocketing growth of wireless and mobile market, it has now become essential to provide multiple services on a single device and escalated huge demand to integrate a great number of bands on a single platform. The most popular of all antenna is wide band antenna. Due to rapid advancements and breakthrough in wireless technologies, the exigency for developing antenna to work at multiple frequencies is booming tremendously. Antenna that can execute at more than one frequency band is appraised as multiband antenna. The microstrip patch antenna (MPA) is a popular and sought-after antenna that has assorted dominance like small size, economical, low weight and simple fabrication. These antennas have the significance of providing larger bandwidth and can be employed for multiple application without altering the design [1].

Ultra-wide bandwidth is achieved through half ground plane which is popularly employed methodology. This method makes use of slotting in patch to generate huge bandwidth. The resonating frequency of the antenna is tuned by using parasitic elements in the patch. Using this methodology, a small portion of the patch is not joined electrically and is feed back to the lumped port [2]. This study employs the U-shaped slit which is employed in the ground plane, to further amplifies bandwidth of the antenna by employing methods like slotting and notching and the operational frequencies of the design can be lessened and the bandwidth can be raised. This paper approaches that if a certain part of the ground plane is extracted then resonance

can be established with the patch [3]. This paper confers a design in the shape of the diamond which is mounted on the top of the square slot and yielding wide band. [4]. This paper presents a semi elliptical slot which is designed on a rectangular patch to consummate resonance in the higher band [5]. This paper talks about the use of slots on a single layer microstrip square ring patch which accounts for the dual band reflect array antenna. This paper describes high-gain, ultra-wide, aperture-coupled antenna with a slot for fixed-beam-tilt array applications. The antenna has more than 10 dB broadside gain without offset and gain in tilt elevation can be achieved by employing offset technique [6]. This paper depicts a novel modified triangle slot antenna with three ring resonators is proposed in X band with considerable bandwidth enhancement gain [7].

This paper focusses on Dual-band behavior of antenna by applying T and C shaped slots. [8]. This paper articulates the use of H-shaped slots to achieve impedance matching in lower and upper bands by configuring the slot [9]. The author in this study presents the design of multiband resonant frequency of patch antenna by extracting slots on patch which can be in the shape of U, V, L, and T [10]. This paper focusses on attaining X, Ku, K bands by placing slots in multiple numbers at various positions in patch through series feed array configuration [11]. In this paper, a T-shaped design having a small structure geometry is intended to operate on 28/38 GHz with high gain. This structure is formed by etching rectangular slots in defected ground to augments the bandwidth of the design [12]. This paper emphasis on Meander antennas to generate good radiation efficiency with appreciable reduction in size as correlates with accustomed half- and quarter-wavelength antennas [13]. Antenna has multiple applications like GSM mobile phones, 3G, 4G LTE, GPS, WLAN, WiMAX, Wi-Fi and many other. The proposed antenna can employ its usage in multitudinous applications in domains of radar communications, Satellite Communications, military and Weather Monitoring.

In this proposed and presented draft, the design is basically formulated through miniaturization by the use of meander lines techniques and multiband operation is achieved through circular slot which is the eminent intention of this task. Multiband are executed with the use of circular slot as it has the supremacy of large bands, miniaturized size and integrate easily with innumerable wireless devices, and accounts for a fair choice in designing of multiband antennas. Thence, with a view to accomplish the aforementioned scheme, the presented antenna is executed in five steps, as illustrated in Fig. 1(a)



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## II. ANTENNA DESIGN

The design of structure is segmented into 4 sections where each section explains the evolution of the design.

- Section 1 explains the Meander line structure are asymmetric or zig-zag in a fashion that finger dimension is altering with each bend. Asymmetrical meandered lines (having distinct length) serve as inductor which is employed to get miniaturization and incorporating U-shape ground plane as bottom, gain can be enlarged. The proposed antenna achieves 48.5% miniaturization by creating meandered lines.
- Section 2 presents the theory to substantiate the designed structure. It incorporates the dimensions of antenna for designing appropriately for validating the antenna.
- Section 3 It explicates the parametric studies and distinctive authentication on affirming the evolution of proposed antenna.
- Section 4 narrates the results simulated on Ansys HFSS Ver 13 carried out for the proposed structure and concluding the design for the aforesaid work.

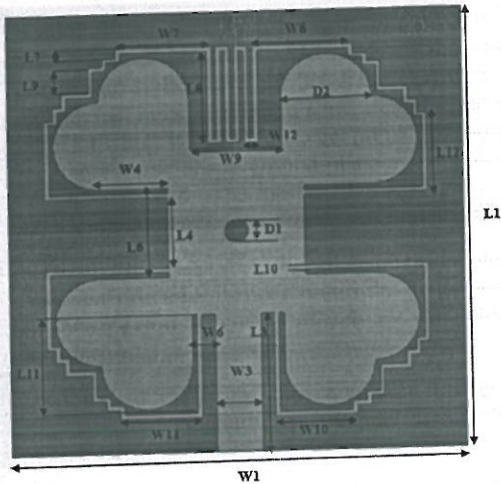


Fig. 1. Top View of Proposed Antenna Design

The Patch is mounted on the top of the substrate with all the mentioned labeling in the figure 1(a) of the proposed antenna design. At the bottom of the structure, Ground is inserted on the substrate.

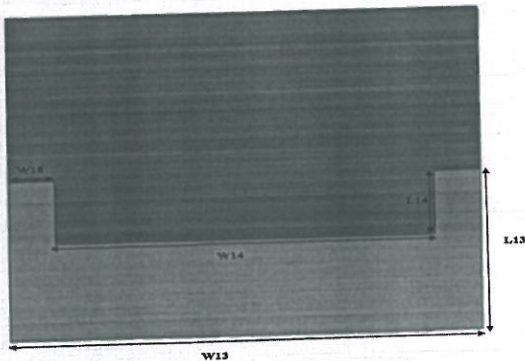


Fig. 2. Bottom View of Proposed Antenna Design

The meandered lines are inserted in the patch as it provides the miniaturization and enhancement in gain is achieved. The ground is chosen to be partial U shape. It is further and also compared with other structures and in final design, the U shape structure gives a greater number of bands.

## III. PATCH DESIGN STEPS

Steps could be detailed hereby in sequence.

- Initially, a simple rectangular patch antenna is designed on substrate which gives resonance at 19.95GHz. Only one band is obtained at this value which are shown in the table The patch is designed on 20mm×20mm×1.88mm size substrate. The parameters of this antenna are given in Table 2 mentioned below. The designed structure is simulated and shown in figure 2. The simulation results of return loss and radiation pattern are showcased in figure 4 and 6.
- The problem in first step of having only single band is resolved in step 2. Now, in this step we add 4 squares on each corner of the big rectangle. The designed structure is simulated and shows gain improvement in bandwidth as depicts in graph. The simulation result shows that a dual band is achieved at 7.8GHz and 18.9GHz and. However, the resonance frequency drops down but quite good gain is achieved. The return loss and radiation pattern are indicated in figure 4 and 6.
- A circle of radius 2mm is introduced on the outer edges of the structure making a shape of a flower petal and a small circle of radius 1mm is inserted in the middle of patch as shown in figure and the parameters are also mentioned in table 2. By inserting circle cut-out, the distortions are minimized. The result shows that the reduction in noise. However, the resonance of antenna comes at 6.98GHz and 18.84GHz. The plot of return loss and radiation pattern are represented in figure 4 and 6.
- Some meander lines have been added in the design to reduce the size of patch. By using meander lines further, the size is miniaturized and good gain is achieved with two bands and same is shown in figure 4 and 6.
- A partial ground is designed below on substrate. By using partial ground, quite good gain is achieved, and radiation pattern is directional as figured out in subsequent diagrams and the parameters are provided in the table 2. The outcome showcases a dual band resonant antenna possessing 10.77GHz and 19.00GHz. The return loss plot and radiation pattern are manifested in figure no. 4 and 6.

## IV. EVOLUTION OF ANTENNA STRUCTURE

Multi Band Antenna as evolute after designing and parameters finalization are displayed here in Fig. 3(a), 3(b),3(c),3(d) and 3(e) as Antenna 1,2,3,4 and 5. With each design, there is change in the frequency, radiation patterns and numbers of bands are generated. Eventually, by using notch, meander lines there is change in the gain and VSWR. By etching the patch, a circular notch provides better gain and radiation pattern. The bandwidth is also enlarged and suppresses back reflection.

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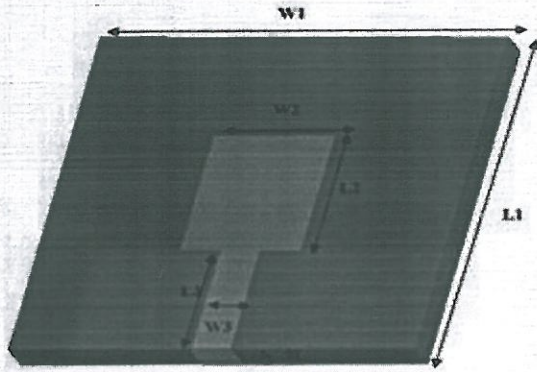


Fig.3 (a). Top View of Proposed Antenna Design 1

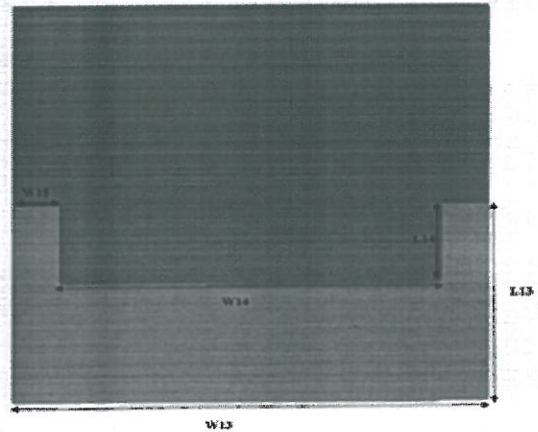


Fig. 3 (e). Bottom View of Proposed Antenna Design

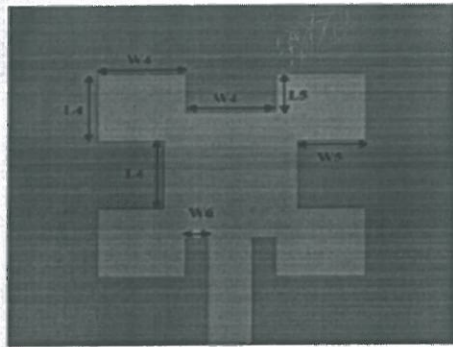


Fig.3 (b). Bottom View of Proposed Antenna Design 2

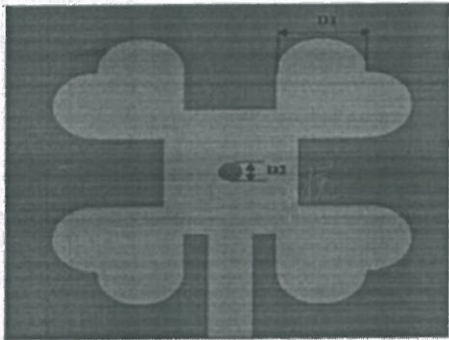


Fig. 3 (c). Top View of Proposed Antenna Design 3

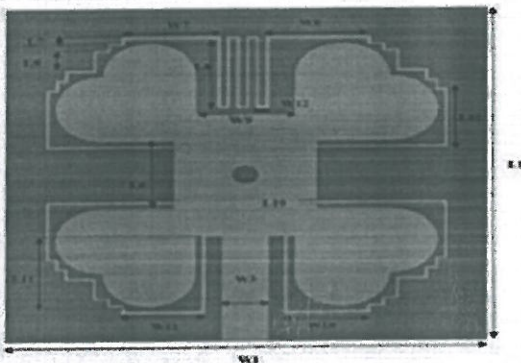


Fig. 3 (d). Top View of Proposed Antenna Design 4

## V. ANTENNA DESIGN ANALYSIS

The material chosen for the designing of antenna is FR4 as a substrate having dielectric constant of 4.3 and total thickness is 1.588 mm used to achieve multiband MPA. The height of the patch is 0.1mm, while the volume of the antenna structure is 20mm×20mm×1.88mm. Meander lines are utilized to generate multiple resonant frequencies and the reduction in size of the patch. This antenna is availing use of microstrip line having a feed length 6.25mm and width 2mm and subjected to ground length of 20mm. The design initially imbibes a rectangular microstrip patch antenna and zig-zag slots were encapsulated to investigate both lower bands and upper bands. It covers bandwidth from 10.77 GHz (X-band) and 19 GHz (K-band) usage in numerous wireless applications. Rectangular design is modified with the help of circular notch by etching the patch. Through etching of rectangular ground into U-shape half planar ground yields preferable matching of impedance and large gain in bandwidth is acquired. Further ground-plane is transfigured, designed and optimized to acquire broadband frequency. This design is compared with another circular resonator made on ground and results so obtained of VSWR and return loss are discussed in subsequent sections.

The performance of the miniaturized multiband antenna with the change in the dimensions has been observed and optimized with parametric studies are carried out as depicted in Fig. The framework of design is studied in five conditions, which are as: - (1) change in patch dimension, (2) change in circular notch size, (3) variation in meander lines lengths, (4) Variation in ground plane.

It is seen that by reducing W2 into 3 parts to W4 with each length having 4mm size square and L2 into 3 parts with each length to 4mm square give arise to two bands which resonates at 18.9GHz and 7.8 GHz but additional noise is introduced as the surface currents goes into substrate. The improvement is achieved in the design by introducing a circular notch of radius 1mm. It is seen that when notch size is 2mm there is poor impedance matching. Hence, the notch is optimized at 1 mm. It is also seen that by adding meander lines surface current is reduced and leads to good impedance matching and therefore some more lines are added in final design as decrease the surface charge in the substrate. By lowering the values of W9 in ground plane from 16mm to 14mm, there is increase in bandwidth.


  
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TABLE1: DETAILED PARAMETERS OF ANTENNA DESIGN

Parameters	Unit in mm	Parameters	Unit in mm	Parameters	Unit in mm
L1	20	L6	4	L11	4.45
W1	20	W6	1	W11	3.6
L2	7.5	L7	0.4	L12	3.6
W2	6	W7	4.2	W12	0.2
L3	6.25	L8	4.2	L13	10
W3	2	W8	4.4	W13	20
L4	4	L9	1.2	L14	4
W4	4	W9	4	W14	16
L5	2.25	L10	0.2	W15	2
W5	3	W10	3.6	D1	4
				D2	1

VI. PARAMETRIC STUDY OF GROUND

The performance of the design is made better by adding a U-shaped structure of copper on FR4 epoxy layer i.e., substrate. By adding the U-shaped structure, a greater number of bands are acquired.

TABLE 2: MULTI BAND ANTENNA RETURN LOSS

Antenna Version	Return Loss (dB)	No. of Bands
Antenna 1 (a)	19.7GHz	Single
Antenna 2 (b)	7.79GHz,18.9GHz	Dual band
Antenna 3 (c)	6.89GHz, 18.84GHz	Dual band
Antenna 4 (d)	6.81GHz,19.6GHz	Dual band
Antenna 5 (e)	(4.54-7.73GHz),10.77GHz, (13.68-15.94GHz), (19-24.21GHz)	Quad band

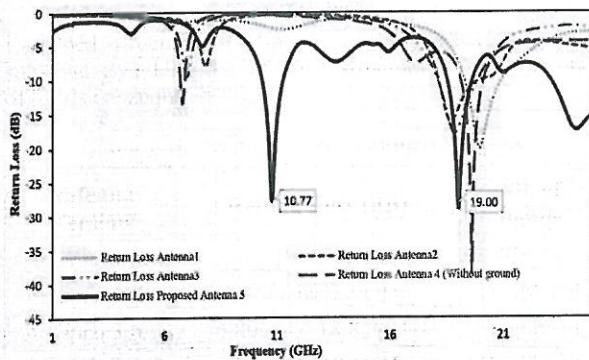


Fig 4. The simulated reflection coefficient for proposed & experimental Antenna structures 1,2,3,4,5

The proposed design achieves resonant frequency at 10.77 GHz and 19 GHz with other bands. With the subsequent changes in the dimension and by introducing meander lines the gain is enhanced with some more frequencies in (4.54-7.73GHz),10.77GHz, (13.68-15.94 GHz), (19-24.21GHz). In antenna 1, the resonance is obtained at 19.95 GHz.

After having addition of 4 squares at corner of the rectangular patch in antenna 2, two bands are achieved at 7.8 GHz and 18.9 GHz but gain is less than 10dB. With further addition of circular notch in antenna 3, although gain is recovered in K band but in one band gain is less. By adding meander lines at patch in antenna 4, gain is achieved in lower band but good gain is also achieved in K band. In the final structure, half planar U shape ground is used which gives a greater number of bands. The antenna is also compared with the circular resonator at the back. The gain is achieved at 6.79 GHz and 19.6GHz but bands are limited. The proposed final design is having VSWR at 1.2 and 1.07 which shows the design has good S11 parameter.

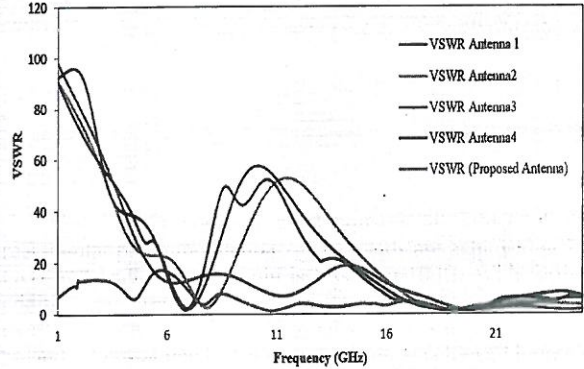


Fig. 5 The simulated VSWR for proposed & experimental Antenna structures 1,2,3,4, Proposed design

VII. DISCUSSION OF RESULTS

The Radiation intensity in the z direction along phi=90 and therefore the design is applicable for radar, satellite communication.

- a. Radiation pattern at different frequencies in E-Plane and H-Plane
- b. 3-D pattern comparison of proposed design
- c. Surface current density

Brief here by:

- a. Radiation pattern at different frequencies in E-Plane and H-Plane

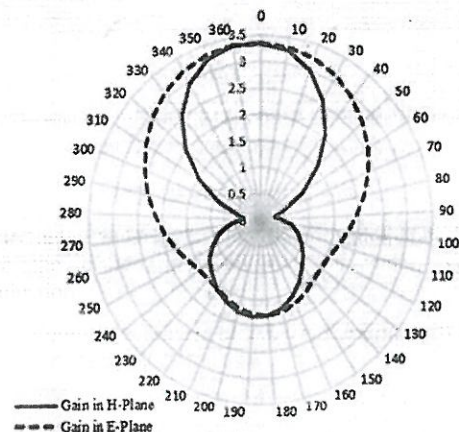



Fig.6 (a). Antenna5(Proposed design) at 10.77 GHZ & 19GHZ

  
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# A Novel Violin Type UWB Patch Antenna for X & Ku Bands using metamaterial: A Review

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- IV. Comparison with Different Resonator Structures at the Bottom
- V. Discussion of Results

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The main motive of this paper is to design an antenna using metamaterial that provides lower return losses, high gain and good performance in X and Ku Bands. The antenna is a violin shaped structure and resonates at 9.4 GHz and 14.2 GHz. The center frequency  $f_r$  is 10 GHz. The design is finalized by employing metamaterial based split circular ring resonator. RT Duroid 5880 is used as substrate and patch is design on  $20 \times 20 \times 1.588$  mm substrate body. Comparison is also studied by employing (CSSR) Complementary Split Rectangular structure and different results have been simulated on HFSS software showcasing the return loss and VSWR. The E and H patterns lies on same plane and good gain is achieved up to 16dB. The simulated results show  $-15$  dB and  $-21$  dB impedance bandwidth for X-band applications which is in range of 9.42 GHz and for Ku-band applications which is in range of 14.2 GHz. Circular notch is also inserted to have good bandwidth. The radiation efficiency is found to be approximately 98% for the bandwidth. The VSWR is also less than 2 for both bands which makes it suitable for applications in satellite and radar communications.

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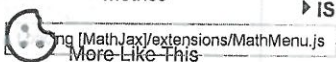
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# A Novel Violin Type UWB Patch Antenna for X & Ku Bands using metamaterial

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**Abstract**— The main motive of this paper is to design an antenna using metamaterial that provides lower return losses, high gain and good performance in X and Ku Bands. The antenna is a violin shaped structure and resonates at 9.4 GHz and 14.2 GHz. The center frequency  $F_r$  is 10 GHz. The design is finalized by employing metamaterial based split circular ring resonator. RT Duroid 5880 is used as substrate and patch is design on  $20 \times 20 \times 1.588$  mm substrate body. Comparison is also studied by employing (CSSR) Complementary Split Rectangular structure and different results have been simulated on HFSS software showcasing the return loss and VSWR. The E and H patterns lies on same plane and good gain is achieved up to 16dB. The simulated results show  $-15$  dB and  $-21$  dB impedance bandwidth for X-band applications which is in range of 9.42 GHz and for Ku-band applications which is in range of 14.2 GHz. Circular notch is also inserted to have good bandwidth. The radiation efficiency is found to be approximately 98% for the bandwidth. The VSWR is also less than 2 for both bands which makes it suitable for applications in satellite and radar communications.

**Keywords**— *Metamaterials, patch antenna, CSSR, Ku band, X band*

## I. INTRODUCTION

With the advent of digitization, proliferation of electronic devices and technology being invariably an indispensable part of our daily life, antennas find their way by embedded into any device. In today's era, satellite applications majorly find its employability in multiple frequency bands named as C, Ku, and Ka bands. Such frequency bands necessitate for small antenna, having wide coverage with good gain which is pertinent for weather forecast, atmospheric and various other applications. A lot of research work has been done in the improvement and advancement of miniaturization, low-weight and inexpensive materials to earn ameliorate accomplishment and effective services in satellite applications. A study on developing and exploring diverse kinds of materials have been done previously to evolve innovative technique conquering with the focus to steer enhanced technology. Metamaterials permits small size antenna elements that engulfs wide frequency, making better use of feasible and attainable space such that space so available can be utilized for the betterment. Henceforth, miniature antennas having huge gain are most impeccable and significantly relevant because large antenna arrays are syndicated from the radiating elements. Their ability to support linear and circular polarization, coupled with capability to operate in dual/triple frequency band, makes them suitable for a wide array of applications [1]. The patches are designed to be generally symmetrical in nature,

to measure performance metrics that are more predictable like limited bandwidth, little efficiency and gain, plus extraneous radiation from surface. Plenty number of designs have been implemented to overcome such difficulties [2].

Metamaterials structures using Split Ring Resonator (SRR) and Complementary Split Ring Resonator (CSRR) to be utilized in WLAN/ISM/Bluetooth/WiMAX & ITU bands at the peak gain of 4.8 dB [3]. More adaptable structures have been employed that could easily be loaded into arrays in comparison to a cylinder and moreover, continuous path for conduction could also be avoided. Therefore, redesigning of the system for recovering consistency and curtailing electrical effects issues have been looked after and worked out and thence the inception of SRR replaced cylinders with flat disks [4]. Metamaterial TLs are popularly known as Composite Right/Left-Handed (CRLH) TLs because they have both right- and left-handed properties. The introduction of CRLH TL theory paves way to the turbulent growth and development of metamaterials for TL applications [5].

The dual band CRLH TL Antenna using Minkowski-Like fractal method miniaturized the design with the help of fractal shape in the ground plane and radiator. Metamaterials based four-unit cells are equipped into monopole antenna for the bandwidth enhancement by using via free method employed in CRLH -TL unit cells. This technique provides freedom in designing and flexibility in fabrication. By using ZOR mode, compact structure and increased bandwidth can be achieved [6,7].

Fractal Antenna using meta materials load techniques have been further studied and the miniaturized design finds its suitability in indoor wireless applications [8]. The gain is further enhanced by using Frequency Selective Surface (FSS) and defected ground for bandwidth improvement. A design on impedance matching and phase shifting layer is crafted using metamaterials [9,10]. The design of antenna incorporates bilayer reflect array to get linear reflection phase in broad band and employing perforated dielectric substrate for the reflection to obtain desired variations in permittivity [11,12].

A metamaterial based four-port MIMO CP antenna with slow wave structure has been made and investigated. By employing slow wave structure, reduction in mutual coupling up to  $-40$  dB, circular polarization and enhanced gain has been attained up to 20GHz which is apt for the space research applications and explorations [13]. By imbibing SRR based structures, high gain, miniaturized size, and economical cost, meta-surfaces have been executed. Also, by applying frequency reconfiguration techniques, a single antenna can



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perform at multiple frequencies. The resonant frequency of an antenna can be altered by adjusting its effective length [5].

## II. ANTENNA DESIGN

Work of many researchers have proclaimed design of microstrip patch antennas build on either materializing slots or acquainting multiple layers. The proposed antenna design is a consolidation of circular structures. For mounting a patch antenna, some crucial parameters have to be encountered carefully while designing. Firstly, the resonant frequency ( $F_r$ ) of the antenna must be selected appropriately as in Fig. 1 (a) and Fig. 1 (b) which shows the configuration of the proposed antenna design. The antenna is designed by using patch on top side and ground on bottom side. The patch is made up of a main circle with radius of 5 mm subtracted by a cone on three side and then small circle of radius 1.1 is subtracted from main circle giving it a violin shape. The patch is fed through a microstrip feed line. This antenna is composed square ground plane of length 20 mm. Table 1 represents the whole dimensions of the proposed antenna. The antenna with the use of single resonator gives multiband outputs. The materials used for patch and ground is copper. The dielectric substrate used here is RT Duroid (tm) with a thickness of 1.588 mm.

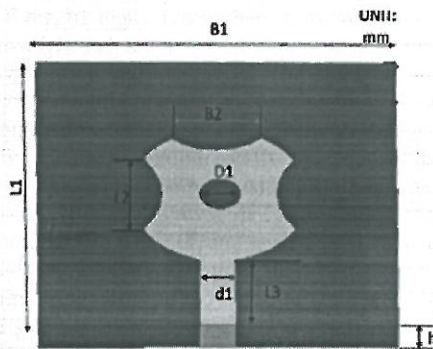


Figure 1 (a) Configuration of the proposed antenna (Top view)

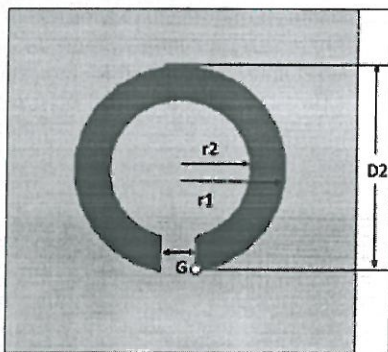


Figure 1 (b) Configuration of the proposed antenna (Bottom view)

The proposed antenna has a patch and ground structures are designed on the substrate of size  $20 \times 20 \times 1.588$  mm size RT Duroid 5880 is the substrate used for designing the antenna.

## III. EVOLUTION OF ANTENNA STRUCTURE

The design presented in this research is with X and Ku bands frequency. The evolution of design proposed for violin type patch antenna is represented in Figure 2. The design is formulated in three main steps which are as follows:

- i. First of all, a circular patch of 5mm radius is made on substrate RT Duroid (tm) with a feed.
- ii. The patch is cut out in such a way that a shape of a violin is produced.
- iii. A circular slot of radius 1.1mm is etched from the patch to obtain the required resonance.

The simulated results are obtained by Ansoft HFSS. The patch of the proposed antenna is designed so as to generate the required X and Ku bands with required radiation intensity.

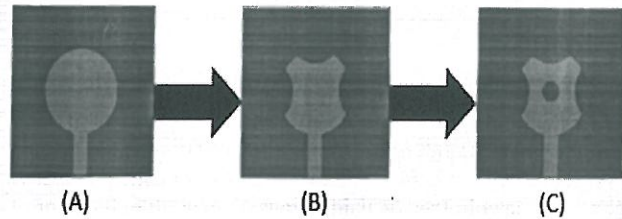


Figure 2. Design evolution of proposed Antenna

Table 1. Dimensions of antenna (UNIT: mm)

Name	Parameters	Unit (mm)
Length of the substrate	L1	20
Width of the substrate	B1	20
Height of the substrate	h	1.588
Length of patch	L2	5.39
Width of patch	B2	4.9
Feed line length	L3	4.9
Feed line width	d1	2
Diameter of inner circle	D1	2.2
Diameter of resonator	D2	11.9
Gap	G	2
Radius of outer circle	r1	6
Radius of inner circle	r1	4

The suggested antenna has also been designed with two different resonators other than the proposed antenna. The first resonator has a main circle resonator with a square resonator around it. The square resonator has width of 1 mm and length of 15 mm. and the second resonator structure consist of two circular metamaterial structures. It has outer circle radius of 8.4 mm and inner circle of 6 mm. Figure 3(a) and 3(b) represents these resonators and Table 2 depicts the dimensions of experimental resonators. This analysis was done to analyze and study the impact of a different resonator design and these results are further discussed in the upcoming sections.

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#### IV. COMPARISON WITH DIFFERENT RESONATOR STRUCTURES AT THE BOTTOM

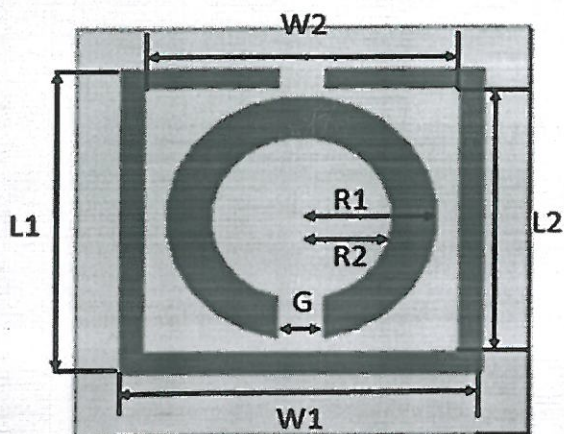


Figure 3 (a) Experimental Resonator structure 1

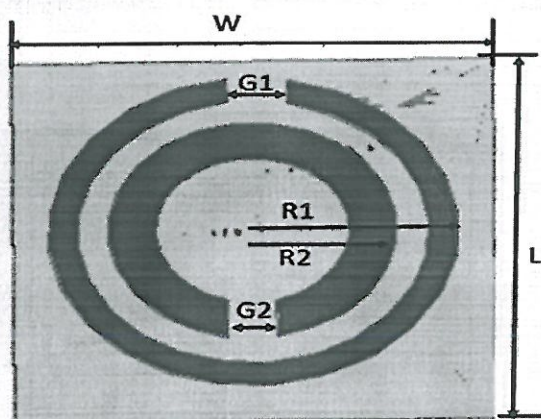


Figure 3 (b) Experimental Resonator structure 2

Table 2. Dimensions of experimental resonator (UNIT: mm)

Name	Parameters	Unit (mm)
Length of outer rectangle	L1	15
Width of outer rectangle	W1	16
Length of inner rectangle	L2	13
Width of inner rectangle	W2	14
Gap	G	2
Radius of outer circle	R1	6.1
Radius of inner circle	R2	4.2

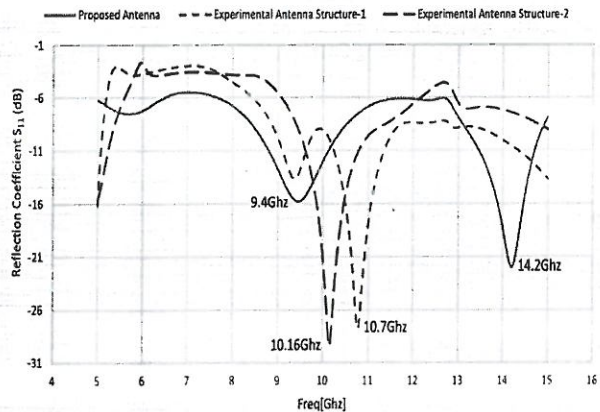


Figure 4. The simulated reflection coefficient for proposed & experimental Antenna structures 1&2

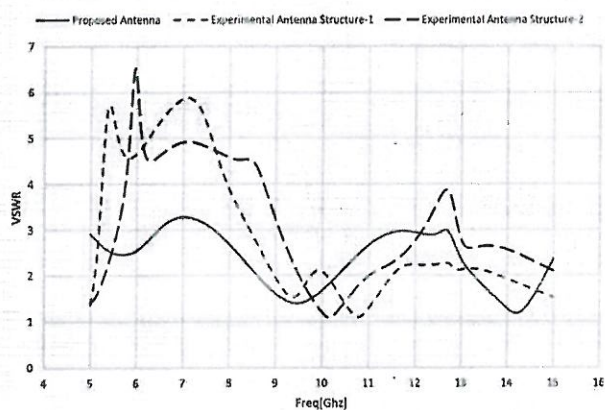


Figure 5. The simulated VSWR for proposed & experimental Antenna structures 1&2

#### V. DISCUSSION OF RESULTS

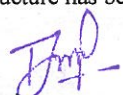
The Radiation intensity in the z direction along  $\phi=90$  and therefore the design is applicable for radar, satellite communication.

- Radiation pattern of different resonator structures in E-Plane and H-Plane
- Surface current density

Brief here by:

- Radiation pattern of different resonator structures in E-Plane and H-Plane

The Proposed antenna yields good radiation pattern with a maximum gain of 16dB in fig 6 (a) whereas experimental resonator structure 1 and 2 in fig 6 (b) and (c) are not in good contrast with each other. Different structure has been utilized to get the best efficiency and gain.

  
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# Prediction of Movie Success Using Sentimental Analysis and Data Mining

Meenu Vijarania, Ashima Gambhir, Deepthi Sehwat, Swati Gupta

Source Title: Applications of Computational Science in Artificial Intelligence (/book/applications-computational-science-artificial-intelligence/275267)

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## Abstract

Movies have become a significant part of today's generation. In this chapter, the authors worked on data mining and ML techniques like random forest regression, decision tree regression, support vector regression, and predict the success of the movies on the basis of ratings from IMDb and data retrieved from comments on social media platforms. Based on ML techniques, the chapter develops a model that will predict movie success before the release of the movie and thereby decrease the risk. Twitter sentimental analysis is used to retrieve data from Twitter, and polarity and subjectivity of the movie is calculated based on the user reviews, and those retrieved data machine learning algorithms are used to predict the IMDb rating. A predictive model is developed by using three algorithms, decision tree regression, SVR, and random forest regression. The chapter compared the results using three different techniques to get the movie success prediction at a reasonable accuracy.

## Chapter Preview

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## Literature Review

The fact of how the movie has been justified primarily decides the success of a movie. Initially, many people considered gross collection as the major point for movie success. But now many factors affect the same like a review of the movie, background story, box office collection, likes and comments about the movies. Many used regression models and considered revenues and applied binary classification for the forecast. At the same time, few adopted applications of Natural Language Processing for sentimental analysis and gathered movie reviews for their testing. There are many works done, predicting the success or failure of the movie. Some were predicting result after the movie is released, while some were predicting before release. We have studied multiple papers which we are discussing below:

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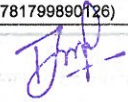
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## Preface

Anand Nayyar, Sandeep Kumar, Akshat Agrawal

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## Cross Linguistic Acoustic Phonetic Study of Punjabi and Indian English

Amrita Dey, Shweta A. Bansal & Shyam S. Agrawal

Conference paper | First Online: 29 January 2022

192 Accesses

Part of the [Communications in Computer and Information Science](#) book series (CCIS, volume 1546)

### Abstract

Punjabi and English are the languages that does not belong to the similar family. For instance, English belongs to the West German languages while Punjabi is a part of the Indo Aryan family. Regional languages have an impact on English in this borrowing and code-mixing process because borrowed words go through a make-up caused by phonetic features of the regional languages. In India, English is the medium of media, science, and technology & its influence on the native languages of the country is significant. This study shows how the regional dialects of the country have a significant influence on the way English is pronounced. It is an effort to define the phonemic changes in Punjabi and Indian English. The purpose of this study was to see if the sound pattern of Indian English varies depending on the speakers' native languages or if it is the same irrespective of the speakers' native languages and also to

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# Prediction of head loss for fly ash-water slurry flow through 90° bend pipe using Computational fluid dynamics

Asiisha Ranjan Pradhan<sup>a</sup>, Satish Kumar<sup>a</sup>, Shalendra Kumar<sup>a</sup>, Harmanpreet Singh<sup>b</sup>, Kaushal Kumar<sup>c</sup>, Gurmeet Singh<sup>d</sup>

<sup>a</sup> National Institute of Technology, Jalandhar, Jalandhar 148004, India  
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<sup>c</sup> K.R. Mangalam University, Gurugram, Haryana 122103, India  
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# Characterization of fly ash for potential utilization in green concrete

Authors Kaushal Kumar, Rishabh Arora, Sarah Khan, Saurav Dixit

Publication date 2022/1/1

Journal Materials Today: Proceedings

Volume 56

Pages 1886-1890

Publisher Elsevier

Description Coal-based thermal power plants are the residue material of the combustion of FA (Fly Ash). The use of FA has become an attractive alternative to disposals by raising the consciousness of the environment. The present study aims to examine the prospective use of FA in concrete and building applications, the physical, chemical, mineral and thermal properties of FA. FA obtained at the Rajiv Gandhi thermal plant, Hisar, Haryana, India. Electrostatic precipitations for experimental purposes. The FA sample is characterized as being mostly enriched in silicon, alumina and iron oxides fall into the F-type FA group. In the ash sample, Quartz and Mullite are the main mineral crystalline phases. Distinguishing thermal examination of the FA sample reveals degradation from 400 °C to 700 °C in a particular stage. The absorbed humidity and light volatility is removed in the sample during initial area. The findings of the

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## Machine Learning and Deep Learning-Based Detection and Analysis of COVID-19 in Chest X-Ray Images

Authors : Kunal Kumar, Harsh Shokeen, Shalini Gambhir, Ashwani Kumar, Amar Saraswat

Published in: International Conference on Innovative Computing and Communications

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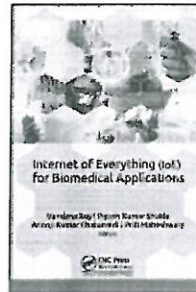
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## Internet of Everything (IoE) for Biomedical Applications

Editors: Vandana Roy, PhD  
Piyush Kumar Shukla, PhD  
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Notes: 13 color, 57 b/w illustrations

Biomedical applications coupled with IoT advancements help to bridge the gap between the physical and digital worlds, creating a hyper-connected society where objects are utilized not only to share data but are also becoming increasingly intelligent and aware of their context. This book takes a look into applications of the Internet of Things (IoT) in clinical patient diagnosis, treatment, and monitoring.

The book approaches networking, databases, and privacy from a biomedical systems-level perspective, considering human concerns as well as technical considerations. Many of the chapters focus on cutting-edge technology involving the Internet of Things and biomedical engineering in everyday life in the 21st century.

The book explores the use of Internet of Things (IoT) devices to track the health of patients, devices for use in various emergency situations, and devices for the smart management of patients. It discusses smart healthcare systems, remote and near-patient monitoring, rare disease diagnosis, and smart wearable healthcare devices for health monitoring. Chapters look at this technology for cardiac analysis in e-healthcare, and the book also discusses the importance of the Internet of Things (IoT) in biomedical applications such as electroencephalography (EEG) and magnetic resonance imaging (MRI). Chapters also look at the incorporation of Internet of Things applications with the usage of smart wheelchairs, telemedicine, GPS locations, etc.

Internet of Everything (IoE) for Biomedical Applications will be valuable for academicians and students, industry practitioners, and researchers in biomedical engineering, bioinformatics, and computer science.

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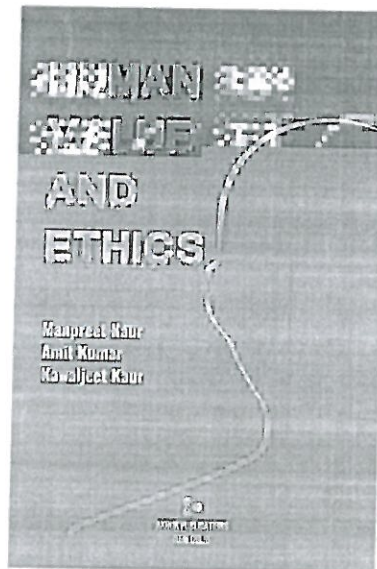
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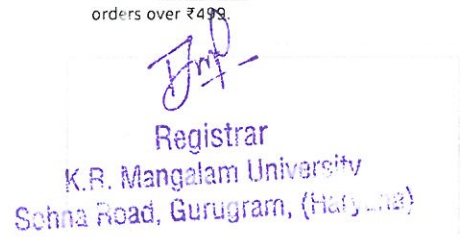
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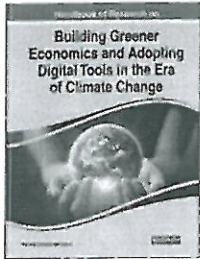
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# Chapter 15


## Impact of the Brundtland Commission on Select Climate Changing Variables: An Empirical Analysis

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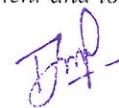
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### ABSTRACT

*The concept of sustainable development has been introduced following the Brundtland Commission's report "Our Common Future." Though significant volume of literature does exist on the various aspects and impacts of the mentioned commission, the actual impact of the commission on the environment for which it was initiated has never been considered by any academicians. The chapter tries to quantify the qualitative aspect of environment through per capita emission of CO<sub>2</sub> over the years. It shows that the concerned commission is successful in bringing down the rate of growth of per capita CO<sub>2</sub> emissions, but it is yet to be negative. The chapter opines that to restore the resilience of the environment and to make ecology and economy synonymous again, further efforts are needed.*



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## INTRODUCTION

At the beginning of the earth, nature was nurtured by nature. All the natural maladies such as extremely high or low temperatures, flash floods, draught came in a cycle and every time has taken care by the nature towards a more sustainable environment that can support complex life forms. The natural order received its first brunt with the mastery of fire by our forefathers (Dartnell, 2019; Harari 2014, 2016). That accidental event left no clue to Mother Nature that how she can supersede the anthropogenic supremacy over all other life and non-life form. The prey and predator balance were dismantled and a less quick, less powerful animal without any natural gifts like sharp teeth, and claw; became the determining agent of all other life forms. A minor animal starting its life at the bottom of the food pyramid, promoting them to the middle of the food pyramid through the invention of minor hunting tools all of a sudden reached the top of the food pyramid owing to the biased blessings of the fire (Dartnell, 2019; Harari 2014, 2016).

As our forefathers mastered farming and settled from hunter gatherers, the unequal geographical distribution of population became prompter and that meant increased biomass pressure on some particular points at the cost of others. These anthropogenic choices and behavioural aspects put Mother Nature in a dismal state. Population pressure slowly laid its eyes on the woods and there was deforestation initially at a bearable level and then at an unprecedented level. However, the anthropogenic atrocities were at a manageable level by Mother Nature. It is worth noticing that the last few lines portray centuries even thousands of years, it was not as quick as it has been portrayed in these few lines.

However, the most brutal attack on nature was yet to come. Following the Industrial Revolution in England in 1750 and the American Industrial Revolution in 1820 mother earth had been ravaged by its most intelligent inhabitant the human being for more than 200 years. Industrialization was urban centric and witnessed huge rural to urban migration that broke all the hell on nature. It has been estimated that the Carbon-Di-Oxide gas content in the atmosphere was increased by many times before and after the industrial revolution (Sumner, 2015).

The Anthropocene era that started from 1950 introduced Plastic and Atomic garbage to the environment (Bostock & Lowe, 2018). These pollutants are non-biodegradable. The global environment was approaching a choking point. However, from the early 70s of the last millennium following the Stockholm Convention of 1972 certain environmental concerns among the people developed. This concern took shape into the formation of the Brundtland Commission in 1983 and dissolved in 1987 after the publication of their report *Our Common Future* (Brundtland, 1987; Keeble, 1988). This report brought path-breaking changes in our approach to growth and development. The concerned report refuted the conventional growth and development theories and introduced a new concept of sustainable development that is benefitting the present without sacrificing the future. Eventually, sustainable development gained so much momentum that it became a part of the Millennium Development Goals of the United Nations. However, there is a flaw, as we may check that the existing literature on Brundtland commission emphasized this sustainability or sustainable development but somewhere ignored the building block of sustainability i.e., environment. In other words, the existing literature on the Brundtland commission is silent on one aspect what is the actual impact of the Brundtland Commission on the environment? In the 25<sup>th</sup> year of the emergence of the report (Brundtland, 1987; Keeble, 1988) of the Brundtland commission delving into this aspect becomes quite necessary.

In this background, the present chapter is dedicated towards the evaluation of the impact of the mentioned commission on certain climate changing variables. The chapter considers time series data on these select variables and eventually comments on the impact of the Brundtland Commission on them, which

## **“A study of financial planning behavior of women college teachers working in Delhi-NCR”**

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<sup>b</sup> Department of Management and Finance, J K Business School, Gurugram122102, India

### **Abstract**

Financial planning is based on an understanding of personal financial goals and methodology to fulfill those goals. It includes estimating the financial needs of a person in his/her lifetime and implementing a comprehensive plan of action to meet them. Financial planning involves choosing right investments through well-planned budget, savings to fulfill future needs. A good financial plan includes contingency planning, risk planning (insurance), Tax Planning, retirement planning etc., along with investment and saving management. It is advised to start financial planning at an early stage. Teachers not only impart knowledge but also prepare more responsible citizens with high moral values. Personal financial planning is important to teachers to improve their personal well-being and help them to produce students who are fiscally and socially responsible citizens. It becomes important to understand the financial behavior of female college teachers. An attempt is being made to examine the personal financial planning behavior of the women teachers in higher education in Delhi-NCR.

### **Keywords:**

Financial Planning, Financial Behaviour, Personal Finance, Savings, Investments, Equity, Debt, Retirement planning, Risk Planning, Insurance, Financial Goals.

### **Introduction**

Financial planning is the process of successfully meeting financial requirements through the proper management of financial resources. Personal financial well-being is affected by external financial shocks like the Global financial crisis, recession, and household shocks like death, divorce, loss of employment, etc. The recent financial crisis during the COVID-19 pandemic proved the importance of proper financial planning to navigate through the destabilizing financial uncertainties (1). Financial planning means doing investments to earn the expenditure needed in the future needs through well-planned budget, savings, and investments. Planning is a fundamental function that requires a systematic approach. Financial planning is based on an understanding of personal financial goals and future expectations of markets. It includes estimating the financial needs of a person in his lifetime and implementing a comprehensive plan of action to meet them. Financial planning is incomplete if results are not monitored regularly as it is necessary to revise the plans and goals if desired results are not achieved (2). Knowledge of key financial concepts, awareness about various investment avenues, insurance, and pension schemes, retirement planning, tax saving options, investor protection measures, and safety from financial frauds and Ponzi schemes, etc., are the main components of financial planning.

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# A Study of Investment Risk Tolerance Among Teachers in Higher Education Institutions

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Risk tolerance is an important dimension of the investment and financial planning behavior and hence it is important to understand educators' perception of financial risk to interpret their investment behavior. This paper examines the investment risk tolerance abilities of teachers from various disciplines working in higher educational institutes and tries to test whether demographic factors like gender, age and income have any significant influence on their risk-taking abilities. The study would try to find out whether teachers in higher education are risk-averse, risk-tolerant or risk-takers. It would try to find if risk-taking capacity is dependent on age, (i.e., older Verses younger teachers), gender and income. The study would be beneficial to policymakers, wealth managers, investment planners, institutions etc., to construe various aspects of economic behavior and develop programs for the improvement of the financial well-being of higher education teachers.

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# “A study of Investment Risk Tolerance among Teachers in Higher Education Institutions”

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## Abstract

Risk tolerance is an important dimension of the investment and financial planning behavior and hence it is important to understand educators' perception of financial risk to interpret their investment behavior. This paper examines the investment risk tolerance abilities of teachers from various disciplines working in higher educational institutes and tries to test whether demographic factors like gender, age and income have any significant influence on their risk-taking abilities. The study would try to find out whether teachers in higher education are risk-averse, risk-tolerant or risk-takers. It would try to find if risk-taking capacity is dependent on age, (i.e., older Verses younger teachers), gender and income. The study would be beneficial to policymakers, wealth managers, investment planners, institutions etc., to construe various aspects of economic behavior and develop programs for the improvement of the financial well-being of higher education teachers.

**Keywords:** *Investment risk, Risk aversion, Risk-taking ability, Risk appetite, Risk capacity, Financial risk tolerance, Higher education teachers*

## Introduction

Risk taking is an important dimension of individual financial behavior (3). Individuals' knowledge about various investment options and perception towards financial planning and cognition of risk influences their saving behavior. Risk tolerance is a significant indicator of their investment strategy (4). The ability to understand the degree of risks and returns of different investments can effectively change the financial well-being of an individual (5). Investor's financial behavior and perception towards risk gets influenced by their thought process, belief system and past experiences. These prejudices lead to individual variations in risk appetite and risk capacity. Risk appetite is generally understood as the willingness to take financial risk while risk capacity is the ability to take financial risk. Both risk appetite and risk capacity together constitute risk tolerance of an individual (6).

Financial risk affects the investment returns along with the other factors. The investors shall first understand the various types of risks involved with portfolio.

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# Chapter-13

## FROM GENDER DISCRIMINATION TO GENDER EMPOWERMENT: CRITICAL EXAMINATION OF BETI BACHAO BETI PADHAO SCHEME

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## **ABSTRACT:**

*BBBP scheme is aimed end gender discrimination and gender inequality. However, the identification of root cause for the gender violence, gender inequality and gender discrimination is footed on the misconception that is CSR and SRB caused by prenatal sex selective abortion and post natal neglecting health, nutrition, and educational needs of the girl child is the root cause for the gender discrimination and gender disempowerment in Indian society. Actual root cause of gender discrimination and gender inequality in India is 'socio-religious and political institutions and practices of patriarchy'. It is only by challenging, questioning and transforming various patriarchal practices we can bring gender equality and gender empowerment.*

## **INTRODUCTION:**

Beti Bachao and Beti Padhao (hereafter BBBP) scheme was launched by the NDA government on 22 January, 2015. It is based on the misconception that CSR (Child Sex Ratio) and SRB (Sex Ratio at Birth) caused by prenatal sex selective abortion and post natal neglecting health, nutrition, and educational needs of the girl child is the root cause for the gender discrimination and gender disempowerment in Indian society. This seems to be very radical statement. Let us explore this step by step.

### **Part I: Review of Literature on Gender:**

First of all, gender and sex are two different terms. Sex is biological and physiological difference between male, female and other and gender is a social construction. This means gender that is man and woman, masculinity and femininity, boy and girl are social construction and it is reproduced, transformed or both through the performance of gender roles. Gender roles are historical and cultural specific in nature. Ortner, in her seminal book *Making Gender* (1996:1) claims "Subjects as constructed by, and subjected to, the cultural and historical discourses within which they must operate". That is to say gender identities constructed or made through historical and cultural specific performances of gender roles. For example; girl child should wear pink dress, play with Barbie doll and boy child must use blue dress, play with racing cars are some of the gender specific roles performed under the supervision of their parents. As they grow up many more gender specific roles performed by boys and girls and finally as a woman she has to take care of kitchen and man has to work outside. Performance or practices of these gender specific roles through socio-religious bases and sanctions lead to justification for gender stereotypes, gender inequality, gender discrimination and ultimately gender violence.



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Secondly, some believe that gender roles and gender inequalities are flowed from sexual differences. In sociology we call them biological essentialists, who seem to claim "anatomy is destiny" (Leibowitz, 1975: 23) that is to say the women's subjugation is related to their physical traits. The physical and biological traits of women such are smaller in size, softer body and fatter tissues, pregnancy, lactation and so on are better suited for the women to be "nurturant, affective, docile followers" (Leibowitz, 1975: 23) on the contrary the males are naturally large in size, better muscles (muscular), strong and bony chest, body hair and so on is conceptualized as sign dominance. "By virtue of being leaders, providers, protectors and sexually aggressive, larger males are more likely to father stronger babies" (ibid 23). Question can be asked whether contemporary social roles are result of physical differences or contemporary physical differences are result of past social roles. It is difficult establish this hypothesis since we have no way to go back to primitive stage of human existence. Authors like Lila Leibowitz (1975) and Marlene Zuk (2005) tried to observe the non-human primates and their social adaptations to the environmental and social changes. Therefore, one thing is for sure there are no conclusive proofs to establish gender roles and gender inequality is flows from sex and sexual differences.

Thirdly, male domination in Indian society or in any other society is the root cause of gender discrimination. The male domination is derived from patriarchy and socio-religious and political institutions and practices reproduce patriarchal institutions. Patriarchy can be defined as a system of male domination in all spheres of life from morality, religion to politics and even to the action and movement of women. With regard to Indian context Uma Chakravathy (1993) describes says, "the foundation of Brahmanical Patriarchy lay in the collective subordination of women and lower-castes so that upper-caste men could control both wealth and labour. This control was ensured through a number of texts that were written by men, where women were instructed to be obedient and chaste, in return for which they would be venerated. Women, along with lower-caste men, were also kept away from material wealth and resources, which made them dependent on upper-caste men. In this manner, by strictly controlling reproduction, upper-caste men could retain their social dominance for generations".

Fourthly, to establish gender equality and gender empowerment we need challenge and transform root causes of the same. The root cause for gender inequality and gender discrimination is patriarchal institutions and practices, in Indian context whatever religion, language, race and caste we may belong, as Indians we are all part of 'Brahminical patriarchy'. It is only by challenging and transforming brahminical

  
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# Chapter-12

## A CURRENT SCENARIO OF DOMESTIC VIOLENCE AGAINST WOMEN IN INDIA

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## **ABSTRACT:**

*In Indian civilization, the female subjugation has always persisted. Inequality in the social, cultural, and fiscal domains has been fostered in Indian society as a consequence of gender discrimination. Despite the implementation of several laws and legislative measures relating to women's development and the guarantee of equality by the Indian Constitution, women's persecution continues to exist in all facets or domains of human existence. In order to successfully stimulate and advance the development of women, this study aims to comprehend and assess all factors that contribute to gender inequality in domestic violence affecting women.*

*Keywords: Gender, Violence, Constitution, Discernment.*

## **INTRODUCTION:**

Men and women were designed by nature to complement each other. Human existence goes continually because of their reciprocity. They are both equally significant to the other. Despite the typecasts that women are weak or helpless, they actually have a tremendous strength that helps men in many facets of life. However, the ultimate reason for concern is that despite constant changes in authority, management, and administration, women continue to search for their existence.

The advancement of women is crucial for our society and country. When these issues are resolved, it is doable. Although women make up about 50% of the population overall, they are seldom ever represented in public life. The bulk of the home work is still done by women. The culture frequently perceives her major function as homemaker.

Gender is a general concept; however gender discrimination solely affects women as they are the only ones who experience it. Gender discrimination is socially determined rather than biologically established, and it may be reversed with the right sustained efforts. Gender discrimination is the practice of denying someone on the basis of their gender equality, rights, or opportunities. Men and women in India enjoy equal rights under the constitution; however gender discrimination and disparity still exist for women. There aren't enough possibilities for women to grow. In compared to males, their social, economic, and political situations are worse.

Violence against women is defined as "any act of gender-based violence that results in, or is likely to result in, physical, sexual, or psychological harm, or suffering to women, including threats of such acts, coercion, or arbitrary deprivation of liberty; whether occurring in public or private life" in the Declaration on the Elimination of Violence

Against Women, adopted by the UN General Assembly in 1993. In terms of access, involvement, and compensation, women's position in India is not on par with men's standing. The patriarchal and feudalistic social structure of the society is responsible for this situation's existence.

### **Meaning of Domestic Violence:**

Under current scenario various forms of exploitation and violence are considered to be domestic violence. Any form of abuse that endangers a woman's health and wellbeing is considered to be abusive. For example, the lady or her family can be harassed or harmed in exchange for dowry, money, or property.

Domestic violence also includes making harassing or harmful threats. It also encompasses any behaviour that makes you suffer emotionally or physically. Exploitation can take numerous different forms, comprising verbal, emotional, physical, and financial. Domestic violence need not take the shape of an action; it can simply take the form of not acting at all. For instance, failing to provide you with money to support your family or your kids would be considered as economic abuse that further fall under the category of domestic violence.

Women make up half of the global population. It has been observed that only 1% of the world's assets are owned by women, who make up nearly two-thirds of the population. In India, where men predominate, domestic violence is often modified according on gender. Gender discrimination in domestic violence refers to a pattern of abusive behaviour that one spouse uses to acquire or keep authority and control over a second intimate partner. Due to gender inequality in domestic violence, several types of abuse are perpetrated. Due to gender several types of abuse are perpetrated.

- **Bodily Abuse:** Bodily abuse involves beating, shoving, grasping, biting, pulling hair, etc.; it also includes depriving a spouse of medical attention or compelling him or her to use alcohol or drugs.
- **Emotional Abuse:** When someone's sense of self-worth and/or self-esteem is undermined, it is abusive. Constant criticism, undermining one's skills, calling someone names, or harming one's connection with their children are all examples of this.
- **Sexual Abuse:** Coercing or attempting to force any sexual conduct or contact without permission constitutes sexual abuse.
- **Fiscal Abuse:** Making or attempting to make someone financially reliant on someone else is known as fiscal abuse. This can be done by keeping complete

control over financial resources, denying someone access to money, or prohibiting someone from attending school or working.

- **Psychosomatic Abuse:** Threats of physical violence to oneself, one's spouse, children, or one's partner's relatives or friends, destruction of pets and property, and forced isolation from friends, family, school, and/or employment are all examples of psychosomatic abuse.

In addition to the victims of domestic violence, gender discrimination has a significant impact on the family, friends, coworkers, other witnesses, and the community at large. Children who experience domestic violence as they grow up are among those who are negatively influenced by this crime. Frequent exposure to domestic violence increases children's chance of developing a variety of physical and mental conditions as well as teaching them that violence is a normal way of life. This upsurges the possibility that they will grow up to be society's future victims and abusers.

#### **Reasons of Domestic Violence:**

- **Patriarchy/Male Dominance:** When one spouse feels the urge to dominate and control the other, domestic violence may begin. This drive to control their relationship may be felt by abusers. Certain people with very customary views may contemplate that they have the right to control their partner, and that women aren't equal to men.
- **Observation of violence in past:** Boys who see violence against women and learnt that women are not to be regarded or respected are more likely to harm women as adults. As abusers become older, some pick up aggressive tendencies from their families, neighbours, and other cultural influences.
- **Lack of Knowledge and Awareness:** Lack of education and ignorance among women are major contributors to domestic abuse against them. Education is no less vital for a woman's life because marriage is the ultimate objective of life and she is raised to serve men and their families. Women have a propensity to accept domestic violence as a normal part of life. Uneducated women are unaware of their rights to protection from domestic abuse when it occurs.
- **Socio-cultural:** The Indian marriage scheme has its roots in dowry. Because dowry is an unquenchable hunger that can never be fully satiated, there is no cure for this issue. Honor killings and deaths connected to dowries are further examples of domestic violence.

# Chapter-19

## THE POSITION OF WOMEN UNDER INDUSTRIAL LAWS

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## **ABSTRACT:**

*Women make up 50% of the population in India as well. Women have always faced discrimination, have endured it in quiet, and continue to do so. They have the courage and nobility to sacrifice and deny themselves, yet they are nevertheless subjected to injustices, inequity, and discrimination. Women's status has varied in various communities around the world. Women have always held a special position in society, regardless of whether it is developed, in development, or underdeveloped. Additionally, in all modern and contemporary societies, women's positions have always been discriminatory, making them one of the weakest segments of society. This is because nearly all societies around the world have always been dominated by men. This chapter tries to put light on women position in Industries and their problem and remedies available for them.*

*Keywords: Woman, society, social justice, rights, Child care, Remuneration.*

## **INTRODUCTION:**

Feminism was born as a result of many movements that were sparked by the status of women around the world. Feminism is a set of social theories, political ideologies, and moral convictions that are in opposition to one another, contradictory, and generally inspired by the experiences of women and by historical injustices in the social, political, and economic spheres. In accordance with this idea, numerous laws have been passed to safeguard women, and various privileges have been granted to women in an effort to elevate them. A number of statements have also been made in this regard, and in addition to the fundamental human rights, women have also been granted a number of civic and political rights.

### **Women under Industrial Law:**

To accomplish a fair distribution of income among the members of society based on the tenet "From everyone according to his capacity, to each according to his needs," law should be used as a tool of distributive justice. In order to sustain equality in society, social justice is essential. It is also crucial for the social and economic development of any country. Under labor and industrial regulations the most significant step in achieving the social justice is ensuring the equality in gender and protecting women's interest towards the society and nation as well.

According to various sources, women make up a sizeable portion of the workforce in the nation. However, despite the existence of numerous laws intended to improve the status of women, the number of women participating in the labor force is

steadily declining. The reason for this will be the factors affecting the conditions of the women, including the fact that they do not receive job offers that are suitable for their needs, which causes a gap between what they do and what they are capable of doing. Security also plays a crucial role because there are numerous laws designed to protect women.

### **The Equal Pay for Equal Work:**

According to Article 39 of the Indian Constitution, all citizens, whether men and women are alike, they have the right to adequate means of subsistence and also equal pay for equal work. Although it's the state's responsibility to ensure equal employment opportunities for men and women, this article makes it clear that the state should adopt policies that gives women in the workforce and also equal access to that workforce. However, this article does not impose any obligations on the state to implement these policies.

### **The Equal Remuneration Act of 1976:**

The intention of the Equal Remuneration Act of 1976 was to pay men and women equally for identical or similarly characterized labor. The employer is required by this act to make sure that there is no sex-based discrimination and that both male and female employees are provided equal opportunity. According to Section 5 of this law, employers are not allowed to discriminate against women when hiring for the same position or one that is comparable to it, unless doing so would violate any legal restriction or prohibition.

Even though there are numerous laws in place to protect women from sexual harassment at work, there are still many instances where the offenders go unpunished, or the victims of such humiliation are frequently blackmailed by their employers under the threat of losing not only their jobs but also of being treated disrespectfully in society. As a result, many times the women who are subjected to such pressures choose not to report the incidents. The state should take measures like toughening up penalty for such crimes, educating women about their rights, and letting them know about the different protections they have in case of an occurrence to stop such behaviors and give women the voice to speak out against such evils.

### **New Codes and Women Protection:**

The new labor laws, which were passed on September 19, 2020, they will become effective by the end of this year and the labor code which aims to reform numerous labor regulations which have been passed by the Central Government over

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**Authors**

Gupta, Shruti; Singh, Jyotsna; Kumar, Kaushal

**Abstract**

The membrane potential is used to compute the coefficient of correlation between normal state and Parkinson's state. The emphasis of this manuscript is to aim at the parameters that shows a noteworthy part for refining the correlation between a normal state in addition to Parkinson's state and similarly to learn the consequence of one parameter in contrast to other parameters on the coefficient of correlation. This study is significant to look inside the reasons for deviation of Parkinson discharge outline also towards classify the parameters which might show a vital part in rectifying the illness. Consequences display that the activity outlines are much sensitive to numerous parameters and these consequences also deliver insight into the motor dysfunction.

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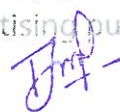
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By Dr. Suchita Sharma

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# Digital Transformation and Innovation Management: A Systematic Literature Review

Priyanka Chadha, Rajat Gera

Source Title: Promoting Inclusivity and Diversity Through Internet of Things in Organizational Settings (/book/promoting-inclusivity-diversity-through-internet/296244)

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## Abstract

Digital innovation is the creation and commercialization of novel products and services while digital transformation indicates the combined effects of several digital innovations by novel actors (and actor constellations), structures, practices, values, and beliefs that change, threaten, replace, or complement existing rules of the game within organizations and fields. Since innovation processes themselves are subject to digitization, scholars have argued that accepted theories of innovation are no longer applicable, and hence, there is a significant need for novel theorizing and empirical research on digital innovation management.

## Chapter Preview

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## Introduction

Digital technologies are impacting all aspects of economic and social activities by disrupting or complementing existing activities or creation of new activities, services, and businesses. Digitalization allows automation and tracking and storing of information and data which can be analysed for improving processes, work organization (Zuboff, 1988) and predict future events (Agrawal, Gans, and Goldfarb 2018). Some of the high impact digital technologies are internet of things, blockchains, additive manufacturing, big data, and artificial intelligence: cloud computing, and augmented and virtual reality (Rindfleisch et al., 2017). Digital innovation is the creation and commercialization of novel products and services while digital transformation indicates the combined effects of several digital innovations by novel actors (and actor constellations), structures, practices, values, and beliefs that change, threaten, replace or complement existing rules of the game within organizations and fields (Hinings et al., 2019).

In order to leverage the complex and dialectical relationships between innovation, digital technologies, the relationship between evolution and trajectories of connected digital technologies and firm innovation needs to be understood. Innovation is a result as well as a source of digital transformations at all levels.

Digital technologies are continuously improving through higher processing capacity and lower cost enabling new opportunities for networks to generate, develop, and fund innovative digital products and services (Yoo, 2010). The unique characteristics of digital innovation processes make it mandatory for firms to evaluate the role and configuration of their product and service portfolio, their interaction with the digital environment, and how organizational processes can be configured to support digital technology driven innovation.

Since Innovation processes themselves are subject to digitization, scholars have argued for newer theories as existing assumptions and perspectives may no longer be relevant (Nambisan, Lyytinen, Majchrzak, & Song, 2017; Svahn, Mathiassen, & Lindgren, 2017). Hence there is a significant need for novel theorizing and empirical research on digital technology driven innovation. Management and organizational scholars have been focussed on interconnections between digital transformation and innovation management in recent past. However due to a fragmented research on the interplay between digital transformation and innovation management, practitioners and researchers lack a framework to undertake decisions and evaluate current situations.

Through a systematic literature review, this study aims to develop a holistic framework systematically of key dimensions (*what*); and a framework which can be used to explore the role and approach played by digital technologies in innovations at level of firm, industry and society, based on the empirical evidence from the selected papers. The paper contributes to our understanding of the theory of digital technologies and innovations in various contexts of industries across different sectors of the economy and different levels of decision making i.e. firm, industry and societal levels.

The research objectives of this study are:

1. To evaluate and synthesize the current scenario of empirical research on digital technology and innovation in literature
2. To develop a framework for understanding and evaluating the role of digital technology in innovation
3. To identify the emergent themes and future trends

Hence this study aims to validate and contribute to an integrated framework based of Digital Technologies and Innovation based on the themes of Digital transformation, digital innovation, digital entrepreneurship, digital technologies, and business model innovations (adapted from Apio et al., 2020) applicable at various levels i.e. micro (firm level), meso (industry or competition level) and macro (institutional or society level). The papers findings are synthesized into 15 themes in the proposed framework (Table 1), and conclusions are drawn.

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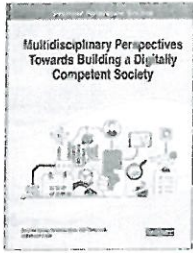
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## Multidisciplinary Perspectives Towards Building a Digitally Competent Society

Sanjeev Bansal (/affiliate/sanjeev-bansal/412444/), Vandana Ahuja (/affiliate/vandana-ahuja/412445/), Vijit Chaturvedi (/affiliate/vijit-chaturvedi/412446/), Vinamra Jain (/affiliate/vinamra-jain/412447/)

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**Multidisciplinary Perspectives Towards Building a Digitally Competent Society** explores multidisciplinary perspectives towards building a more digitally competent society, considers new business models and the need for organizations and individuals to develop the right mindset to embrace digitalization, and discusses how social capital can become a key driver in crafting a whole new digitally competent social fabric. Covering topics such as technological transformation, social media, and corporate social responsibility, this reference work is ideal for corporate practitioners, business owners, policymakers, scholars, researchers, practitioners, instructors, and students.

#### Coverage:

The many academic areas covered in this publication include, but are not limited to:

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- Corporate Social Responsibility
- Digitalization
- Job Skills
- Marketing
- Social Capital
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## REINSTALLATION OF BUSINESS MODEL INNOVATION

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### ABSTRACT

A Business model has certain important features as to how the concerned company or organization propose its business issues and generate delivery of its product to the customer and other stakeholders. It is felt that business model innovation is a critical process and contributes to company's survival, business rules and regulations through enactment and also it is treated as foundation to grab competitive advantage over the others in the field. As per Microsoft News Report (November 2020), it has been made clear that 77% of Indian firms have opted for the innovations to be the significant aspect in their performance and springiness. Taking into consideration the growing demand for use of innovative business models and the customers' expectations, technology up gradation, deregulation it has started receiving more attention by public. Therefore it has become a seriously discussed matter that cuts across many industries. It has also been emphasized by scholars that organizational prospects are closely monitored and decided that it is closely related to business model innovation and its success relies on various factors. The study is confined to focusing on business model innovation implemented in various industries depending on different factors.

*Keywords: Business model, Innovations, Factors, Corporation*

### 1. INTRODUCTION

The ability of a business to respond swiftly to challenges and successfully perform in four dimensions viz people, processes, data, and technology capabilities is referred as innovation.

One of the most essential and difficult concerns that organizations confront today is innovation. Organizational success hinges on innovation (Barreto, Amaral, & Pereira, 2017; Edmondson, 2012).

As per Microsoft News Report (November, 2020), 77% of Indian Firms have believed innovation to be precarious or significant to their performance and springiness. Furthermore, the epidemic has augmented the progression towards innovation, with companies in India maturing by 4% in their drives over the past six months. In order to establish resilience in the new normal, Indian organisations were forced to innovate. However, as a result of this evolution, organisations in the country have found it easier to innovate. According to the survey, 64% of respondents said that in the post-COVID-19 period, innovation has grown simpler. Only 32.5 percent of Indian firms felt it easy to innovate their products and services prior to the pandemic (Figure 1).



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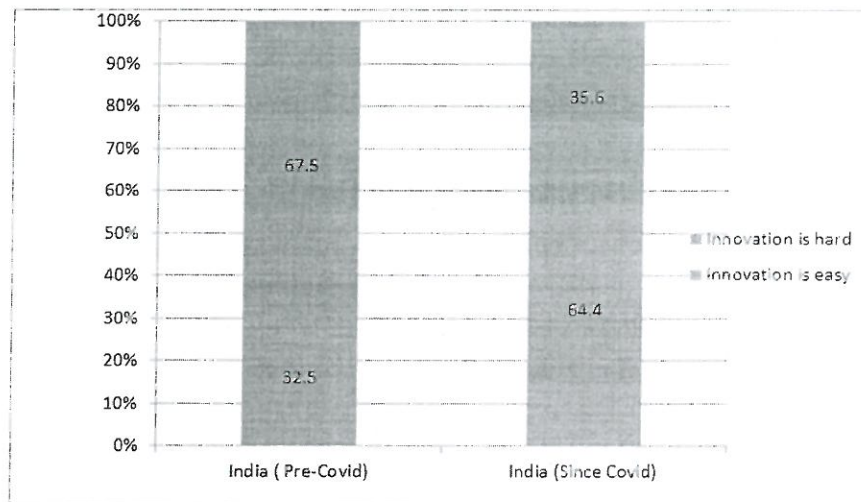


Figure1: Indian businesses' innovations across the organization in the new normal

Organizations seek to revolutionize their business models by looking for new methods to outline value propositions, create value, and capture value for consumers, traders, and associates (Voelpel, Leibold&Tekie, 2004; Morkunas, Paschen& Boon, 2019; Reuschl, Tiberius, Filser&Qiu, 2022).According to a large body of research, business model innovation is critical for company survival, business enactment, and as a foundation of competitive advantage (Hutahayan, B., 2019; Trimi &Berbegal-Mirabent, 2012; Foss, &Saebi, 2017). Given the increased prospects for innovative business models provided by shifting customer expectations, technology progressions, and deregulation, it is beginning to receive more attention (Karimi, & Walter, 2016; Buliga, Scheiner, & Voigt, 2016). . As a result, it's critical to understand it and figure out where various business models.

### 1.1 LITERATURE REVIEW

Any company's performance is largely dependent on its business plan. Business model innovation is not only becoming increasingly crucial as a result of increased and globalised competition (Carayannis&Meissner, 2017; Casadesus-Masanell&Ricart, 2011) but it is also posing a significant theoretical and practical challenge (Massa&Tucci, 2013). Although many executives are willing to contemplate more disruptive changes to their business model, they frequently lack the ability to explain their current or intended business model, let alone comprehend the prospects for innovation (Lindgardt, Reeves, Stalk, & Deimler, 2009; Spieth, Schneckenberg&Ricart, 2014). A business model depicts how a company proposes, generates (Euchner&Ganguly, 2014) delivers, and collects value for the company, its customers, and other stakeholders (Yang, Evans, Vladimirova, &Rana, 2017). As a result, it provides a 'systemic lens' through which businesses and their operations can be examined. A value proposition (product/service offering), value creation and delivery (how this value is supplied, e.g., through activities and sales channels), and value capture mechanisms (how money is earned and other kinds of value are captured) are common components of a business model (França, Broman. Robert, Basile&Trygg, 2017).The identification of kinds and the construction of a typology of business model innovations is one of the first stages toward gaining greater theoretical understanding (Geissdoerfer, Savaget, & Evans, 2017) and practical instructions (Schneider& Spieth, 2013;Foss&Saebi, 2017). Geissdoerfer, Vladimirova & Evans (2018) examined about social enterprise business model innovation, identify several forms, and discusses their rationales. They



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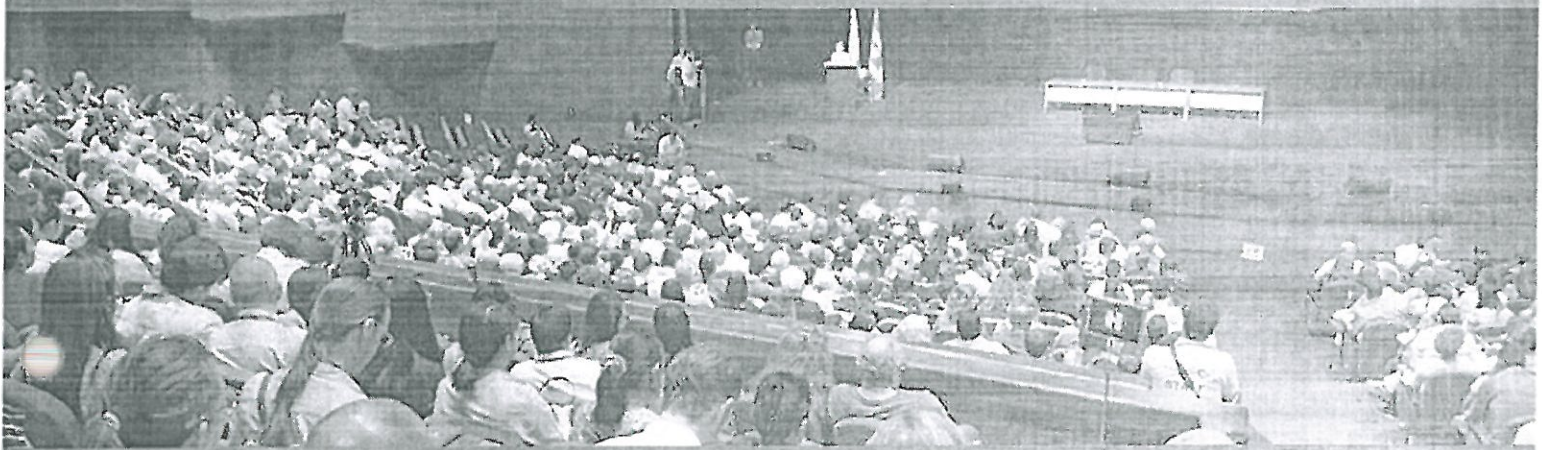


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## Fraud Prevention Initiatives taken by Regulatory Authorities in India

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### Abstract

Banking sector back of the economy, and from the ancient times in India, an indigenous system of economy had prevailed. The sector is a big system in itself which is said to have transparency in operations. But nowadays, despite strong mechanism, the system is nearly losing out consumer's trust in banking sector due to frauds and scams. The rising incidents of frauds and scams in banks is a matter of concern not only for the regulatory mechanism, but also for an economy and we being a customer to banks. These rapid increase in graph of frauds and scams is hampering consumer's entrust on banking mechanism. While the primary responsibility for preventing frauds lies with banks themselves, the Reserve Bank of India (RBI) has been advising banks from time to time about the major fraud prone areas and the safeguards necessary for prevention of frauds. Banks are also being advised about the details of unscrupulous borrowers and related parties who have perpetrated frauds on banks so that banks could exercise caution while dealing with them. To facilitate this ongoing process, it is essential that banks report to RBI complete information about frauds and the follow-up action taken thereon. Government has also bought extensive reforms, change in credit culture has been instituted and tightened for every stakeholder in the financial system which has enabled a strict check on corruption to decline the occurrence of frauds. Government has issued framework for timely detection, reporting, investigation etc. relating to large value bank frauds to Public Sector Banks (PSBs) as well. The Reserve bank and Government continues to aware banks and customers in real time to control such frauds and scams. The purpose of this paper is to study the reforms and initiatives taken by the Reserve bank and the Government together to eradicate the disparity of reporting by banks and make the financial system corruption free.

**Keywords:** Fraud, Scam, Reserve bank of India, Financial System, Consumer, Breach of Trust, Banking sector

### Introduction

From the ancient times in India, an indigenous system of economy had prevailed. The business had been carried on by the Shrofs, Seths, Sahuukars, Mahajans and Chettis etc. The business of banking had been carried out by them since ancient times. These indigenous bankers included very small money lenders to Shroffs with huge businesses, who carried on the large and specialized business even greater than the business of banks. India was not a strange to the conception of banking. Giving and taking of credit in one form or other have existed as early as the Vedic period. However, evolution of banking sector in India from the Vedic period till 21<sup>st</sup> century, has brought drastic modernization in the system, especially in late 1990s when internet banking came into existence. From ATMs to cashless transactions, banking sector has come a long way and still improving each day. The application of Information Technology has brought significant change in operations, process and storing data in banking sector.

Banking sector is a big system in itself which is said to have transparency in operations. But nowadays, despite having strong mechanism various methods of Audit (audit by types and audit by levels), the system has nearly losing out consumer's trust in banking system. A sound internal audit function plays an important role in contributing to the effectiveness of the internal control system. The audit function should provide high quality counsel to management on the effectiveness of risk management and internal controls including regulatory compliance by the bank. Historically, the internal audit system in banks has been concentrating on transaction testing, testing of accuracy and reliability of accounting records and financial reports, integrity, reliability and timeliness of control reports, and adherence to legal and regulatory requirements.

However, in the changing scenario such testing by itself would not be sufficient. There is a need for widening as well as redirecting the scope of internal audit to evaluate the adequacy and effectiveness of risk management procedures and internal control systems in the banks. Incidence of frauds, robberies, etc., in banks is a matter of concern. While the primary responsibility for preventing frauds lies with banks themselves, the Reserve Bank of India (RBI) has been advising banks from time to time about the major fraud prone areas and the safeguards necessary for prevention of frauds. As per RBI press release FY 2019 data declared that there has been significant 45% of rise in banking frauds compared to FY 2009. To this, loan & advance constituted highest number of frauds in FY 2019 amongst all other categories of fraud (around 55%), whereas only 27% fraud recorded





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# HR Analytics and Artificial Intelligence – Transforming Human Resource Management

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**Abstract**—Advancements in artificial intelligence (AI) has led to rapidly changing the business environment. Integration of AI in human resource will facilitate the analysing, predicting and diagnosing of the issues faced by the organizations and help to make better employee related decisions. An integrative synthesis of multiple streams of literature was undertaken to critically analyze the implementation of AI and HR analytics in HRM for performance enhancement and to gain a competitive advantage. The HRM has undergone a drastic transformation from the administrative functionality to more advanced processes like automation through application of artificial intelligence which has entirely re-defined and re-shaped the attributes of the organizational workforce. AI plays a major role within HR to support smart people analytics. With deployment of AI and analytics in HR functions such as talent acquisition, training and development, employee retention, employee engagement and performance appraisal, organizations can enhance proficiency and productivity. Additionally, AI, cloud and HR Analytics also support in collecting huge volumes of employee information. HR is considered as a 'predictive engine' essential for the organizational upliftment. The real challenge for HR department is how thoroughly they can enhance employee skills and re- renovate their teams in the field of HR Analytics and AI. The current research evaluates the functional analysis of artificial intelligence in the human resource context. It emphasizes on the application of AI in various HRM functions and stipulates the barriers in adoption of HR technological among employees.

**Keywords**— Artificial Intelligence, HR Analytics, Big Data, Technology, Decision

## I. INTRODUCTION

Artificial intelligence can be referred to as a technique that acts like an individual's brain and apply human intelligence in numerous disciplines to enhance the efficiency and productivity of various industries. It consists of diverse inputs to provide outputs in the field of HRM. It includes three essential mechanisms - advanced algorithms, high- speed computation large volumes of quality data, which differentiates it from an ordinary software. This technology uses algorithms which connects quality data with fast computation services and can perform multiply tasks that require human cognition. With the advent of AI, organizations have undergone a revolutionary change in the decision-making process [1] and has redefined

various management models [2]. AI technology offers important opportunities for enrichment of various HR processes, such as talent acquisition, payroll, self-service transactions, policies and procedures and reporting. HR professionals believe that collaboration of AI with various HR practices will enhance the people related decision making process.

The advancement in HR technology, has encouraged the availability of real-time data for organizations but they still rely on their intuitions and instincts for drawing insights from data. This creates delays in drawing insights from the data which gradually becomes outdated. AI helps HR to extract insights from data and provide suggestions on real time basis. AI can eliminate various human biases and discrepancies in a sensitive function like Human Capital Management. Hence, decisions are more data- driven, consistent and unbiased. The application of AI is seen majorly in five HR functions such as analytics and metrics, time and attendance, talent acquisition, training and development, and compensation and payroll [3].

Incorporating technologies like AI and analytics in HRM have proved to be way beyond just a tool [4]. Previous studies have illustrated the impact of AI on various HR functions such as using techniques of data mining and extraction tools in employee selection and recruitment, detect knowledge hiding, smart sensory mechanism for assessing productivity of employees and intelligent agent technologies for employee development [5,6]. Nevertheless, till now the studies have emphasized the role of AI in human resource at a functional level. However, the emergence of AI-powered machines such as robots and its application in various tasks related to human interaction and collaboration including product development [7], customer service delivery [8] and industrial production [9] have established a new domain for research. Though these technologies have now become an integral part of the businesses, their still exists many controversies regarding the application of AI-based analytics within the human resource functions [10]. Hence, the managers and the employees have an obligation to use, augmented reality and games, big data analytics, simulations, algorithms, social media, machine learning in day to day lives which helps to support the decision-making processes [11].



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In spite of several articles on AI and analytics, there are very few research-based studies on its integration in HR. Hereafter, there is a paucity of academic research carried out in the field of AI and HR. The aim of this paper is to look at different HR practices and understand how digitization plays an important role to enhance its efficiency. Previous studies have illustrated the difference between the promise and reality of AI in HRM [12]. Nonetheless, this gap is deteriorating with quick expansion of AI applications. This is qualitative research which adds to the concept of integrating AI and analytics in HR. This study describes various HR functions where AI has been incorporated and how it has benefitted these functions more effectively and systematically. The findings illustrate that by gathering and analyzing meaningful data through HR analytics and AI organizations can improve expenditure, operations, and productivity for the better. Finally, the key challenges faced by the organizations in adoption of HR technology are highlighted. The study concludes with illustrating various strategies for the implementation and promotion of AI-based HR technology to enhance organizational performance as well as future research implications.

## II. LITERATURE REVIEW

In today's era of technological innovation, organizations are continuously being influenced by different HR interventions. Various functions in HR department like recruiting, selecting, motivating, developing and retention of high performing employees in organization [13] continue to remain significant, but needs incorporation of different approaches to work [14]. Many companies have adopted complicated data collection technologies and analytics for improving process of talent acquisition, therefore verifying the technological transformation in HR processes [15]. The use of technology in HR can increase efficiency and effectiveness of service delivery, reduces the administrative functions, and permits HR to focus more on the strategic aspect [13,16]. With the increase in easy access to data there is a paradigm shift from being administratively oriented to being more strategically oriented in the HR department, which has led to the re-structuring of decision-making processes thus generating novel HR opportunities for individuals who are involved in "complex, judgment-oriented and demanding tasks and responsibilities" [17]. The advancement in HR technologies has encouraged the evolution of sensors and decision-making through composite algorithms for real-time monitoring of employee and work place [16].

The terms Artificial Intelligence (AI), Machine Learning (ML) and Big Data have evolved in the business world. The concept of AI was first coined by John McCarthy [18] also known as father of AI. It can be defined as "an intelligent machine which includes automation theory, information processing and cybernetics" [18] which can help to solve various cognitive problems [19] and execute activities similar to an intelligent individual [20]. AI includes Machine Learning and Predictive analytics. Big data can be referred to as huge, fast flowing, and high-variety data which acts as the fuel essential for advanced predictive analytics and machine learning [21].

As cited by Ben Waber, the "power of analytics [provides] a nearly superhuman ability to understand and change the world around us" [22]. The top priority for CEOs is to have right talent

strategy as the organizations need to grow in an increasingly complex, competitive business landscape. HR leaders rely on analytics to inform, measure, and refine their strategies. HR analytics has gained substantial importance in last few years. Artificial intelligence (AI) and machine learning (ML) are fueling HR Analytics advancement with competences to predict high-performing employees and identify talent at risk.

Organizations have realised the importance of integrating AI in HRM so as to gain competitive advantage in global economy [23]. As HR organizations mature in their analytics capabilities from descriptive to diagnostic to prescriptive and predictive, the key challenge for HR professionals is interpreting the data to resolve issues and effectively advise business leaders. Having the data is not similar to being able to use it effectively. The need of an hour is to convert this raw data into meaningful information which eventually has led to the rapid growth and development of HR analytics. The capability and inventiveness of HR have turn out to be chief mechanisms of a successful business. As a result, the main challenge for the businesses is to win the battle to acquire superior HR talent. Consequently, numerous methods and means of evaluating the HR have been developed.

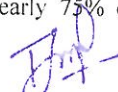
The concept of evaluating, rating, and gathering HR intelligence is known as HR analytics. It can also be termed as HR intelligence [24], predictive analytics [25], talent analytics and workforce intelligence [26] and people analytics. It can be referred to as a procedure that includes data mining, workforce forecast models and investment analysis [15] or as a methodical procedure of collecting and analyzing data and further communicating the meaningful analytics result to support organizations accomplish their strategic goals [24]. HR analytics practices include HR metrics, selection research, and benchmarking and employee surveys [26]. Bassi et al. [25] considered HR analytics as an evidence-based approach for making better people-related decisions to solve certain HR issues [25].

On the contrary, Spahic [26] argues that the idea of HR analytics has been coined from the ancient practice of competitive intelligence that includes procurement of information regarding business competitors, for example, their strategies, competences, and technologies [26]. Competitive intelligence has empowered HR department to focus more on the bottom line of the organization. Findings from different researches have concluded that performance of the organizations that are using HR analytics is better than their competitors as they tend to recognize the best talent among the workforce and identify the innovative opportunities [27].

## III. AI AND HR ANALYTICS IN HRM- AN OVERVIEW

### A. AI and HR Analytics - Talent Acquisition

The Talent acquisition is among the most important functions in HR. HR professionals and recruiters devote a lot of fruitful time in screening and sourcing resumes, attracting best talents, scheduling and conducting assessments and preliminary interviews, informing the applicants about the status of their interview and finally, onboarding. Such tasks have been reduced enormously with the help of analytics and AI. The talent acquisition software has eradicated nearly 75% of the work

  
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**EMERGING**

**• DIMENSIONS of  
BUSINESS & MANAGEMENT**  
in the Present-Day Competitive Environment

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## 5.2

# Derivatives Market – An Emerging Dimension of Indian Capital Markets



**Dr. Rashmi Singel**  
*Associate Professor*  
*K.R. Mangalam University, Gurugram*

### **INTRODUCTION**

Derivatives have emerged as a new and innovative risk management tool in the field of Business Markets around the globe. Businesses use derivatives to hedge against risk and reduce uncertainty relating to future prices. As per recent data (March, 2020) from Bank of International Settlements (BIS), size of total notional amounts outstanding for global Exchange-traded Futures Derivatives contracts is 32,336 billion US Dollars and total of global Exchange-traded Options Derivatives contracts is 50,389 billion US Dollars for Exchange-traded futures and options. The total notional amounts outstanding for Global OTC derivatives market, stands at 606,810 billion US Dollars

Derivatives contribute to economic growth of a country by increasing efficiencies of financial markets and commodity markets. India is also witnessing growth of derivatives market in the recent years. Derivatives were introduced in India as an investment alternative two decades back. In the year 2000, the first derivative traded in India was Equity derivatives which was traded on National Stock Exchange.

Then there was no looking back. NSE introduced Index Futures in June 2000. Then, next year in June 2001, Index Options was launched, then in very next month i.e. July 2001, Stock Options was launched, which was followed by Stock Futures in next four months in November 2001. Subsequently Indian derivatives market have expanded multidimensionally in terms of eligible investors, number of contracts, types of derivatives, regulatory framework for derivatives etc. An active exchange traded derivatives market is the benchmark of growth and development of economy and financial markets of any country. In India, this is achieved through electronic order book trading, Pan India market access, largely retail market, better regulations. This study focuses on National stock exchange and Bombay Stock Exchange as these exchanges hold major share of India's financial derivatives trading.

### **DERIVATIVES**

The financial instrument, the value of which is based on another financial product or commodity are called derivatives. Value of these Contract is derived from an underlying asset / portfolio of assets on which they are written. "Underlying asset" is also known as Primary Asset; which may be either a stock or a bond or a foreign currency or a commodity like wheat or a precious metal like gold or a portfolio of assets such as a stock index. Derivative instruments can assume many varieties as there is no limit on kind of contract signed between two consenting parties.

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Derivatives are dependent on the value of underlying assets. It can be in the form of Equity trading, commodity trading, currency trading and interest rate. Derivatives in India can be classified as

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## Emerging Dimensions of Business & Management in the Present-day Competitive Environment

Daunting challenges of the prevailing fiercely competitive times have made it incumbent for organizations to continuously embark on the path of innovation to remain alive and kicking. To achieve this avowed objective, critical areas of business functioning and thrust dimensions of management practices need to be identified along with charting a course to achieve success and gain acceptance among stakeholders. This book is a step in the direction of exploring and analysing issues which determine the survival and growth of our progressive organizations and aspirational economy.

### Key Features

- The book is a collection of more than 60 well-researched and well-argued articles by as many young academicians, inquisitive researchers, industry experts, experienced professionals and 'out-of-box' thinking educational administrators.
- Readers will get a glimpse of how technology and digitalization across the world are shaping mindsets and communication and also how the choices of people, the way business is conducted, are undergoing a dramatic change.
- To steer the readers through the maze of intricate issues, important emerging dimensions like entrepreneurial orientation, digital journey of MSMEs, strategic planning and decision making, identity and gender roles, diversity and inclusion, alternative strategies in the education sector, etc. have been analyzed in detail, in the light of the challenging contemporary times and also to show their relevance in the days ahead.
- Writing styles of authors and choice of topics have made it a very informative and intellectually satisfying work to an extent where our young scholars will discover critical dimensions for further enquiry, identify focus areas for business practitioners to maximize their competitive superiority, and suggest sound theoretical foundation to policy framers to formulate realistic programs necessary to fulfil the legitimate aspirations of people.



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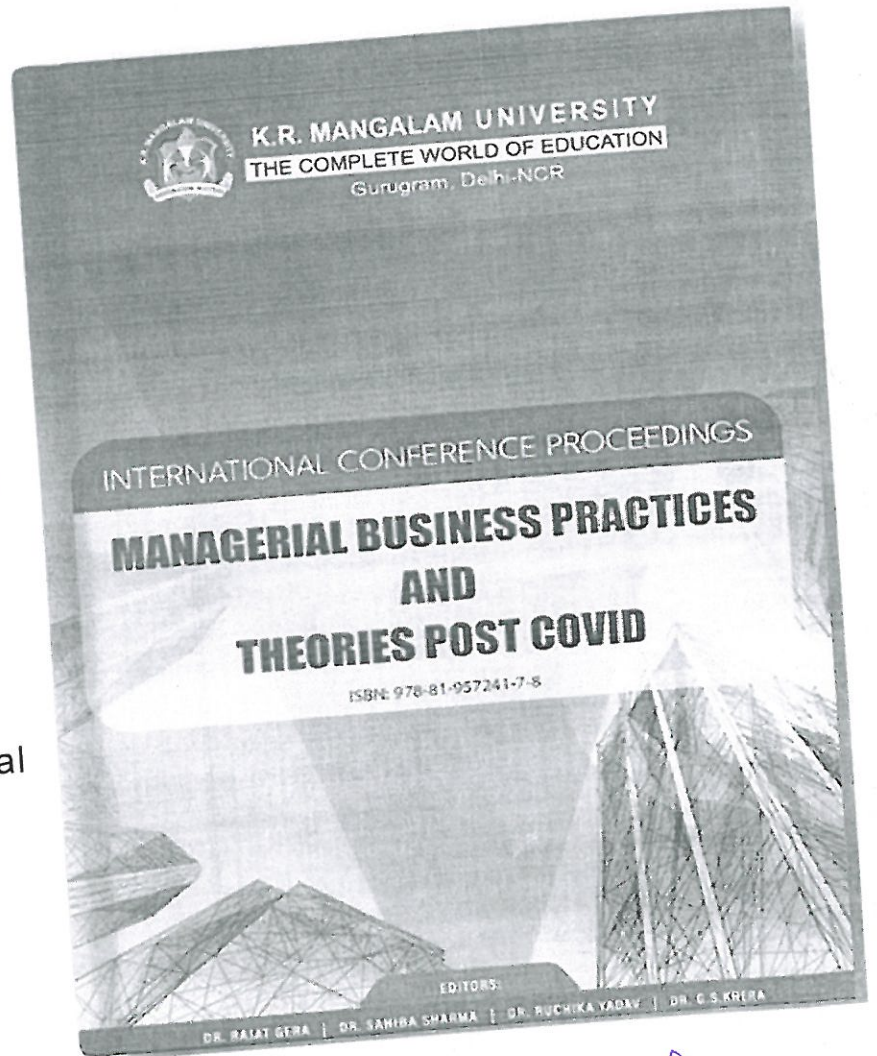
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