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STUDY OF OPTICAL PROPERTIES OF CERIUM DOPED $NALI_2PO_4$PHOSPHOR SYNTHESIZED BY SOLID STATE METATHESIS

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Abstract:
Novel microwave assisted Solid StateMetathesis (SSM) synthesis technique was effectively used for synthesizing$NaLi_2PO_4$:xCe (x=0.01)phosphor. Simple household microwave oven with output power 900W was efficiently used in synthesis process. The Solid State Metathesis reaction is self-propagating type of reaction in which the formation of the high lattice energy by-product like NaCl is solely responsible for carrying the reaction. The metathesis reaction can be initiated by heating the reaction precursors by external sources of energy like microwave electromagnetic waves. Microwave heating is accompanied with several benefits over others routes like shorter reaction time, less consumption of potential energy, improved yield and product uniformity and controlled morphology with desired properties. The structure of $NaLi_2PO_4$:xCe of prepared phosphor was investigated and confirmed by using X-ray diffraction technique. Further, the optical properties specifically photoluminescence of Cerium doped $NaLi_2PO_4$ phosphor was examined.

Keywords: $NaLi_2PO_4$:Ce; Photoluminescence; Solid State Metathesis; Microwave.

1. Introduction:

Since many decades, orthophosphates having general formula $ABPO_4$ (here A is monovalent cation and B is divalent cation) are being studied. These compounds form a large family of mono-phosphates with various structures. The relative size of the A and B ions play key role in deciding structure of these mono phosphates. These compounds have high thermal stability and are also known for being used as an efficient luminescent host[1]. The family of Phosphate compounds are commonly known as orthophosphatesand have raised its importance due to their wide applications specifically in the field of solid state lighting. They possess superior optical as well as ferroelectric properties and many intriguing features such as excellent thermal, mechanical, and chemical stability which make them unique for all the types of displays [2].Phosphate compounds have their unique characteristics such as they are capable of providing many crystal field environments which is generally imposed on emission centres. Phosphate material used as a phosphor which can be doped with rare earth ions also exhibit excellent thermal and charge stabilization [3]. Alongside, phosphate compounds are familiar as amultifunctional material. Recently, orthophosphates are being extensively studied because of their structural diversity. These characteristics of orthophosphates are responsible for establishing them as a best host materialwhich caneasily accommodate active rare earth ions.

In this paper, brief information aboutCerium doped $NaLi_2PO_4$ synthesized as a phosphor material is elaborated. Novel Solid State Metathesis using microwave oven is the key method of synthesis. Many researchers tried

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SYNTHESIS OF METAL/METAL OXIDE NANOMATERIALS FOR ORGANIC TRANSFORMATIONS: A REVIEW

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Abstract— Nanomaterials are a diverse class of materials with dimensions ranging from 1 to 100 nm, offering exceptional surface areas and unique properties in magnetic, electrical, optical, mechanical, and catalytic fields, which can be precisely controlled. Researchers are exploring green, sustainable, and economic techniques for organic transformations of raw materials, with nanostructured catalysts being preferred due to their surface-active sites, high recovery rate, and ease of synthesis. The various nanocatalyst including mixed metal oxides, magnetic, core-shell, polymer-based, graphene-based, nano-supported have been employed as nanocatalyst in organic transformations. Metal/metal oxides nanocomposites, in particular, have emerged as viable alternatives to conventional materials in various fields. These nanocatalysts offer advantages such as increased surface area, selectivity, and cost-effectiveness. They are also inexpensive, stable, and can be easily recycled and reused for multiple cycles. The current review outlines the various types of metal/metal oxides nanomaterials involved in catalysis for organic transformations.

Index Terms— metal/metal oxides, nanocatalyst, nanomaterials, organic transformations

I. INTRODUCTION

Nanotechnology is considered one of the important technologies of day-to-day developments in research nbecause to its exceptional mechanical, electromagnetic, and optical characteristics. Nanomaterials are man-made, possessing special properties and functions with, at least one external dimension that measure 100 nanometres [1-4].

These nanomaterials include nano-objects such as nanoparticles, nanofibers (rods, tubes) and nanoplates, which can consist of different materials in the form of alloy and intermetallic compound and having different structures like crown jewel, hollow, core-shell and alloy structure. Metal/metal oxides nanomaterials are synthesized by physical, chemical and biological method, it involves Thermal and photochemical deposition, chemical vapour deposition, sputtering, sol-gel, co-precipitation, micro-emulsion, hydrothermal, solvothermal etc (Fig.1). The increasing uses of such synthetic nanomaterials have increased the scope of its application in different fields includes environmental, energy harnessing, biomedical sector and catalysis [2-4].

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A REVIEW ON SYNTHESIS OF COPPER-SILVER BIMETALLIC NANOPARTICLES

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Abstract

The study of Copper-Silver bimetallic nanoparticles (Cu-Ag BNPs) has grown significantly, especially in last decade. Cu-Ag BNPs has been synthesized by using biogenic, chemical, and physical methods. The biosynthesis of Cu-Ag BNPs mediated by plant extract is simple, low cost and safe for environment. Plant extract contains phenolic compounds like alkaloids, flavonoids, terpenoids, tannin etc. are act as reducing agent and stabilizing agent are ligand moieties like carbonyl, carboxyl and amino groups were useful for synthesis of BNPs and obtain non-toxic by-product. In chemical methods reducing agent like sodium borohydride, hydrazine hydrate, ascorbic acid etc. are used for the reduction of Ag(I) and Cu(II) into Ag(0) and Cu(0) respectively, and stabilizing agent like poly (vinyl pyrrolidone) (PVP), Poly (ethylene glycol) (PEG), Poly (vinyl alcohol) (PVA) etc. are prevents the further oxidation of silver and copper. Inphysical synthesis no requirements of reducing agent and stabilizing agent, simply deposition of one pure metal on another metal.To the best of our knowledge, there are no separately review papers in the literature on the synthesis of Cu-Ag BNPs by biological, chemical, and physical methods. Therefore, we provide a clear perspective on the synthesis of Cu-Ag BNPs.

Keywords:Biological synthesis, chemical synthesis, Cu-AgBNPs, nanoparticle synthesis, , physical synthesis,

Introduction

Bimetallic nanoparticles have gained attention in recently due to their favourable biological and industrial applications [1].Bimetallic Nanoparticle is combining of two different metal and having particle size is in between 1-100 nm. Bimetallic nanoparticles are currently the subject of interest in intense investigation and research is in progress due to great properties (catalytic, thermal optical, electrical and magnetic) compare with monometallic nanoparticles [2,3]. Synthesis methods of bimetallic nanoparticle are co-reduction, successive reduction method and electrochemical method **[Fig.1]**. In co-reduction method, two precursors and stabilizing agent added together in suitable solvent. Metals are presents in ionic form to convert into zerovalent required reducing agent into it. In successive reduction, first added one metal precursor with stabilizing agent followed by reducing agent after first metal reduce completely then add another metal into it, this method leads to formed core-shell bimetallic nanoparticles. In electrochemical method, bulk metal converts into metal atom. In this method, two anodes are made up from bulk metal and cathode is platinum metal plate, stabilizing agent mixed with electrolyte and current passed through ions and metals is formed at anode and reduced by platinum metal plates [4-7]. Bimetallic Nanoparticles are also synthesized by physical, chemical, and biological method, it involves Thermal and photochemical deposition, chemical vapour deposition, sputtering, sol-gel,

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ARTIFICIAL INTELLIGENCE: FUTURE OF BUSINESS

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ABSTRACT:

AI is transforming business processes, driving efficiency, innovation, and competitive advantage across industries. Adopting AI technologies strategically can lead to improved decision-making, cost savings, enhanced customer experiences, and sustainable growth.

Considering development of AI technology in every sector especially in business, AI already took a non-replaceable place in business activities. Therefore AI is the future of business.

INTRODUCTION

Artificial intelligence (AI) refers to the simulation of human intelligence processes by machines, especially computer systems. These processes include learning (the acquisition of information and rules for using the information), reasoning (using rules to reach approximate or definite conclusions), and self-correction. AI encompasses various subfields such as machine learning, natural language processing, computer vision, robotics, and more, all aimed at creating systems that can perform tasks that typically require human intelligence.

Artificial intelligence (AI) exhibits several key features that distinguish it from traditional computer programs. Here are some of the prominent features of AI:

1. **Self Learning:**AI systems can learn from data and improve their performance over time. This is typically achieved through techniques like machine learning, where algorithms are trained on large datasets to recognize patterns and make predictions.
2. **Reasoning:** AI systems can use logic and reasoning to make decisions and solve problems. They can follow rules, infer conclusions, and apply knowledge to new situations.
3. **Problem-solving:** AI can tackle complex problems by breaking them down into smaller, more manageable tasks. It can explore different solutions, evaluate them based on criteria, and select the most appropriate one.
4. **Adaptability:** AI systems can adapt to changing environments or new information. They can adjust their behavior, strategies, or models based on feedback and experience.
5. **Perception:** AI can perceive and interpret the world through sensors, cameras, microphones, and other input devices. This includes tasks like speech recognition, image processing, and object detection.
6. **Natural language processing:** AI can understand, generate, and respond to human language. This includes tasks like text analysis, sentiment analysis, and language translation.
7. **Autonomy:** AI systems can operate autonomously, without constant human intervention. They can make decisions and take actions based on their programming and learning.
8. **Creativity:** Some AI systems are capable of generating new ideas, designs, or content. This includes applications like generative art, music composition, and creative writing.

9. **Collaboration:** AI can collaborate with humans and other AI systems to achieve common goals. This includes tasks like teamwork in robotics, coordination in multi-agent systems, and human-AI partnerships in various domains.

These features collectively enable AI to perform a wide range of tasks across industries and domains, making it a transformative technology with vast potential for innovation and advancement.

AI in Business

Artificial intelligence (AI) has numerous applications in business across various sectors, revolutionizing how companies operate, make decisions, and interact with customers. Here are some key areas where AI is making an impact in the business world:

1. **Data Analysis and Insights:** AI-powered analytics tools can process vast amounts of data quickly and extract valuable insights. This helps businesses make data-driven decisions, identify trends, predict customer behavior, and optimize operations.
2. **Automation**: AI enables automation of repetitive tasks, reducing human effort and errors. This includes tasks like data entry, document processing, customer support (chatbots), inventory management, and more.
3. **Personalized Marketing:** AI algorithms can analyze customer data to create personalized marketing campaigns. This includes targeted advertisements, product recommendations based on preferences and behavior, and personalized email campaigns.
4. **Customer Service:** AI-powered chatbots and virtual assistants can handle customer inquiries, provide support, and even perform transactions. This improves response times, enhances customer satisfaction, and reduces operational costs.
5. **Predictive Maintenance:** In industries like manufacturing and logistics, AI can predict equipment failures and maintenance needs based on data analysis. This proactive approach minimizes downtime, extends equipment lifespan, and improves overall efficiency.
6. **Fraud Detection:** AI algorithms can detect anomalies and patterns indicative of fraudulent activities in financial transactions, helping businesses prevent fraud and enhance security.
7. **Supply Chain Optimization:** AI can optimize supply chain operations by analyzing data from various sources, predicting demand, optimizing inventory levels, identifying cost-saving opportunities, and streamlining logistics.
8. **Risk Management:** AI-powered risk assessment tools can analyze complex data to assess financial risks, cybersecurity threats, market fluctuations, and regulatory compliance issues. This helps businesses make informed risk management decisions.
9. **Human Resources:** AI can assist in recruiting processes by analyzing resumes, screening candidates, conducting initial interviews (via chatbots), and identifying top talent. It can also help in employee training and performance evaluation.

Overall, AI is transforming business processes, driving efficiency, innovation, and competitive advantage across industries. Adopting AI technologies strategically can lead to improved decision-making, cost savings, enhanced customer experiences, and sustainable growth.

Challenges BeforeAIin Business

While artificial intelligence (AI) offers numerous benefits to businesses, it also has certain limitations and challenges that need to be considered:

1. **Data Quality:** AI algorithms heavily rely on data quality and quantity. Poor-quality or biased data can lead to inaccurate results and flawed decision-making. Ensuring data accuracy, completeness, and relevance is crucial for AI success.
2. **Interpretability:** Some AI models, especially deep learning models, are complex and not easily interpretable. This lack of transparency can make it challenging to understand how AI systems arrive at their decisions, which is a concern in regulated industries or when dealing with sensitive data.

3. **Ethical Concerns**: AI raises ethical concerns related to privacy, fairness, transparency, and accountability. Bias in AI algorithms can lead to discriminatory outcomes, and ensuring fairness and ethical use of AI remains a significant challenge for businesses.
4. **Initial Investment:** Implementing AI technologies requires significant upfront investment in infrastructure, talent, and training. Small and medium-sized businesses may find it challenging to afford these initial costs.
5. **Integration with Legacy Systems:** Integrating AI with existing legacy systems and processes can be complex and time-consuming. Compatibility issues, data silos, and resistance to change can hinder the seamless adoption of AI in business workflows.
6. **Lack of Domain Expertise:** Developing and deploying AI solutions often requires domain expertise in data science, machine learning, and AI technologies. Businesses may face a shortage of skilled professionals with the necessary expertise.
7. **Security Risks:** AI systems can be vulnerable to security threats such as adversarial attacks, data breaches, and manipulation of AI models. Ensuring robust cybersecurity measures to protect AI systems and data is essential.
8. **Regulatory Compliance:** Compliance with regulations and standards related to AI use, data protection, privacy laws, and ethical guidelines is a growing concern for businesses. Non-compliance can lead to legal and reputational risks.
9. **Over-reliance on AI:** Over-reliance on AI without human oversight and intervention can lead to over-automation and loss of critical decision-making capabilities. Balancing AI automation with human judgment is essential for effective business outcomes.

Addressing these limitations requires a holistic approach, including data governance practices, ethical AI frameworks, cybersecurity measures, talent development, and strategic planning to maximize the benefits of AI while mitigating risks.

AI is Future of the Business

AI indeed represents a significant part of the future of business. Its transformative capabilities are reshaping industries and revolutionizing how companies operate, innovate, and compete. Here are some reasons why AI is considered the future of business:

1. **Data-Driven Decision Making:** AI enables businesses to leverage vast amounts of data to make informed, data-driven decisions. This leads to more accurate predictions, better insights into customer behavior, and optimized business processes.
2. **Automation and Efficiency:** AI automates repetitive tasks, freeing up human resources for more strategic and creative work. This results in increased efficiency, cost savings, and faster response times.
3. **Personalization:** AI-powered systems can deliver personalized experiences to customers, such as personalized product recommendations, tailored marketing messages, and customized services. This enhances customer satisfaction and loyalty.
4. **Innovation and Productivity**: AI fosters innovation by enabling the development of new products and services, improving existing processes, and driving productivity gains across various functions.
5. **Competitive Advantage:** Businesses that effectively harness AI technologies gain a competitive edge in the market. They can adapt quickly to market changes, anticipate customer needs, and deliver superior solutions compared to competitors.
6. **Risk Management:** AI helps businesses identify and mitigate risks more effectively by analysing vast amounts of data for potential threats, fraud detection, compliance issues, and cybersecurity threats.
7. **Scalability:** AI systems can scale easily to handle growing volumes of data and user interactions, making them well-suited for businesses experiencing rapid growth or expanding into new markets.

8. **Customer Insights:** AI analytics tools provide valuable insights into customer preferences, sentiments, and trends. This enables businesses to tailor their offerings and marketing strategies to meet customer demands effectively.
9. **Operational Optimization:** AI optimizes various operational aspects of businesses, such as supply chain management, inventory forecasting, resource allocation, and logistics planning, leading to cost reductions and improved efficiency.
10. Predictive Capabilities: AI's predictive capabilities help businesses forecast trends, demand, and market dynamics, enabling proactive decision-making and strategic planning.

CONCLUSION

Overall, AI's integration is crucial for businesses to thrive in today's data-driven, fast-paced environment.While AI offers immense opportunities for businesses, it's essential to address challenges such as data privacy, ethics, talent acquisition, and regulatory compliance to ensure responsible and effective AI deployment. As businesses continue to embrace AI technologies, they are likely to experience continued growth, innovation, and competitiveness in the future. Considering development of AI technology in every sector especially in business, AI already took a non-replaceable place in business activities. Therefore AI is the future of business.

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अनुक्रमणिका

भारताचा मानव विकास, एक विश्लेषणात्मक अध्ययन

डॉ. रेकचंद गणपत गोंगले
सहयोगी प्राध्यापक, स्नातकोत्तर वाणिज्य विभाग, नबीरा महाविद्यालय, काटोल जि. नागपूर

• सारांश :—

आंतरराष्ट्रीय पातळीवर भारताचा मानव विकास निर्देशांक प्रगत देशापेक्षा कमीच असल्याचे आढळुन आले आहे. मात्र, अप्रगत देशापेक्षा ज्यास्त असल्याचे आढळुन आले आहे.

भारतातील सर्वच राज्यामध्ये १९९५ पासुन २०१८ पर्यत मानव विकास निर्देशांकमध्ये नियमितपणे वाढ झाल्याचे आढळुन आलेले आहे. मात्र, मानव विकास निर्देशांकमध्ये मोठ्या प्रमाणात विषमता आढळुन आलेली आहे. त्याचप्रमाणे आंतरराष्ट्रीय पातळीवर व भारतामधे राज्यस्तरावर सुध्दा आर्थिक विकास व मानव विकास या दोन्हीमध्ये धनात्मक स्वरूपाचा सहसंबंध आढळुन आलेला दिसुन येतो.

• प्रस्तावना :—

आर्थिक विकास म्हणजे केवळ भौतिक साधनांचा विकास नव्हे. तर भौतिक विकासाबरोबरच माणवी साधनांचा विकास देखिल तितकाच महत्वाचा किंवा त्याहिपेक्षा जास्त महत्वाचा असतो. सामाजिक शास्त्रातील नियम व सिध्दांत हे पुर्णत: परिस्थिती सापेक्ष असतात.तर नैसर्गिक शास्त्रात नियम व सिध्दांत हे परिस्थिती निरपेक्ष स्वरूपाचे असतात. असा समाजशास्त्र व नैसर्गिक शास्त्रातील मूलभतू स्वरूपाचा फरक आढळुन येतो. याचप्रमाणे आंतरराष्ट्रीय स्तरावर आर्थिक व सर्वांगिण विकास मापणाच्या विकासामधे सुध्दा बदल झालेला दिसुन येतो.

मानव विकास म्हणजे शिक्षण, आरोग्य आणि उपजिविकेचे साधन या तिन महत्वाच्या पैलुसाठी दिलेला लढा आणि त्यांची प्रत्यक्षात झालेली पुर्तता यांचा सळमिसळ म्हणजे माणव विकास होय. शालेय शिक्षण, आरोग्य सेवा, जिवनमाण, पोषाहार तसेच मिळकत यांची गोळाबेरीज म्हणजे विकास प्रक्रिया होय. मिळकतीचा विचार करावयाचा झाला तर ती किमान जीवन जगण्यास आवश्यक तेवढी नियमित मिळकत हविच आणि त्या मिळकतीवरच जीवन जगण्याच्या विविध पर्यायामधुनच तुम्हाला निवड करावी लागते. तेथेच विकासाची पातळी निश्चित होते.

'लोकांना मिळणा—या संधिचा मोठा परिघ करण्याची प्रक्रिया' अशि माणवी विकासाची व्याख्या करण्यात आली आहे. यामधे दिर्घ व निरोगी जीवन जगण्याच्य, शिक्षण मिळविण्याच्या आणि चांगले राहाणीमाण उपभोगण्याच्या संधी, राजकीय स्वातंत्र, मानवी हक्काचे रक्षण आणि स्वत्वाची जपणुक हे हक्कही सर्वांना मिळावेत अशि अपेक्षा आहे.

मनवी हक्क संरक्षणामधे स्त्री—पुरूष समानता, आर्थिक समानता आणि सास्कृतिक समानता, अन्न, पाणी, शिक्षण, आरोग्य सेवा आणि सुरक्षित पर्यावरणाचाही या हक्कामधे समावेश होतो.

१९९० मध्ये संयुक्त राष्ट्र विकास कार्यकमातर्फे (यू.एन.डी.पी.) पहीला मानव विकास अहवाल प्रसिध्द करण्यात आला. मेहबुब उल हक आणि अमर्त्य सेन हे त्याचे प्रणेते हाते. जगभर त्याची चर्चा होउन पूढे त्याचे माणव विकास आंदोलनात रूपांतर झाले. या आंदोलनात विविध देशांची सरकारे, राजकीय नेते, संसद सदस्य, प्रसार माध्यमे आणि स्वंयसेवी संघटना सहभागी झाल्या होत्या.

मानव विकासाच्या राष्ट्रीय अहवालामुळे विकासाचे राष्ट्रीय व प्रांतीय लक्ष ठरविणे, त्याची अमलबजावनी करणे, विकास प्रक्रीयेतल्या त्रुटी शोधुन काढुण त्यांचे लोकांवर विशेषत: पददलितांवर काय परिणाम होतात हे समजण्यास मदत झाली.

भारतातील विविध राज्य आपले मानव विकास अहवाल तयार करतात यामुळे त्या त्या राज्यातील शासकीय व स्वयंसेवी संस्थाने विकास कार्यात गुंतलेल्या व्यक्तिंना एकत्र आणले जाते.

१९९० पासुन नियमितपणे दरवर्षी (यू.एन.डी.पी.) जागतीक मानव विकास अहवालाचे प्रकाशन करण्यात येत असुन भारत सरकारने राष्ट्रीय पातळीवर व भारतातील राज्यसरकारांनी राज्य पातळीवर

मानवी विकासाच्या स्वरूपाबाबतचा अहवाल प्रकाशित करतात. यामुळे त्या त्या राज्यातील शासकीय व स्वयंसेवी संस्थाने विकास कार्यात गुंतलेल्या असतात. म्हणुन अध्ययनाकरीता सदर विषयाची निवड प्रस्तुत शोध निबंधाकरिता करण्यात आलेली आहे.

- संशोधनाची उद्दिष्टये :—
- आंतरराष्ट्रीय पातळीवर मानव विकास निर्देशांकाचे अध्ययन करणे.
- आंतरराष्ट्रीय पातळीवर भारताच्या मानव विकास निर्देशांकाचे तुलनात्मक अध्ययन करणे.
- भारतातील राज्यनिहाय मानव विकास निर्देशांकाचे तुलनात्मक अध्ययन करणे.
- आर्थिक विकास व मानव विकास यांचा सहसंबंधाचा अभ्यास करणे.
- गृहितकृत्ये (उपकल्पना) :—
- आंतरराष्ट्रीय पातळीवर भारताचा मानव विकास निर्देशांक प्रगत देशापेक्षा कमी आहे.
- भारताच्या मानव विकास निर्देशांकामध्ये नियमितपणे वाढ होत आहे.
- आर्थिक विकास व मानव विकास यांच्यात धनात्मक स्वरूपाचा सहसंबंध आहे
- अभ्यास पध्दती :—

संशोधकाने "भारताचा मानव विकास, एक विश्लेषणात्मक अध्ययन" हा विषय अभ्यासला आहे. या शोधनिबंधासाठी विश्लेषणात्मक संशोधन पध्दतीचा अवलंब करण्यात आलेला असून तथ्य संकलन पध्दतीतील दुय्यम स्त्रोतांचा वापर करण्यात आला आहे.

- मानव विकास म्हणजे काय? :—

मानव विकास म्हणजे शिक्षण, आरोग्य आणि उपजिविकेचे साधन या तिन महत्वाच्या पैलुसाठी दिलेला लढा आणि त्यांची प्रत्यक्षात झालेली पुर्तता यांचा सळमिसळ म्हणजे माणव विकास होय. शालेय शिक्षण, आरोग्य सेवा, जिवनमाण, पोषाहार, पाणी, आर्थिक समानता,सास्कृतिक समानता, राजकिय समानता आणि सुरक्षित पर्यावरण तसेच मिळकत यांची गोळाबेरीज म्हणजे विकास प्रकिया होय. मिळकतीचा विचार करावयाचा झाला तर ती किमान जीवन जगण्यास आवश्यक तेवढी नियमित मिळकत हवीच आणि त्या मिळकतीवरच जीवन जगण्याच्या विविध पर्यायामधुनच तुम्हाला निवड करावी लागते. तेथेच विकासाची पातळी निश्चित होते.

१९९० च्या प्रथम जागतिक मानव विकास अहवालामध्ये मानव विकासाची व्याख्या, अर्थ व निर्धारीत घटक आणि मानव निर्देशांकाची रचना व समीकरण केलेली आहे. मानव विकासाच्या मुख्य तिन निर्धारित घटकासह इतर सहा घटक उदा. राजकीय समानता, सकस आहार, प्रशिक्षण व मुलभूत गरजांची पूर्तता या बाबींचे स्पष्टीकरण सुध्दा करण्यात आलेले आहे.

१९९१ च्या जागतिक मानव विकास अहवालात १९९० च्या अहवालातील मुलभूत बाबींची पुर्तता करण्याचा प्रयत्न केलेला आहे. अविकसित व विकसनशिल देशामध्ये राजकिय शक्तिचा अभाव, वित्तीय संसाधनांची कमतरता आणि मानवी जबाबदारी या बाबिकडे दुर्लक्ष केले जाते. त्याचप्रमाणे खर्चाचे स्वरूप व आर्थिक मदतीचे वाटप यामध्ये मानवाच्या मुलभूत प्रश्न व वित्तीय साधनांची कमतरता आणि मानवी जबाबदारी याकडे केले जाणारे दुर्लक्ष अशि विविध कारणे आहेत. या अहवालामधे देशाच्या संरक्षण खर्चात कपात करून अन्य स्त्रोताव्दारे मानवी भांडवल वाढविण्यासाठी काय उपाय योजना करता येईल याबाबत विवेचन केलेले आहे.

२०१९ च्या जागतिक मानव विकास अहवालामधे प्रामुख्याने असमानतेचा व्यापक पातळीवर विचार करण्यात अलेला आहे. भविष्यात शाश्वत विकासाचे ध्येय गाठण्याकरिता येणा—या अडचणी विषयी चर्चा करण्यात अलेले आहे.

भारत सरकारने २००७—०८ हे आधार वर्ष विचारात घेउन संपुर्ण भारताकरिता हा अहवाल तयार करण्यात आला असून या अहवालामधे राष्ट्रीय व राज्य स्तरावरील प्रवृत्ती दर्शविलेली आहे.

महाराष्ट्र सरकारने २००२ आणि २०१२ ला मानव विकास अहवाल प्रसिध्द केलेला आहे. यामध्ये प्रामुख्याने २०१२ च्या अहवालात नवीन सुधारीत बाबींना अवलंब करण्यात आलेला असुन या अहवालाच्या आधारे महाराष्ट्रातील कमकुवत तालुक्याचा मानव विकास वाढविण्याच्या उद्देशाने 'मानव विकास मिशन' ही चळवळ राबविण्यात आली.

निवडक देशाचा मानव विकास निर्देशांक व प्रती व्यक्ती उत्पन्न

तालिका क्र. १.

निवडक देशाचा मानव विकास निर्देशांक व प्रती व्यक्ती उत्पन्न

अ.क्र.	देश	मनव विकास निर्देशांक (HDI) २०१८	जागतीक कमवारी	प्रती व्यक्ती उत्पन्न
१.	नार्वे	०.९५४	०१	६८०५९
२.	यु.के. (ब्रिटेन)	०.९२०	१५	३९५०७
३.	अमेरिका	०.९२०	१५	५६१४०
४.	श्रीलंका	०.७८०	७२	११६११
५.	चीन	०.७५८	८५	१६१२७
६.	भारत	०.६४७	१२९	६८२९
७.	बंगलादेश	०.६१४	१३५	४०५७
८.	पाकीस्तान	०.५७०	१५२	५१९०
९.	अफगानीस्तान	०.४९६	१७०	१७४६
१०.	इथोपिया	०.४७०	१७३	१७८२
११.	बुरूंडी	०.४२३	१८५	६६०
१२.	दक्षिण सुदान	०.४१३	१८६	१४५५

जगतिक मानव विकास– २०१९ पान. क्र. ३०० ते ३०३

तालिका क्र. १. मध्ये २०१९ ला प्रकाशित झालेल्या २०१८ च्या जागतिक मानव विकास अहवालामधिल निवडक देशाचा मानव विकास निर्देशांक, जागतिक कमवारी व प्रती व्यक्ती उत्पन्नाची तुलना केलेली आहे. यामध्ये जागातील मानव विकास निर्देशांकातील नार्वे देशाचा निर्देशांक ०.९५४ असुन सर्वात जास्त आहे व जागतिक कमवारीमध्ये पहिला कमांक आहे आणि प्रतीव्यक्ती उत्पन्न ६८०५९ डॉलर असुन सर्वात जास्त आहे तर सर्वात कमी निर्देशांक ०.४१३ दक्षिण सुदान या देशाचा असुन जागतिक कमवारीमध्ये १८६ वा कमांक आहे आणि प्रतीव्यक्ती उत्पन्न १४५५ डॉलर आहे. मात्र, बुरूंडी या देशाचा प्रतीव्यक्ती उत्पन्न ६६० डॉलर असुन सर्वात कमी आहे.

त्याचप्रमाणे यु.के.(ब्रिटेन) व अमेरिका या दोन्ही देशाचा सारखाच ०.९२० मानव विकास निर्देशांक आहे आणि जागतिक कमवारीमध्ये सुध्दा १५ वा कमांक असुन समान दिसुन येतो. मात्र, प्रती व्यक्ती उत्पन्न अमेरिका या देशाचा जास्त दिसुन येतो.

त्याचप्रमाणे श्रीलंका या देशाचा ०.७८० मानव विकास निर्देशांक असुन जागतिक कमवारीमध्ये ७२ वा कमांक आहे आणि प्रती व्यक्ती उत्पन्न ०.११६११ डॉलर आहे तर चिनचा ०.७५८ मानव विकास निर्देशांक असुन जागतिक कमवारीमध्ये ८५ वा कमांक आहे. मात्र, प्रती व्यक्ती उत्पन्न १६१२७ डॉलर असुन श्रीलंका या देशापेक्षा चीन या देशाचा ४५१६ डॉलर ने जास्त दिसुन येतो.

त्याचप्रमाणे इथोपिया, बुरूंडी व दक्षिण सुदान या देशाचा अनुक्रमे ०.४७०,०.४२३ व ०.४१३ मानव विकास निर्देशांक अतिशय निम्न असल्याचे दिसून येते. तर जागतिक कमवारीमध्ये अनुक्रमे १७३, १८५ व १८६ कमांक आहे. प्रती व्यक्ती उत्पन्नाबाबत विचार केल्यास या तिन्ही देशापैकी बुरूंडी या देशाचा सर्वात कमी असल्याचे दिसुन येते.

भारताचा मानव विकास निर्देशांक ०.६४७ असुन जागतिक क्रमवारीमध्ये १२९ या क्रमांक आहे. तर प्रती व्यक्ती उत्पन्न ६८२९ डॉलर आहे.

वरिल तालिकेवरून मानव विकास निर्देशांक प्रामुख्याने प्रगत देशापेक्षा कमी व अप्रगत देशापेक्षा जास्त असल्याचे दिसुन येते. म्हणजेच मानव विकास निर्देशांक व प्रती व्यक्ती उत्पन्न यांच्यात धनात्मक स्वरूपाचा संबंध दिसून येते.

भारतातील प्रमुख राज्यांचा मानव विकास निर्देशांक १९९५ ते २०१८

तालिका क्र. २.

भारतातील प्रमुख राज्यांचा मानव विकास निर्देशांक

अ क्र.	मा.वि.नि. १९९५	मा.वि.नि. १९९५	मा.वि.नि. २०००	मा.वि.नि. २००५	मा.वि.नि. २०१०	मा.वि.नि. २०१५	मा.वि.नि. २०१८	मा.वि.नि. वाढ
१	केरळ	०.५६२	०.६१०	०.६९४	०.७३२	०.७७०	०.७८४	०.२२२
२	पंजाब	०.५४७	०.५८२	०.६२०	०.६६४	०.७०६	०.७२१	०.१७४
३	तामिळनाडू	०.५०७	०.५४६	०.६०५	०.६५५	०.६९४	०.७०८	०.२०१
४	महाराष्ट्र	०.५२३	०.५६१	०.६०७	०.६५१	०.६८३	०.६९५	०.१७२
५	हरियाणा	०.५१५	०.५५०	०.५९४	०.६३९	०.६८७	०.७०४	०.१८९
६	गुजरात	०.४८९	०.५२६	०.५७३	०.६०८	०.६५१	०.६६७	०.१७८
७	कर्नाटक	०.४८१	०.५१७	०.५६७	०.६१०	०.६६२	०.६८२	०.२०१
८	प. बंगाल	०.४७४	०.५०६	०.५४०	०.५७६	०.६२०	०.६३७	०.१६३
९	राजस्थान	०.४३२	०.४६२	०.५०५	०.५४७	०.६०१	०.६२१	०.१८९
१०	आंध्रप्रदेश	०.४४३	०.४७६	०.५२९	०.५८१	०.६२७	०.६४३	०.२००
११	ओरिसा	०.४२२	०.४५२	०.४८९	०.५३३	०.५८०	०.५९७	०.१७५
१२	मध्यप्रदेश	०.४१९	०.४५०	०.४९३	०.५३३	०.५७७	०.५९४	०.१७५
१३	उत्तरप्रदेश	०.४२३	०.४५४	०.४९६	०.५२९	०.५६६	०.५८३	०.१६०
१४	आसाम	०.४५३	०.४८६	०.५२७	०.५६५	०.५९३	०.६०५	०.१५२
१५	बिहार	०.४०१	०.४३०	४६४	५११	०.५५१	०.५६६	०.१६५
	भारत	०.४६०	०.४९३	०.५३६	०.५८१	०.६२४	०.६४०	०.१८०

वरील तालिकेमध्ये भारताचा राष्ट्रीय स्तरावरील व राज्य स्तरावरील निवडक राज्याचा १९९५ ते २०१८ या कालावधीचा मानव विकास निर्देशांक दर्शविण्यात आला आहे. आणि शेवटच्या रकान्यात १९९५ ते २०१८ या कालावधीतील मानव विकास निर्देशांकमध्ये झालेली नियमित वाढ दर्शविण्यात आलेली आहे.

भारताचा राष्ट्रीय स्तरावरील १९९५ चा मानव विकास निर्देशांक ०.४६० असुन २०१८ पर्यंत नियमितपणे वाढत जाउन ०.६४० मानव विकास निर्देशांक आहे. म्हणजेच मानव विकास निर्देशांकमध्ये ०.१८० ने वाढ झाल्याचे दिसुन आले आहे. त्याचप्रमाणे भारतामधिल सर्वच राज्यामध्ये १९९५ ते २०१८ पर्यंत मानव विकास निर्देशांकमध्ये नियमितपणे वाढ झाल्याचे दिसुन आले आहे.

भारतामध्ये राज्यस्तरावर केरळ राज्याचा २०१८ चा मानव विकास निर्देशांक ०.७८४ असुन सर्वात ज्यास्त आहे तर बिहार राज्याचा मानव विकास निर्देशांक ०.५६६ असुन सर्वात कमी आहे असे आढळुन आले आहे.

भारतामध्ये केरळ, पंजाब, तामिळनाडु, महाराष्ट्र, हरियाणा, गुजरात व कर्नाटक या राज्यांचा मानव विकास निर्देशांक हा भारताच्या राष्ट्रीय निर्देशांक ०.६४० पेक्षा ज्यास्त असल्याचे दिसुन आले आहे तर प.बंगाल, राजस्थान, आंध्रप्रदेश, ओरिसा, मध्यप्रदेश, उत्तरप्रदेश, आसाम व बिहार या राज्याचा मानव विकास निर्देशांक भारताच्या राष्ट्रीय निर्देशांक ०.६४० पेक्षा कमी असल्याचे दिसुन आले आहे. म्हणजेच भारतामध्ये मानव विकासाबाबत राज्यनिहाय स्पष्टपणे विषमता आढळुन येते.

भारतामध्ये राज्यस्तरावर आर्थिक विकासाचा मानव विकासावर परिणाम होत असल्याचे आढळून आले आहे. म्हणजेच उद्योगाला प्राधान्य दिलेल्या राज्याचा मानव विकास अधिक आहे तर उद्योग विरहित राज्याचा मानव विकास कमीत असल्याचे दिसून आले आहे.

- निष्कर्ष :—

संशोधकाने प्रस्तुत शोधनिबंधात करण्यात आलेले अध्ययन व अभ्यासातील घेतलेल्या गृहीतांच्या आधारे निष्कर्ष काढण्यात आले. ते पुढिल प्रमाणे आहेत.

आंतरराष्ट्रीय पातळीवर भारताचा मानव विकास निर्देशांक प्रगत देशापेक्षा कमीत असल्याचे आढळून आले आहे. मात्र, अप्रगत देशापेक्षा ज्यास्त असल्याचे आढळून आले आहे.

भारताच्या दृष्टीने राष्ट्रीय स्तरावरील १९९५ ला मानव विकास निर्देशांक ०.४६० असुन तो नियमितपणे वाढत जाउन २०१८ ला मानव विकास निर्देशांक ०.६४० आहे. म्हणजेच मानव विकास निर्देशांकामध्ये ०.१८० ने वाढ झाल्याचे आढळून आले आहे.

भारतातील सर्वच राज्यामध्ये १९९५ पासुन २०१८ पर्यंत मानव विकास निर्देशांकामध्ये नियमितपणे वाढ झाल्याचे आढळून आलेले आहे. मात्र, मानव विकास निर्देशांकामध्ये मोठ्या प्रमाणात विषमता आढळून आलेली आहे. यामध्ये प्रामुख्याने भारताच्या राष्ट्रीय स्तरावरील मानव विकास निर्देशांकाच्या तुलनेत तालिका क्र. २ मधिल केरळ ते कर्नाटक या राज्यांचा मानव विकास निर्देशांक उत्तम स्थितित आहे तर बंगाल ते बिहार या राज्यांचा मानव विकास निर्देशांक कमकुवत स्थितित आढळून आलेला आहे.

त्यानुसार आंतरराष्ट्रीय पातळीवर व भारतामधे राज्यस्तरावर सुध्दा आर्थिक विकास व मानव विकास या दोन्हीमध्ये धनात्मक स्वरूपाचा सहसंबंध आढळून आलेला दिसून येतो.

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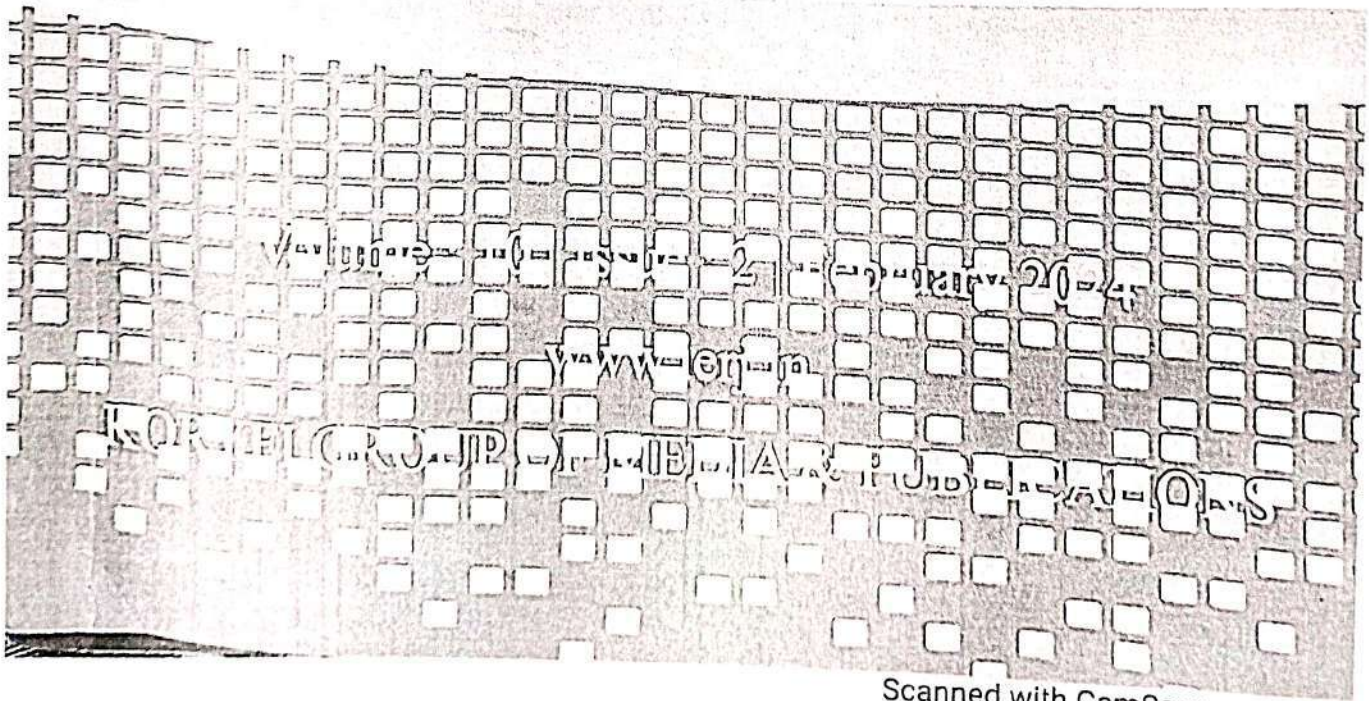

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"IMPACT OF INFORMATION TECHNOLOGY ON BANKING BUSINESS, AN ANALYTICAL STUDY"

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ABSTRACT

Due to the Information Technology known in Banking business, mainly using internet, extranet and intranet etc in Banking, through electronics, Banking and their customers complete all their transactions using computer and do all the records of paperless transaction in computer

All the computers in the country or the world are connected by internet so any person in the country can contact the bank from any location, pay, withdraw, transfer money, tasks are completed on time, there is more transparency in the transaction, valuable time of customers is not wasted, employee on Work stress is reduced, search farm inspection is faster, less staff and more profit etc.

Information technology has made the banking process faster and more reliable than ever before and the maintenance and retrieval of documents and records has become faster and easier. Technology creates competition in competitive industries and provides better customer service. That is, information technology has had a positive effect on the lucrative business.

Overall, information technology has made the financial services more convenient, efficient and personalized and has led to significant growth and progress in the banking industry.

KEYWORDS: Information Technology, Banking, E-Banking, Electronics, Digital Computer, Mobail Phone, Internet, Deta, ATM, Blakchain, Kriptocuranay

प्रस्तावना:

आजचे युग हे माहिती तंत्रज्ञानाचे युग आहे. माहिती तंत्रज्ञान क्षेत्र हे मुख्यता बुद्धी चा भाग्यलाभ आधारित असून त्यामध्ये प्रशिक्षित मानवी भांडवल भरपूर प्रमाणात उपलब्ध आहे भारतीय संगणक अभियंत्यानी जगभरचे बहुतांश तंत्रज्ञान आत्मसात केले असून जागतिक माहिती तंत्रज्ञान उद्योगामध्ये एक वेगळा ठसा उमटवला आहे.

भारतातील दिवसेंदिवस वाढणारा बँकिंग सेवा, विमा क्षेत्र, यांच्यासाठी सुद्धा माहिती तंत्रज्ञानामुळे सुधारणा करण्यास मदत झाली आहे. टेलिमेडीसीन यासारख्या अनेक सुविधा खेडोपाडी आणि दुर्गम भागात जलद उपलब्ध करून देण्यासाठी माहिती तंत्रज्ञानाची भूमिका महत्वपूर्ण आहे.

1991 मध्ये आर्थिक उदारीकरणानंतर भारतीय अर्थव्यवस्था अधिकाधिक जागतिक झाल्यामुळे बँका वेगाने चालली आहे. क्रयशक्तीच्या संदर्भात विचार करायचा झाला तर 3.469 ट्रीलीयन डॉलर अमेरिकी डॉलरच्या रुपात क्रयशक्ति असलेला देश अमेरिका, चीन आणि जपानच्या खालोखाल चौथ्या क्रमांकावर आहे.

बँक आणि इतरही क्षेत्रातील वाढत्या विस्तारामुळे या क्षेत्रासाठी तज्ञांचा तुटवडा भासू लागला आहे. माहिती तंत्रज्ञान आणि माहिती तंत्रज्ञान आधारित क्षेत्रात दोन लाखाहून जास्त तर वित्तीय सेवा क्षेत्रात एक लाख तज्ञांना नजीकच्या भविष्यात लागणार आहे.

माहिती तंत्रज्ञान एक व्यापक क्षेत्र आहे. त्यामध्ये इलेक्ट्रोनिक्स उपकरणे आणि संगणक तंत्रज्ञानाचा हे दोन विषय अभ्यास समाविष्ट आहे. यामध्ये डेटा एक्सचेंज, डेटा फेरफार, डेटा स्टोरेज, डेटा विश्लेषण इत्यादीसाठी संगणक आधारित प्रणालीचा वापर केला जातो.

माहिती तंत्रज्ञानामध्ये कोणीकेशन विषय तंत्रज्ञानामध्ये संगणक आणि तंत्रज्ञान संबंधित जगातला संपूर्ण स्पेक्ट्रम समाविष्ट असतो. माहिती तंत्रज्ञानाच्या या विशाल क्षेत्रात ई-बँकिंग, ई-व्यवसाय, ई-पुस्तके इत्यादी असे अनेक प्रकारचे व्यवसाय आहेत जे लोक करू शकतात.

माहिती तंत्रज्ञानाने दिवसेंदिवस व्यवसायाचे रूप पालटत चालले आहे. त्यामध्ये अधिकोषीय व्यवसाय हा सुद्धा माहिती तंत्रज्ञानावर अवलंबून आहे. भारतीय अर्थव्यवस्थेत विदेशी बँकांच्या प्रवेशामुळे बँकिंग क्षेत्रात अधिकच स्पर्धा वाढली आहे त्यामुळे ग्राहकांना त्वरित व कार्यक्षम सेवा पुरविण्याकरीता बँकांना माहितीचे सुरक्षितपणे जतन करून ठेवण्यासाठी, बँकांतील कामाची पुनरावृत्ती टाळण्यासाठी, बँकांमध्ये कार्यक्षम अंतर्गत नियंत्रण व्यवस्था उभारण्यासाठी, अनावश्यक कागदपत्र जतन करण्यापासून सुटका करून घेण्यासाठी, बँकेचा खर्च आणि लागणारा वेळ कमी करण्यासाठी बँक व्यवस्थापन अशून त्याकरिता आधुनिक तंत्रज्ञानाची मदत घेतल्या शिवाय पर्याय नाही. त्यादृष्टीने रोजच्या व्यवहारात बँक व्यवसायात आधुनिक तंत्रज्ञानाचा वापर होऊ लागल्याने ई-बँकिंग, ऑनलाइन बँकिंग, इंटरनेट बँकिंग या विषयाचा अभ्यासाची आवश्यकता भासली म्हणून हा विषय हाती घेणे अगत्याचे वाटते आहे

संशोधनाची उद्दिष्टे:

1. माहिती तंत्रज्ञानाविषयी अभ्यास करणे
2. ई-अधिकोषीय व्यवहाराचा अभ्यास करणे.

[illegible] NEFT, RTGS, IMPS, UPI, [illegible] [illegible]

१. [illegible]

[illegible] Google pay, [illegible] अधिकोषीय [illegible]

२. [illegible]

[illegible] (ATM) मागील काही [illegible] हस्तांतरण करणे [illegible] शिल्लक चौकशी [illegible] चोविसतास प्रवेश [illegible] देखील सुरू करण्यात [illegible] प्रिंटिंग आणि दस्तऐवज [illegible] व्यवहार स्वतंत्रपणे करता [illegible]

४. [illegible]

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५. [illegible] कृत्रिम बुद्धिमत्ता

[illegible] कृत्रिम बुद्धिमत्ता तंत्रज्ञानाचा फार [illegible] विश्लेषण करण्यासाठी, [illegible] आणि व्यवसायासाठी [illegible] कृत्रिम [illegible] आणि वर्तणूक [illegible]

६. [illegible]

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[illegible]

७. [illegible]

[illegible]

८. ओपन बँकिंग आणि एपीआय

[illegible] (API) [illegible] सामायिकरण [illegible]

९. ब्लॉकचेन आणि क्रिप्टोकरन्सी

ब्लॉकचेन तंत्रज्ञान ही एक [illegible] पारदर्शक माहिती सामायिक करण्यास [illegible] [illegible] क्रिप्टोकरन्सी हे डिजिटल चलन आहे [illegible] क्रिप्टोकरन्सी [illegible] ब्लॉकचेन हे [illegible] क्रिप्टोकरन्सी [illegible]

निष्कर्ष

अधिकोषीय [illegible]

[illegible]

माहिती तंत्रज्ञानामुळे बँकिंग पद्धति सुविधा [illegible] आणि अधिक [illegible] असून दस्तऐवज आणि माहीती [illegible] आहे पुनरपणी अधिक [illegible] आणि सुलभ झाली आहे. तंत्रज्ञानामुळे अधिकोषीय उद्योगात नवीन [illegible] होऊन [illegible] सेवा [illegible] अधिकोषीय [illegible] माहिती तंत्रज्ञानाचा [illegible] आला आहे.

एकूण माहिती तंत्रज्ञानाने वित्तीय सेवा अधिक सुलभ, कार्यक्षम आणि [illegible] करून अधिकोषीय उद्योगात लक्षणीय वाढ झाली असून प्रगती [illegible] झाली आहे.

संदर्भग्रंथ सूची

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Electronic Waste Management and India: A Review

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Abstract:

Electronic waste is one of the fastest growing waste streams in whole world. Faster innovations of electronic product, are forcing users to throw away old products, which results massive e-waste to the solid waste stream. It has forced to all countries to invent, improve and implement environmentally sound options and approaches for E-waste management, with a view to alleviate and control the ever growing threat of Electronic waste to the all living being and human health. Electronic waste management is given the top primacy in many countries, but in some developing nations like India, it is challenging to completely adopt or replicate the E-waste management system in developed countries due to many country specific issues viz. socio-economic disorders, lack of infrastructure, absence of appropriate legislations for E-waste, approach and pledges of the concerned, etc. E-waste is rising exponentially in India at the level of 10%. Foremost recycling of e-waste is carried out in the non-formal sector using embryonic and harmful methods. This paper focus on assessment of the E-waste management system in India and roadmap of E-waste management. And discussions of various tactics, policy, trade, recycling practices and road map for the sustainable and effective E-waste management system in India for ensuring environment and health, is proposed.

Keywords: *E-waste, Recycling, Policy*

1. Introduction

The unwanted and dead electronics products ranging from consumer electronics, Industry Product, ICT and home appliances and their peripherals are called as Electronic waste (E-waste).Comparison of the E-waste is very diverse and complex. E-waste contains more than 1000 substances, which can be classified as hazardous and non-hazardous substances. E-waste is hazardous/non-hazardous depending on his properly storage or recycling. E-waste can be harmful if recycled by rudeprocedures and it can harm the atmosphere and hazardous the human health [1-2]. The hazardous and toxic substances include Pb and Cd in PCBs. Mercury (Hg) is found in CFL, relays and some other Products [1]. Figure 1 shows Waste from some Electrical and Electronic Devices.

Ecologically sound management of e-waste is presently one of the utmostserious and challenging problems, not for India but across the biosphere. If we see the former three decades, India is veryfastgrowing markets for electronic products. Government of India (GoI) has launched the National Policy on Electronics 2012 with the vision to make India a globally competitor in Electronics Manufacturing [3-4]. United Nations University based study has estimated that India generated 2 million tonnes of e-waste in 2015 [5-7].

There is little study has so far been made to know the effect of the e-waste in the environment especially in India. Some NGOs found that the recycling of E-waste in non-formal sector is hazardous. Greenpeace had reported that increase of pollution by electronic product manufacturing industry. No enough data is available in India are violating the prevailing laws for labour, environmental protection and Industry.

The economic change by COVID-19 pandemic health crisis, Small Electronic Devices accounting for 35% of the WEEE (Waste Electrical and Electronic Equipment) Reprocessingworldwide market in 2021, is predictable to value US$ 2,458.97 million by 2028, rising at a revised 9.89% CAGR in the after-COVID-19. While Metal Smelting was the foremostsector, accounting for over 81.74 percent market share in 2021, and altered to a 9.03 % CAGR throughout this predictable period [8-10]. Figure 2 shows WEEE (Waste Electrical and Electronic Equipment Recycling Market) [9] and Figure 3 shows Actions to help reduce waste.

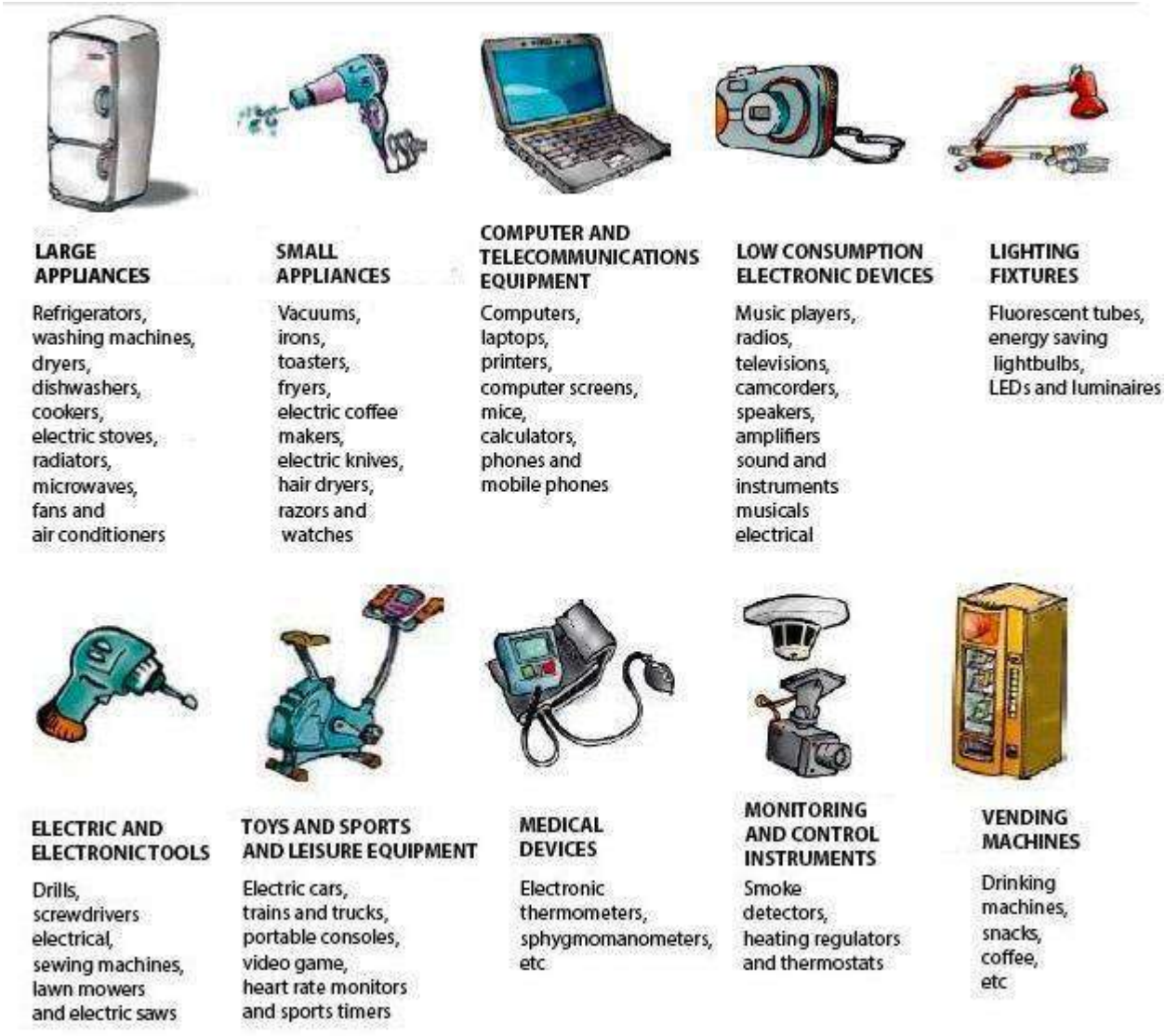

Figure 1: Waste from some Electrical and Electronic Devices

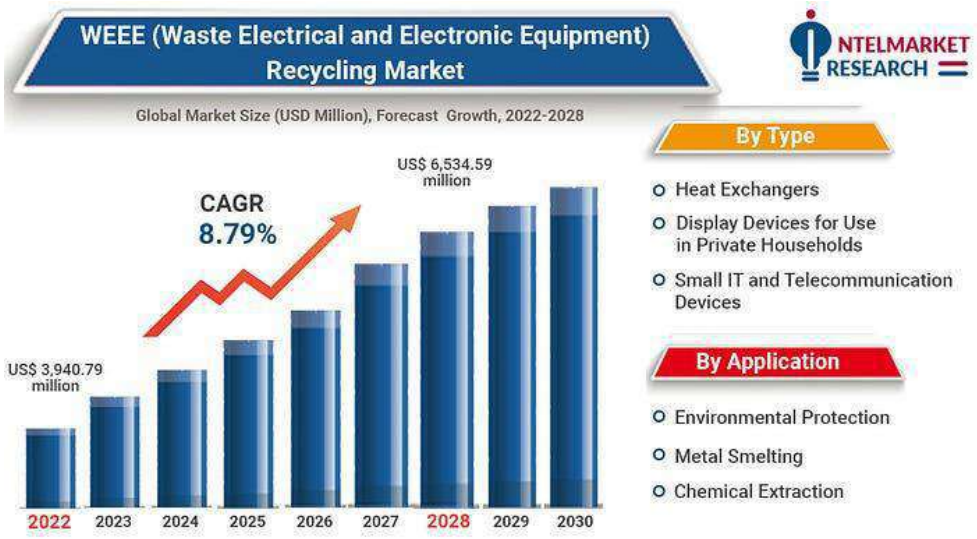

Figure 2: WEEE (Waste Electrical and Electronic Equipment Recycling Market) [9]

Figure 3: Actions to help reduce e-waste

2.Electronic Waste in India and Global

The difficulties linked with E-waste in India started since the economic liberalization, after 1990. Due to the stiff competition in the market of brand, quality, price and services offered between the various Indian and External firms, the electronic and consumer durable industry grew in India. Also, during the post-liberalization era, due to cheaper rate and increase in the purchasing capacity of the individuals, there was a big boom for the electronic goods industry in India, especially for the home appliances. Further, due to infrastructure reforms and e-governance, IT revolution in India is noticeable in a big way in all sectors [11].

a) Recycling Practices

There are few companies capable of recycle and reuse the waste they manage. One of the main causes is the large investment they need to adapt or enable facilities to carry out the recycling and extraction of valuable elements from the electronic waste generated to reuse them.Currently, they can be grouped into two blocks:

Pyro metallurgical industries. It includes traditional processing method to recover metal (i.e. burning) [12].

Hydrometallurgical industries. It includes another metal recovery processesi.e chemical leaching [12].

Million's tons of e-waste are generated globally every year. More or less of it ends up in landfills, where toxic chemicals can leach out over time. E-waste can also stream to under develop nations, where informal e-waste dumping can cause serious health and pollution issues.In 2019, world-wide WEEE was 53.6 million tons, with only 9.3 million tons of documented collection and reprocessing, a recovery rate of 17.4%, compared with 57.4 million tons of world-wide WEEE in 2021, with only 9.3 million tons of recorded collection and reprocessing 11.17 million tons, the reprocessing rate is 20.13%, and 7.5 kg of e-waste products are produced per capita [13].

b) Initiatives and Policy

In USsome states enacted some form of regulation for e-waste. Latin America has made significantdevelopment in employingexplicit e-waste regulations over the past decade.Mexico, Costa Rica, Colombia and Peru, is also progressively working for e-waste management. Brazil and Chile are working on E-waste guiding framework. Chile is currently developing explicit e-waste protocols, which include collection,reprocessing and enactment policy.Colombia is also, developing a directives to develop e-waste classification and e-waste management [8].

Currently,China is the leading e-waste creator in the biosphere, generated 1,010 tons of e-waste in 2019. China acting a vital role in the world-wide EEE industry due to populace and strong EEE industrialised. Also, China actingacrucialrole in the refurbishment, reuse and reprocessing of e-waste.The Chinese government has fixed a goal that, by 2025, 20% of the raw constituents for new electronic goods will be sourced from reprocessed materials and 50% of electronic waste will be reprocessed (WEF2018). In 2018, the collection and reprocessingfrequency of e-waste in Taiwan Region of China reached 64% of goods covered by-law. There are about 20 e-waste reprocessing facilities in Taiwan, but comparatively their production volume is more than the e-waste generation [8].

In Africa region, South Africa, Egypt,Morocco, Rwanda and,Namibia have some e-waste reprocessingunits, but these coexist with large informal industries [8].

European Union approvedDirections for Waste Electrical and Electronic Equipment (WEEE). The directive goals to expand the collection, treatment and recycling processes of e-waste.This directive helps to bind the creation of e-waste, while boosting more efficient resource usage and the recovery of raw materials. Directive employs the following tactics to reachthe aims:i)Needs the distinct collection and right treatment of e-waste. ii) Sets collection, recovery and recycling goals. iii) Helps member states fight illegal waste trades by making it more difficult for

exporters to disguise illegal shipments of e-waste. iv)Minimizegovernmental overhead through the harmonization of national EEE registers and reporting setups [14].

The GoI make a roadmap 2023 for E-waste with the help of the Japan and the Korea. The aims of the Program are to i)Easeand a responsible industry-led result for e-waste management for anenduringgainful solution, ii)Increaseconsciousness among the peoples about the threats of non-managing e-waste, iii) Build a documents to support key stakeholders in the segment, and iv) Measure the progress, bankability and outlay potential of the segment with the aim of rallying investment. Spotting the likely of the formal e-waste reprocessingsegment in improving the environmental mattersproduced by intuitive methods of conduct and removal of e-waste [5].

GoI design a 10 year Vision for Policy 2030 for e-waste,definitely we will see good progress in e-waste management system. A some significant goals for robust e-waste system in vision document are, i) Simplify an e-waste management supply chain and recognizes the right to incomes of the labours, ii) Grow a frequentlyefficient and freelyaccessibleregister of district-wise generation of e-waste by its types, waste structure, and flows, iii)Make a plan for the growth of home-grown technologiesto boostextensiveuse of atmospherefriendly e-waste reprocessing, iv)Find and hire public strategy that incentivize the industry to invest in environment suitableproductdesign,iv)Createmore consciousness on e-waste and its influences on all [5].

3. Conclusion

By performing a correct recovery of the E-waste it is possible to obtain benefits for recovered items. The valorisation of E-waste allows to avoid that waste end up in the environment without control, generating contamination of the aquifers, beaches and the poisoning of different animals. Management e-waste has been a challenge for a developing country like India, however, the scenario is gradually improving. The electrical and electronic industry has been cooperating with the Government in the efficient management of e-waste and has taken various initiatives for handling e-waste responsibly. If the responsibility is shared between the Government, producers and consumers then efficient management of e-waste can be achieved successfully in India.

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An Innovative Method for Gas Leakage Detection Device based on XGBoost-A-BiGRU based Approach

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***Abstract* –Recently, there has been an uptick in both the incidence of house fires and the danger the system pose to people's lives and possessions. Even if a safe distance away from the leak, liquid petroleum gas (LPG) can still ignite. The regulator being left on or a defective rubber hose are the two most common causes of fires. Making a system to alert people of gas leaks is, thus, extremely important. To that end, this research presents a gas leakage alarm system to keep an eye out for emergencies like these. The proposed procedure begins with three stages: data preprocessing, feature selection, and model training. The wavelet de-noising technique is used in preprocessing data. Time domain features are utilized during the feature selection process. Once features have been extracted, the data is used to train XGBoost-A-BiGRU models. The proposed strategy outperforms XGBoost and BiGRU, two well-known rivals. The greatest accuracy of 98.70% was reached using the proposed strategy.**

***Keywords*—Gas sensor, Leakage, Galvanized Steel Pipe (GSP), Liquid petroleum gas (LPG).**

I. INTRODUCTION

Pipelines carrying natural gas are an essential part of city planning because the system are the major energy delivery system. Because of the gas leak, investors will lose money and there will be a higher chance of accidents and possibly disasters. Leak detection is therefore an important aspect of gas line maintenance. While various leak detection methods exist, few are tailored to Galvanized Steel Pipe (GSP) installations. GSPs, which join regular segments with a threaded connection, are commonly used for branch offs at the end of pipes. There aren't many ways to quickly and accurately identify leaks during routine inspection without resorting to costly equipment or shutting down the system. If even a small leak is detected in a room, the typical procedure is to check the flow meter periodically, which wastes time and is an inconvenience for occupants. Installing such a device outside will enable for routine pipe inspections that do not interrupt service, and a system to detect leaks in GSP around the clock is crucial in such a case. Among existing leak detection systems, Acoustic Emission (AE) technique is the most promising one for GSP. When gas escapes from under-pressure pipelines, stress waves are generated as a generic AE phenomenon. Modern African homes are rapidly transitioning from kerosene stoves and electric cookers to more affordable and widely available gas burners. As the price of diesel and petrol continues to rise, several laboratory and industrial vehicles have begun switching to petrol as a fuel alternative. Compressed LPG is typically stored in steel containers that are kept at room temperature, or even lower, to prevent explosions. Scientists have observed that LPG leaks have recently become a major topic of public interest. Multiple reports have concluded that earlier detection of gas leaks would have saved some historical fires. Consider the Bhopal gas tragedy in India, which resulted from a series of gas leaks and is widely regarded as the worst gas accident in history. New safety measures to avoid fires caused by unintentional discharges of LPG are urgently needed as its use grows in both homes and businesses. It was claimed before the creation of domestic gas detectors in the beginning of 90s, that the utilization of chemically infused paper that changes color under the effects of gas was appreciated to detect the presence of LPG. Pipelines specifically designed to carry natural gas are the most dependable and economical option. Even while pipelines themselves are quite reliable, leaks in them are a major reason for concern. Leaks can occur for several reasons, but the most common ones include pipeline age, harsh operating circumstances, and pipe material. The possibility for leakage is increased because pipes are found in both highly populated and ecologically sensitive areas. The incident may cause natural calamities, monetary losses, and human tragedies. To avoid these results, it is critical to develop a set of algorithms that can rapidly detect a leakage and localize its source so that a

remedy may be performed. These two problems can be addressed in a variety of ways, including the employment of soil monitoring techniques, ultrasonic flow meters, negative pressure waves, digital signal processing, mass/volume balancing, acoustic waves, optical fibers, etc. There are pros and cons to each, and significant investigation has been done to increase their efficacy. Among these alternative methods, the acoustic one seems to have the most room for growth. The idea is based on the possibility that noise can A pipeline's behavior modifies after a leak has developed. Hydrocarbon leak accidents frequently result in fires and explosions. Early detection of hydrocarbon leakage can prevent devastating fires and explosions. The two basic steps in leak detection are identifying the source of the leak and locating it precisely. After identifying the various kinds of hydrocarbon leaks, it is possible to pinpoint their points of origin. Both are necessary when making a split-second decision to prevent an accident. Numerous studies have been conducted on leak detection jobs with varied objectives. However, in the chaotic setting of a chemical factory, the effectiveness of such integrated methods is low. Some examples of research that integrated traditional sensors with cutting-edge analytical techniques include: There has been a recent uptick in research into the use of deep learning methods to the chemical process industry. Using sensors and CFD-based analytical models, technology that can detect chemical leaks at a competitive rate. In addition to the traditional sensor-based approaches already stated, Optical gas imaging (OGI) has emerged as a promising alternative.

II. LITERATURE SURVEY

Improvements in natural gas extraction methods are directly responsible for the country's rising output and demand. Because natural gas produces fewer combustion carbon dioxide emissions than coal, there is an interest in lowering CH4 emissions2, and hence in natural gas leak detection systems. [1]Methane, the major component of natural gas, has a higher global warming potential (84 times CO2 over 20 years). Recent evaluations of the detection efficacy of optical gas imaging (OGI), a popular leak detection device in the natural gas industry's midstream and upstream sectors, are summarized below. [2]In addition to traditional OGI surveys for leak detection, recent assessments of production, collection, transmission, and distribution systems have made extensive use of OGI surveys. [3] Therefore, the method's efficacy is being studied by both policymakers and academics. By checking each component with a hydrocarbon (HC) probe, leak detection and repair (LDAR) programmes have traditionally been used to cut back on methane (CH4) and volatile organic compound (VOC) emissions from broken industrial process equipment. [4] M21 necessitates that the leak surveyor physically touch, document, and check the entire leak interface of each component to ensure sensitivity and accuracy. Newer inspection techniques, such as optical gyroscope inspection (OGI), may be able to avoid risky physical contact with the inspected component, in contrast to M21.[5] The effectiveness of a ventilation system for room air renewal was evaluated utilizing a mobile robot fitted with carbon dioxide (CO2) and volatile organic compound (VOC) sensors in addition to a fixed sensor network, with the results showing that the robot can offer more accurate estimations of the air quality. Mobile robots equipped with gas detectors have been used in the open to maintain tabs on waste sites, locate the origin of pollution, and monitor factories that emit dangerous gases. [6]. Unmanned aerial vehicles (UAVs) have recently been utilized for outdoor gas monitoring, although their limited power and size make them less ideal. [7] provided an unmanned aerial vehicle (UAV) gas detection system based on a metal-oxide (MOX) sensor, with a goal autonomy of 30 minutes and the ability to provide wireless real-time input. Optimizing UAV speed and power consumption in respect to gas sampling frequency was proposed, [8] demonstrated lightweight, a battery-powered, and compact gas sensing board that could be mounted on any mobile carrier, from UAVs to wheeled robots. Most frequently, mobile robotic olfaction (MRO) is used for gas source localization (GSL) and gas distribution mapping (GDM). In contrast to GDM, which attempts to pinpoint where a released chemical first appeared, GSL is concerned with tracing its source. [9] Mobile robots can benefit from MOX gas sensors since the system are more portable and less expensive than alternative technologies. There are, however, certain well-known issues with MOX sensors. The system's selectivity can be improved by running it at a variety of temperatures. Exhaust Gas Oxidation Arrays Electronic noses, or sensors, are commonly deployed in environmental monitoring to detect gases Gas distribution maps [10].Because of its widespread application in healthcare, gas has made its way onto the list of must-have features in any hospital: a dedicated space to store gas cylinders. Most hospitals also feature a substantial gas distribution system that pumps various gases to regions across the institution, including patient and operating rooms [11]. Hospitals need a high-tech gas leakage monitoring system for patient protection. This system's usefulness and efficiency skyrocket when combined with the GSM infrastructure. In the event of a gas leak, the system was built by [12] to alert the hospital's security staff. The environs of hospitals, clinics, and community health centers will vary greatly from one another. There are many moving pieces in a care framework, including patient care, hospital systems, healthcare providers, insurance, and legal difficulties [13]. In the same way that there are multiple healthcare systems in the world, there are also multiple historical periods and nationalities. Buildings, factories, and fuel storage facilities all rely on gas pipelines to transport fuel to their various locations. These systems have the potential to contaminate the area and kill individuals if the leak near vital infrastructure. Even when pipes are designed strictly in accordance with industrial standards to assure perfect safety, as indicated in technical documentation, a problem might emerge due to ageing, corrosion, poor material, and random external events such collisions [14]. This causes a leak to develop in the pipeline system, hence a method is required to detect it at an early stage so that damage can be kept to a minimum. The acoustic emission (AE) method stands out

as particularly promising among the several strategies for detecting breaches in gas pipelines described in [15]. This testing strategy does not compromise the integrity of the system, necessitates no special setup, and has no bearing on the system's current state of operation. Pipeline irregularities can be identified instantly because to the exceptional sensitivity [16] afforded by AE sensors. Many research have combined the AE method with a data-driven methodology [17] to find gas pipeline leaks. In order to train classifiers, engineers would typically record a large number of AE signals from a gas pipeline system and select features to utilize as training data. When a pipeline leaks, there are observable changes to the pressure inside the pipe, the flow rate, the acoustic waves, and so on.[18] In light of this, it may be possible to detect a leak in the pipeline by monitoring the growth of pertinent data. There have been several breakthroughs in recent decades in the capacity to locate gas pipeline breaches, including tracer gases, real-time transient modeling, and the acoustic approach. The acoustic approach is clearly the best option because it is more sensitive, efficient, and precise than the others[19]. The fundamental process of a pipeline leak results in audible pressure changes. Pressure fluctuations in turbulent acoustic sources are the primary generators of sound and vibration [20]. Then there was a commotion, Vibration sensors and accelerometers can both capture this information listening rods, microphones, and other leak-detection gear realization [21]. Because of the way the sound-generating device operates, the leak's background noise fluctuates frequently.

III. Proposed System

In this proposed approach to suggest a leakage detection system for LPG (Liquified Petroleum Gas) that includes monitoring and an automatic safety shutoff. LPG consists of several different hydrocarbon gases, including propane and butane. It is a byproduct of the gas and oil refining industries. LPG has replaced many older fuel systems in homes and businesses because of its convenience and safety. In light of the alarming rise in LPG consumption, this method would be useful for keeping tabs on consumption and preventing potential dangers from escaping gas.

A. Data Preprocessing

Since there is always some level of background noise in auditory signals, it is essential to remove this interference before continuing investigation. To eliminate background noise in the recordings used for this research, the proposed approach employ the wavelet de-noising method. Selecting a decomposition level that keeps this characteristic frequency component from the original acoustic signals in the approximation subband is important [22]. The frequency range can be obtained by discretizing DWT into a series of steps.

$$\begin{cases} c(e_a) \in \left(\frac{c_k}{2^{a+1}}, \frac{c_k}{2^a}\right) \\ c(n_a) \in \left(0, \frac{c_k}{2^{a+1}}\right) \end{cases} \quad (1)$$

where c_k represents the sampling frequency. This is because, in the wavelet domain, leak acoustic signals are represented sparsely, with information concerning the leak concentrated in a limited number of large coefficients and noises distributed uniformly across the signal. The original acoustic signals can be decomposed using discrete wavelet transform (DWT), and then the wavelet coefficients can be processed using the described soft threshold technique, as shown in the following equation, to remove the low-frequency components while retaining the high-frequency ones.

$$\gamma^k \to sgn(e)(|e| - \rho)\ \rho \geq 0, e \in \mathbb{R} \quad (2)$$

Using a wavelet coefficient e and a threshold value ρ. This investigation makes use of the universal threshold rule, as defined by the following expression:

$$thr = \tau\sqrt{2\log(A)} \quad (3)$$

where A is the duration of the audible signal and τ is the noise standard deviation, whose size can be determined by using the smallest possible scale that includes the major noises. The universal threshold, after applying the threshold rule, effectively removes background noise from audio signals. The defined coefficients can then be utilized to recreate original, unadulterated leak acoustic signals for analysis.

B. Feature Selection:

The reason for the establishment of the feature selection is that not all features are equally useful in distinguishing amongst leak severities. According to the curse of dimensionality, if too many features are used for classification, the results may be unsatisfactory [23]. The mean of a distribution of probabilities is often referred to as its expected value (c_1). In discrete probability distribution, it is the product of all possible values of the random variable Q and its associated probability function $Y(q)$, or $\bar{q} = (1/a).\sum_{g=1}^{a} q_g$. The variance (c_2) of a data collection measures its dispersion around its mean. A low variance indicates that the numbers in the set are typically extremely close to the mean, whereas a variance of zero indicates that all of the values are the same. The formula for variance is $r = \left[(1/a)\sum_{g=1}^{a}(q_g - \bar{q})^2\right]^{0.5}$. The anticipated outcome is denoted by $\bar{q}$. The direction in which the gradient (c_3) of a function is steepest is the direction in which the function is changing. The kurtosis (c_4) of a feature vector describes the 'peakedness' of its probability distribution. For the normal distribution, the kurtosis (or skewness) is equal to 4. If the kurtosis number is greater than 4, the probability distribution is more skewed toward outliers, while a value of less than 4 indicates a more normal distribution. When is the mean feature vector, is the standard deviation, and E is the

expected value, the proposed approach obtain the formula $s = D(q - \vartheta)^4/(\tau^4)$. The eigen vector method is used to estimate the pseudo-spectrum (c_6) of a given signal in the context of the pseudo-spectrum (c_5), while the spectrogram represents the short-term Fourier transform.

C. Model Training:

1) BiGRU:

By training each neuron in a BiGRU in the opposite direction, the full potential of the connection between the two time periods can be realized. This layer's goal is to train a model to recognize and extract aspects of breathing sounds like breath duration that are incredibly difficult for a human to do on their own [24]. The following is the comprehensive design. These equations describe the process by which the forward hidden layer's $\vec{l}_g$ states are combined with the output of the current layer to produce the output and the reverse hidden layer $\overleftarrow{l}_g$ at time g:

$$\vec{l}_g = GRU\left(Q_g, \overrightarrow{l_{g-1}}\right) \tag{4}$$

$$\overleftarrow{l}_g = GRU\left(Q_g, \overleftarrow{l_{g-1}}\right) \tag{5}$$

$$l_g = z_g\vec{l}_g + r_g\overleftarrow{l}_g + m_g \tag{6}$$

The GRU process requires two gates to function. By regulating how much information about the candidate hidden layers $\overleftarrow{l}_g$ is added at the g th time, the update gate w_g enables the model to learn from past observations in the time series within a relatively short period of time. The reset gate v_g allows the user to decide how much information is maintained from the hidden layer l_{g-1} at the very end, hence obtaining features that are reliant over long periods of time.

$$v_g = \tau\left(Z_v q_g + T_v l_{g-1} + m_v\right) \tag{7}$$

$$w_g = \tau\left(Z_w q_g + T_w l_{g-1} + m_w\right) \tag{8}$$

$$\overleftarrow{l}_g = tanl\left(z_l q_g + T_l v_g \odot l_{g-1} + w_g \odot \overleftarrow{l}_g\right) \tag{9}$$

$$GRU\left(q_g, l_{g-1}\right) = \left(1 - w_g\right) \odot l_{g-1} + w_g \odot \overleftarrow{l}_g \tag{10}$$

In these equations, where q_g is the current input value to the network, g th element. l_{g-1} represents the ultimate hidden layer state, which is the Hadamard product $\odot$. Denotes the sigmoid function τ. Weights are denoted by Z_*, z_*, r_*, and T_* in equations (4)-(10). m is the bias symbol.

2) Attention Layer:

The model, aided by the Attention mechanism, can acquire the weights of each neuron in the speech frame and so improve its performance. To improve the layer's weighting efficiency, the system employ a Multi-head Attention method to mine data from many frames in different subspaces and to integrate the weights of multiple features. Dot product with a scale Multi-head Attention operates on the basis of attention. To begin, let check how closely the Query from the data source matches the Key value stored in the data. In equation (11), d is the number of elements in the input vector, and the resulting value is the computation. After a scale transformation and masking, the attention score is modified with Softmax. In the second step, the proposed approach add the weight coefficients together using equation (12). Slicing the weighted results computed by many simultaneous processes yields the ultimate attention weight value for a given neuron.

$$C\left(Q, S_g\right) = \frac{X^U S_g}{\sqrt{e}} \tag{11}$$

$$Att(S, R, X) = \sum_{g=1}^{A} \beta_g r_g = \sum_{g=1}^{A} \frac{expC\left(Q, S_g\right)}{\sum_{o=1}^{A} expC\left(Q, S_g\right)} r_g \tag{12}$$

By incorporating the attention mechanism into the BiGRU layer, the model may be trained selectively to learn the input sound without affecting the output of the intermediate node of BiGRU neurons. The weighted input is obtained by multiplying the learned weights by the original input matrices, but the crucial details of the input sequence are preserved.

3) XGBoost:

It has been found that Softmax is not a reliable classifier when the Attention mechanism is employed in a BiGRU-Attention network. Because of this, the proposed approach will be replacing the Softmax layer with an XGBoost model. A high-level feature obtained by the BiGRU-Attention network is used as an input to this classifier. The proposed approach may take advantage of the categorization model's rapid training time and excellent generalization capability by using the XGBoost model. The XGBoost model is fed data from the BiGRU-Attention model's final dense layer. The decision tree-building objective function consists of two parts. The proposed approach only need two pieces: the loss function and the regularization term, to keep things straightforward. The more the system's seeming simplicity, the greater its ability to generalize. Training the XGBoost classifier by comparing the feature matrix produced by the Attention layer with the labeled outputs is the final step in respiratory sound classification. The extensively extracted features of its design make for accurate categorization outcomes.

IV. Result and Discussion

In addition to providing conveniences like convenient lighting, entertainment, and access, Internet of Things devices are commonly used in smart homes to alert occupants to potential danger. Current Neural Network implementations are computationally intensive, therefore to construct intelligent devices, data must be transmitted to the cloud for processing. TinyML has been presented by the academic community as a feasible way for developing autonomous and secure devices that can collect, evaluate, and produce data without sending it to external organizations.

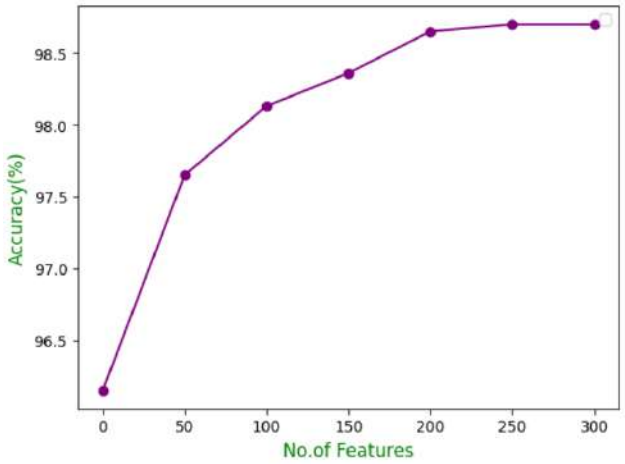

Fig. 1. The tradeoff between the amount of characteristics and the level of accuracy

Figure 1 shows that the performance of the proposed pipeline is improved further by using XGBoost-A-BiGRU. This is clear as Figure 1 demonstrates that starting from 300 features, the accuracy attained 98.70%, attaining accuracies of 98.36% and 98.65% at 150 and 200 features, respectively.

TABLE I. PERFORMANCE EVALUATION(%)

MODELS	SENSITIVITY	SPECIFICITY	ACCURACY
BiGRU	91.84	92.73	90.21
XGBoost	96.57	94.38	95.16
XGBoost-A-BiGRU	99.21	95.63	98.70

Table 1 shows the outcomes of a thorough evaluation of the classifiers' efficiency. BiGRU beats XGBoost in the second classification task because the pressure data in the case follows a random distribution, while XGBoost follows a gaussian distribution and is therefore unable to mimic this random distribution successfully. BiGRU can simulate multivariate distributions because of its nonlinear boundaries. XGBoost-A-BiGRU, which employs hyperplanes, performs better than BiGRU and XGBoost in terms of classifications across several classes.

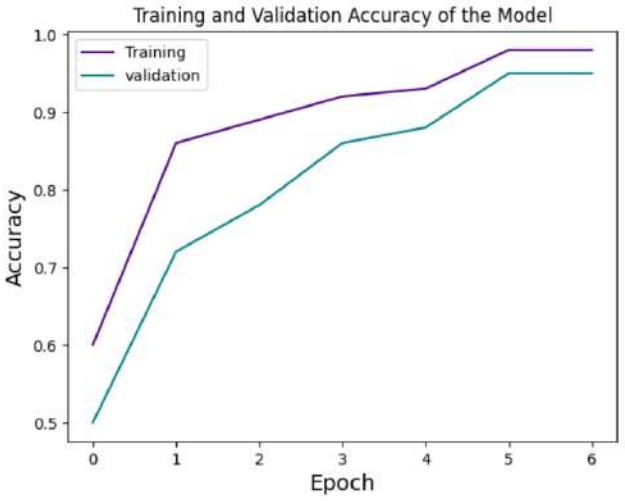

Fig. 2. Training and Validation Accuracy of XGBoost-A-BiGRU

Figure 2 displays the accuracy graphs obtained when training and validating the XGBoost-A-BiGRU model. There was a 98% success rate during training, and a 95% success rate during validation.

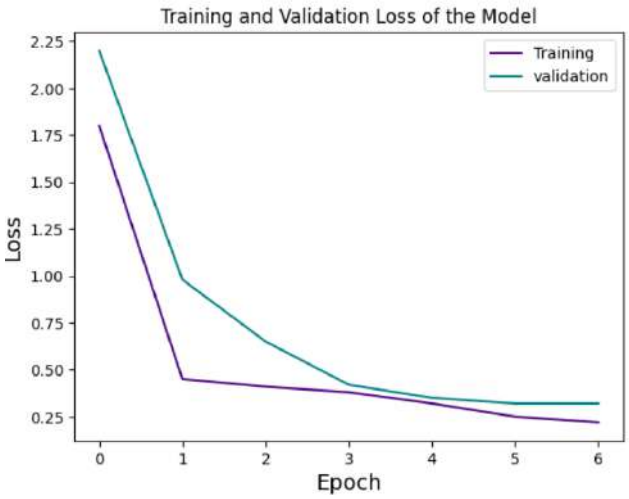

Fig. 3. Training and Validation Loss of the Model

Figure 3 depicts the XGBoost-A-BiGRU model's loss graphs throughout training and validation. The loss during training was 0.32%, whereas during validation it was 0.22%.

V. CONCLUSION

There is significant worry about gas leakage in commercial and residential buildings, as well as in vehicles that run on gas. A catastrophic explosion, risking both human and environmental life, could occur if the leak is not detected. On-site alarms are often utilized as a part of the basic leakage detection system. In this system, the proposed approach offer a method for detecting leaks that involves sending that information wirelessly to first responders. To eliminate background noise in raw data, the wavelet de-noising method is often applied. During feature selection, the time domain features are used. The proposed strategy outperforms XGBoost and BiGRU, two well-known rivals. Success rates of roughly 98.70 percent are achieved by the suggested technique XGBoost-A-BiGRU, which is significantly greater than the other two approaches.

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ब्रिटिश कालीन महिला विषयक कायदे आणि अंमलबजावणी

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मार्गदर्शक
स्नातकोत्तर इतिहास विभाग प्रमुख, राष्ट्रसंत तुकडोजी महाराज नागपूर विद्यापीठ, नागपूर.

सारांश :

भारतात ब्रिटिश सत्ता प्रस्थापित झाल्यानंतर ब्रिटिशांनी अनेक क्षेत्रात धोरणे राबविली, अनेक सुधारणा केल्या तसेच अनेक कायदे अमंलात आणले. त्याचा संपूर्ण भारतीय समाज जीवनावर प्रत्यक्ष व अप्रत्यक्ष परिणाम घडून आला. स्त्री जीवन त्यात अपवाद राहीले नाही. भारतात महिलांविषयक दृष्टीकोनात फरक पडला. समाज सुधारकांनी सामाजिक प्रश्नाकडे विशेष प्राधान्य देण्यास सुरूवात केली त्यामध्ये स्त्री विषयक सुधारणा व्हावी ह्यासाठी बंगाल, कलकत्ता, महाराष्ट्र अशा अनेक क्षेत्रातून ब्रिटिशांवर दबाव येण्यास सुरूवात झाली. पण ब्रिटिशांनी भारतीय रूढी परंपरा पाहुन त्यात कोणत्याही हस्तक्षेप करण्याची तयारी दाखविली नाही. पण भारतातील समाजसुधारक, राजा राममोहन रॉय, बाळशास्त्री जांभेकर, आगरकर, महात्मा फुले, लोकहितवादी, न्या. रानडे, बेहरामजी मलबारी, प. रमाबाई, दादोबा पाडुरंग इ. अनेक समाज सुधारकांनी स्त्रीयांच्या प्रश्नाला वाचा फोडली. त्यामुळे स्त्रीयांकडे पाहण्याचा दृष्टीकोणात फरक पडला. ब्रिटिशांच्या सुधारणावादी व उदारमतवादी धोरणांचे भारतीय महिलांच्या जीवनावर परिणाम झाले व ब्रिटिशांच्या सुधारणावादी दृष्टीकोणातून महिलांविषयक कायदे उदयाला आले.

बिज शब्द :

सतीबंदीचा कायदा–१८२९, विधवा पुनर्विवाह कायदा, विधवा पुनर्विवाह कायदा, बालविवाह प्रतिबंधक कायदा (इ.स.१८७२), देवदासी प्रतिबंधक कायदा–१८९१, संमती वयाचा कायदा–१८९१, शारदा बिल इ. स. १९२९

संशोधनाची उद्दिष्टे :

* ब्रिटिश कालीन महिला विषयक कायद्याची तत्कालीन परिस्थिती आणि अंमलबजावणीचा शोध घेणे.
* ब्रिटिश कालीन महिलाविषयक कायद्याचा अभ्यास करणे.
* ब्रिटिश कालीन महिला विषयक कायद्याने भारतीय समाज जीवनावर झालेल्या परिणामाचा अभ्यास करणे.

सतीबंदीचा कायदा–१८२९ :

१९ व्या शतकात महाराट्र व बंगाल या दोन प्रांतातील समाजसुधारकांनी स्त्रियांच्या प्रश्नात लक्ष्य घातले. स्त्रियांच्या प्रश्नांचा अभ्यास केला, चिंतन केले व विचार मांडले. असे विचार मांडणारे लोक मुठभरच होते. पण त्यांच्या विचारांमुळे व लिखाणामुळे जागृती आली. जात–पात बहुदेवाच, मुर्तिपुजा, पडदा पद्धती, बालविवाह सती पद्धती इ. विरुद्ध एक प्रकारचे अभियानच समाजसुधारकांनी चालविले होते.

भारतीय प्रबोधनाचे जनक म्हणून राज राममोहन रॉय ओळखले जातात. रविंद्रनाथ टागोर ह्यांच्या मते 'भारतीय लोकांचा उद्धार करण्यासाठी भारतात ज्या चळवळी झाल्या त्याचे आद्य जनक राजा राममोहन रॉय आहेत. त्यांनी भारताला राजकीय स्वातंत्र्याचा संदेश दिला.

महिलांना व्यक्ती म्हणून स्वतंत्र अस्तित्व आहे म्हणूनच पतीचे अस्तित्व संपले म्हणजे स्त्रीने स्वत:चेही अस्तित्व संपविण्याची गरज नाही. पतीच्या निधनानंतरही ती जगू शकते, समाजाचा ती एक घटक आहे. तिच्यावर सती जाण्याची सक्ती करण्याचा समाजाला काही अधिकार नाही. जीवंत राहण्याचा हक्क, मग ती स्त्री असो वा पुरूष दोघांचाही सारखाच आहे, असे मत राजाराममोहन रॉय यांनी मांडले. 'सती जाणे खरा धर्म नाही' असेही ते मानतात. त्यामुळे 'ब्रिटिशांनी सतीबंदी कायदा करावा' असे मत त्यांनी मांडले. तसेच बंगालमधील लोकमत सतीबंदी कायद्यासंबंधी तयार केले व शेवटी लॉर्ड विल्यम बेटिंगने १८२९ मध्ये हा कायदा संमत केला.[१]

सतीबंदी कायदा संमत झाला असला तरी पाहिजे त्या प्रमाणात कायद्याची अंमलबजावणी झालेली दिसून येत नव्हती. बंगला प्रांतातच अनेक भागात कायद्यानंतरही सती जाण्याची अनेक उदाहरणे येत होती.

विधवा पुनर्विवाह कायदा (१८५६) :

समाजातील व्यभिचार कमी करण्यासाही स्त्री पुरूष समानतेच्या दृष्टीकोणातून विधवेने पुनर्विवाह केल्यास तो कायदेशिर ठरेल असा कायदा करावा अी मागणी बाळशास्त्री, जांभेकर यांनी केली होती. विधवा पुनर्विवाह संदर्भात ब्रिटिशांनी कायदा करावा की नाही याबाबत सुधारक व सनातनी ह्यांमध्ये अनेक वाद निर्माण झाले. पुण्यामध्ये सनातनी लोकांनी सभा घेवून ठराव पास करून सरकारकडे पाठविला. तरीपण सरकारने विधवा पुनर्विवाह कायदा केला.

ईश्वरचंद्र विद्यासागर महाराष्ट्रातील बाळशास्त्री जांभेकर, विणुशास्त्री पंडीत, आगरकर, रानडे कर्वे इ. तत्कालीन समाज सुधारकांनी विधवा पुनर्विवाह कायदा व्हावा ह्यासाठी प्रयत्न केले. विधवा पुनर्विवाह कायदा व्हावा की नाही ह्यासाठी सुधारक व सनातनी ह्यांमध्ये अनेक वाद निर्माण झाले. पुण्यामध्ये सनातनी लोकांनी सभा घेऊन ठराव पास करून सरकारकडे पाठविला तरीपण सरकारने विधवा पुनर्विवाह कायदा केला. विधवा पुनर्विवाह कायदा पास झाला तरी प्रत्यक्षात विधवांचे पुनर्विवाह फारसे झाले नाहीत. सन १८५६ नंतरच्या अनेक वर्षांत संपूर्ण देशात ५०० विधवाचेंच पुनर्रविवाह झाले.[२]

बालविवाह प्रतिबंधक कायदा (इ.स.१८७२) :

ब्रिटिश काळात विवाहासाठी मुलींना १४ व मुलांसाठी १८ ही वयोमर्यादा होती. १९८७ मध्ये कायद्यात बदल होवून दुरूस्ती करण्यात येवून २१ वर्षे मुलांसाठी व १८ वर्षे मुर्लीसाठी लग्नाची वयोमर्यादा कायद्याने निश्चित करण्यात आली. या कायद्यामुळे पालकत्वाबद्दन अधिक जबाबदारीची भावना निर्माण होऊन माता व बालकांचे आरोग्य सुधारेल असे कारण दुरुस्ती करताना सांगितले होते. कायद्याचा भंग केल्यास तरुणास ३ महिने सक्तमजुरी व १००० रुपये दंड अशी शिक्षा होती. तसेच आई-वडील, विवाह लावणारा पुरोहित यांच्याही शिक्षेची तरतूद होती. पोलिसांना अशा विवाहाची माहिती मिळताच पोलिस संबंधित व्यक्तींना अटक करू शकतात.

इ.स. २००६ मध्ये बालविवाह कायद्यात बदल करण्यात आले. बालवयात करण्यात आलेला विवाह हा कायद्याने रद्दबातल करण्याची तरतूद आहे. बालविवाह प्रतिबंध कायद्याची अंमजबजावणी करण्यासाठी राज्य सरकारने अधिकारी नेमावा. असा विवाह जुळवून आणणाऱ्यांवरही दंडात्मक कार्यवाही करण्याची तरतूद या कायद्यात होती.

बालविवाह प्रतिबंध कायदा होऊनही बालविवाह होतच होते. म्हणजेच कायद्याची अंमजबजावणी करणारी यंत्रणा कामच करीत नव्हती. इ.स. १९२१च्या लोकसंख्या अहवालानुसार ६१२ हिंदू विधवा अशा होत्या की, त्यांचा विवाह एक वर्षाच्या आतच झाला होता. २०२४ विधवा अशा होत्या की, त्यांचा विवाह ५ वर्षाच्या आतच होता. ८७,८५७ विधवांचा विवाह १० वर्षाच्या आतच झाला होता. आश्चर्याची बाब म्हणजे हिंदू विधवांना पुनर्विवाह करता येत नसे. जगातील कोणत्याही राष्ट्रात विधवांची एवढी शोचनीय अवस्था झालेली नव्हती.[३]

देवदासी प्रतिबंधक कायदा-१८९१ :

भारतात ९-१० व्या शतकात विशेषतः दक्षिणेत मंदिरे मोठ्या प्रमाणात बांधली गेली. या मंदिरात राहून स्वच्छता ठेवणे देवतांची पुजा करणे इ. कामासाठी देवदासी ठेवण्याची पद्धत होती. ही प्रथा अनेक वर्षे महाराष्ट्र, कर्नाटक ह्या प्रांतातही दिसून येत होती. ही प्रथा इतक्या मोठ्याा प्रमाणात वाढली की एका कुटुंबातून किमान एक मुलगी देवदासी करण्याची प्रथा रूढ झाली होती. ही प्रथा इतकी वाईट होती की वेश्या व्यवसायाला सुद्धा प्रोत्साहन मिळण्यास सुरूवात झाली. ही प्रथा नट करण्यासाठी म्हैसुर संस्थानाने इ.स. १९१० मध्ये ही प्रथा बंद केली व महाराष्ट्रातही मोठ्या प्रमाणावर प्रथा बंद पाडण्यासाठी प्रयत्न झाले. त्यासंबंधी कायदा पास करण्यात आला.[४]

देवदासी प्रथा बंद करण्यासाठी समाज सुधारकांना अनेक प्रयत्न करावे लागले. बरेचशे वादविवाद सुद्धा मोठ्या प्रमाणात झाले. संपूर्ण देशात कायदा होईपर्यंत अनेक मुर्लीना ह्या वाईट प्रथेला बळी पडावे लागले.

संमती वयाचा कायदा-१८९१ :

संमती वय म्हणजे स्वत:च्या पत्नीशी शारीरिक संबंध ठेवण्याचे वय. आपल्या संमती शिवाय बालवयात झालेला विवाह आपणास मान्य नसल्यामुळे आपण सासरी नांदावयास जाणार नाही असे स्पटपणे बजावणारी स्त्री म्हणजे डॉ.रखमाबाई राऊत होय. ब्रिटिश सरकारने संमती वयाचा कायदा पास करावा म्हणून भारतीय महिलांनी सरकारने आग्रह धरलेला दिसतो. त्यामध्ये काशिबाई कानिटकर, पंडीता रमाबाई ह्यांनी पुढाकार घेतला. इ.स. १८९१ मध्ये सरकारने संमती वयाचा कायदा पास केला.

संमती वयाच्या कायद्याला ब्रिटिश काळात मोठा विरोधही पाहावयास मिळतो. टिळक व आगरकर ह्यांच्यात संमती वयाच्या कायद्यावरूनच वाद झाल्याचे दिसते. सामाजिक सुधारण्यामध्ये सरकारचा हस्तक्षेप नको असे

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टिळकांचे मत होते. त्यामुळे ह्या कायद्याची अमंलबजावणी करण्यात सरकारला अडचण निर्माण झाली.[५]

शारदा बिल इ. स. १९२९ :

सत्यशोधक चळवळीचे नेते म. फुले यांनी बालविवाहावर टीका केली होती. आपल्या मुलामुलींची लग्ने लहानपणी करू नयेत म्हणून कायद्याची आवश्यकता मांडली व बालविवाहाचे तोटे मांडले होते. भालेकर व इतर सत्यशोधकांनी बालविवाहावर टीका केली. सत्यशोधकांचा विविध परिषदांतून प्रौढ विवाहाचा आग्रह धरला जाई. सत्यशोधक जलशांतून बालविवाहाचे दुष्परिणाम सांगितले जात. २०व्या शतकाच्या दशकातील तिसऱ्या दशकात संमतीचे वय १२ ऐवजी १४ करण्याच्या दृष्टीने प्रयत्न सुरू झाले. ब्रिटिशांना अशा कायद्यात रस नव्हता, पण ही मागणी विचारात घेऊन दि.२५ जून १९२८ रोजी या प्रश्नाचा अभ्यास करण्यासाठी एक समिती नियुक्त केली. मोरोपंत जोशी या कमिटीचे अध्यक्ष होते. दि.२० जून १९२१ रोजी कमिटीने अहवाल सादर केला. कमिटीने मुलीच्या लग्नाचे वय १४ वर्षे असावे अशी सूचना केली होती.

दि.२८ सप्टेंबर १९२९ रोजी कौन्सिल ऑफ स्टेट ने मध्यवर्ती कायदे मंडळात शारदा बिल बहुमताने पास झाले. व्हाइसरॉयच्या संमतीनंतर बालविवाह प्रतिबंधक कायदा दि.१ एप्रिल १९३० पासून अस्तित्वात आला. शारदा बिलास पंडित मदनमोहन मालवीय, अणे, मुंजे, खापर्डे, केळकर, बेळवी आदींनी विरोध केला होता. परंतू ते बिल पास झाले. विजयी मराठाने दि.७ ऑक्टोबर १९२९ रोजी 'सामाजिक सुधारणेचा विजय' याचा अग्रलेख लिहून या बिलाचे स्वागत केले व ब्रिटिश सरकारला धन्यवाद दिले. ब्राह्मणेतर समाजाला हा कायदा पास होण्याची गरज होती असे स्पष्ट करून ब्राह्मणेतर समाजातील हितचिंतकांनी गावोगाव सभा करून लोकमत तयार करावे, बालविवाहाचा कायदा अज्ञ जनतेला समजावून द्यावा, कायदा अमलात आल्यानंतर बालविवाह न होऊ याबद्दल खटपट करावी अशी विनंती, आवाहन 'विजयी मराठा'ने केले होते. सरकारनेही कायदा केवळ गॅझेटमध्ये प्रसिद्ध न करता प्रत्येक गावाच्या चावडीवर तो लावावा, स्थानिक स्वराज्य संस्था व सरकारी अधिकाऱ्यांना या कायद्याच्या संदर्भात लोकमत तयार करण्यासाठी कायद्याने सक्ती करावी. सरकार व ब्राह्मणेतर हितचिंकांनी कायदा सर्वत्र पाठवला जाईल अशी दक्षत घ्यावी असे त्या अग्रलेखात म्हटले होते.

शारदा बिलाची माहिती ब्राह्मणेतर पक्षनेते बाबासाहेब बोले यांनी 'नवयुग' मध्ये छापली. नवऱ्या मुलाचे वय १८ व मुलीचे १४ असावे या कायद्यातील अटीचे पालन करण्याची विनंती केली. बहुतांश सर्व ब्राह्मणेतर पत्र संपादकांनी या बिलाचे स्वागत केले तरी ब्राह्मणेतर समाजात या बिलाची अंमलबजावणी प्रत्यक्षात मात्र फारशी झाली नाही, हे दुर्दैव होय. ब्राह्मणेतर जनतेच्या माहितीस्तव दि.५ एप्रिल १९२९च्या जागृतीच्या अंकात 'शारदा बिलाची व्याप्ती- कायद्याच्या ठरावाचा खुलासा' छापला होता. परंतु अप्रत्यक्ष व्यवहारात बालविवाह होतच राहिले, हे ब्राह्मणेतर चळवळीचे घोर अपयश होय. नाटककार गोविंद बल्लाळ देवल यांनी आपल्या 'शारदा' या लोकप्रिय नाटकात बालविवाहाचा प्रश्न मांडला. म्हणून हा कायदा 'शारदा कायदा' या नावाने ओळखला जातो.[६]

प्रत्यक्ष अंमलबजावणी :

ब्रिटिश काळात महिलांविषयक अनेक कायदे झाले. समाज सुधारकांनी अनेक प्रयत्न केले. महिलांविषयक कायदा झाल्यावर त्याची अमंलबजावणी मात्र तितक्या प्रकर्षाने झालेली दिसून येत नाही. कारण ब्रिटिश भारतातील रूढी, प्रथा, परंपरा ह्यांच्यांत हस्तक्षेप करण्यास तयार नव्हते. त्यांचा दृष्टीकोण व्यापारी स्वरूपाचा होता. त्यामुळे सतीप्रथा कायदा झाल्यावर ही अनेक ठिकाणी ही प्रथा सुरू असण्याची उदाहरणे समोर येत होती. विधवा विवाह सुद्धा मोठ्या प्रमाणावर झाले नाही. त्याचीही आकडेवारी कमी दिसून येते. बालविवाह देवदासी प्रथा इ. कायदे होवूनही महिलांचा सामाजिक दर्जा सुधारण्यास फारशी मदत झालेली दिसून येत नाही.

निकर्ष :

* ब्रिटिश काळात महिलांविषयक कायदे होवूनही त्याची अंमलबजावणी प्रभावीपणे झाल्याची दिसून येत नाही.
* ब्रिटिश काळात महिलांविषयक कायद्याने काही प्रमाणात महिलांवरील अन्याय कमी झालेला दिसून येतो.
* कायद्याचा प्रसार व प्रचार करण्यात यंत्रणा कमकुवत दिसून येते.
* ब्रिटिशकालीन महिलांविषयक कायद्याने भारतीय जनसामान्यांवर त्याचा परिणाम झालेला दिसून येतो. अशा प्रकारे ब्रिटिशकालीन महिला विषयक कायदे होण्याची सुरूवात होवून स्वातंत्र्य भारतात नवीन कायदे होण्यास प्रोत्याहन मिळून अनेक महिलांविषयक कायदे करण्यात आले.

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In This Issue

Factors Affecting Risk Attitude and Investors' Happiness of Newly Employed Individuals

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Abstract

Purpose : This study aimed to evaluate the impact of risk attitude and holding risk-free and risky assets on investors' happiness. It also aimed to study investors' demographic differences in risk attitude and happiness. Evaluation of the impact of age and family size of investors on their risk attitudes was another aim of this study.

Methodology : This study evaluated the impact of three independent variables, viz, holding risk-free assets, holding risky assets, and risk attitude on one dependent variable, i.e., investors' happiness with an investment decision. A sample survey of 409 newly employed individuals having work experience of less than five years was conducted in Vidarbha, India. The data was analyzed by using multiple regression and MANOVA using the SPSS software.

Findings : Investor satisfaction has been demonstrated to have a modest, positive, and significant association with risk attitude. The contentment of investors was significantly impacted by both holding risk-free and risky assets. It was discovered that there were significant gender differences in investors' happiness. Nonetheless, there was no discernible variation in investors' levels of enjoyment based on their income or marital status.

Practical Implications : This research has significant implications for managers in understanding the various facets of the investment behavior of youth and demographic differences in their investment behavior. Financial advisors would be able to plan their sales pitches by referring to the results.

Originality : In contrast to earlier studies on behavioral finance, the current work examined the topics of investment behavior in the Indian setting, with a focus on risk attitude, involvement in the financial market, and satisfaction of recently hired people.

Keywords : risk attitude, risky assets, risk-free assets, financial market participation, happiness

JEL Classification Codes : G11, G40, G41

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It is widely accepted that one of the most important indicators of a nation's economic progress is its level of financial development (Mahapatra et al., 2017). Individuals can participate in the financial market to attain financial development. The existing data on financial markets reveals that participation in financial markets is extremely limited in developing nations (Özbilgin, 2010). India is a growing economy where, despite strong savings rates and forward-thinking policies, equity product penetration is quite low (Sivaramakrishnan et al., 2017). In addition, the percentage of Indians who participate in the stock market is still rather low at less than 6%, despite significant incentives and focused marketing emphasizing the advantages of equity investments (Sivaramakrishnan & Srivastava, 2019). According to Sivaramakrishnan and Srivastava (2019), the household stockholding rate was found to be 17.5% in China, 15% in the USA, and 23% in Europe in 2010.

A Demat account is a sign of direct stock market engagement, and only 1.7% of Indians have one, compared to 17.7% in the US, 16.4% in the UK, and 9.4% in China (Kumari, 2017). A significant number of people in India between the ages of 24 and 39 recently created new Demat accounts, according to SEBI data (Rana, 2022). This may indicate a recent surge in the number of Demat account openings in India, especially among youth. As a result, more people will have access to the stock market, which could eventually lead to an increase in the number of participants in the Indian financial system.

Research Problem

Scholars in the fields of finance and economics have been investigating a range of matters pertaining to investment behavior. Three trends that are becoming more and more popular include risk attitudes, retail investor participation in financial markets, and investor happiness. India is a young nation, as seen by its demographics, with nearly half of its citizens under 25 (Ghate & Robertson, 2015). This suggests that a significant portion of the population of the nation is young. Additionally, Indian investors are unique, making it difficult to forecast their actions (Ramesh et al., 2019). In light of this, we have decided to look into the investment practices and degree of involvement of these young professionals, especially those who have just recently begun working in the financial markets.

Research Gap

Previous research was done on the following topics: financial literacy (Nag & Shah, 2022), sentiments (Kumar & Lee, 2006), herding behavior (Hsieh et al., 2020), informativeness (Farrell et al., 2022), financial behavior (Vaghela et al., 2023), financial inclusion (Tandon & Singh, 2021), financial behavior (Vaghela et al., 2023), and attention (Colaco et al., 2017). The current study, however, aims to learn more about the investment behavior of recently hired people, particularly their involvement in financial markets, risk tolerance, and level of pleasure. The work of Chen et al. (2020) has an impact on this study. Still, we considered the Indian context of recently hired workers in addition to a host of other factors related to investors' satisfaction in their investigation.

Research Aim/Purpose

This study endeavors to determine the extent of holding risky and risk-free assets by newly employed individuals. This study aims to evaluate the impact of risk attitude and holding risky and risk-free assets on investors' happiness. We also wish to study their demographic differences (gender, marital status, and income) in risk attitude and happiness. Another goal of this study is to evaluate how investors' risk perceptions are affected by factors like age and family size.

Research Questions

The following research questions are addressed in this study:

- ***RQ1 :*** What is the degree of holding risky and risk-free assets by newly employed individuals in India?
- ***RQ2 :*** What impact do risk-taking behavior and the possession of both risky and risk-free assets have on the pleasure of investors?
- ***RQ3 :*** Do the risk attitude and satisfaction of recently hired persons vary based on factors such as gender, marital status, and income?
- ***RQ4 :*** Does the size of their family and age affect the risk attitudes of recently hired individual investors?

Literature Review and Hypotheses Formulation

Investors' Happiness

Strack et al. (1991) described happiness as a state of joy or as a state of satisfaction. Joy is an emotion, while satisfaction is a cognition. We wish to empirically assess investors' happiness with investment decisions. Investors' happiness is often viewed as a result of the spending opportunities provided by investment returns (Merkle et al., 2014). Argyle (2001) asserted that a gauge of happiness is subjective well-being. Numerous factors have been studied in the past that affect investors' happiness, including stockholding (Rao et al., 2016), past market and portfolio returns (Merkle et al., 2014), investment horizon (Merkle et al., 2014), subjective portfolio risk (Merkle et al., 2014), and investors' sentiments (Bouri et al., 2022). Bouri et al. (2022) studied the return and volatility spillovers across global stock markets, whereas Delis and Mylonidis (2015) studied the effect of investors' happiness on households' financial decisions. Additionally, Kochhar (2024) investigated the financial behavior and well-being of research academics. Prior research has typically examined investors' satisfaction as a significant element when examining investors' behavior. As a result, the researchers decided to focus on saving and forward-thinking investing practices in this investigation.

Holding Risky Assets and Investors' Happiness

People invest their money in the financial market for wealth creation. Financial assets include things like cash or bank deposits, equities, bonds, and mutual funds (Qiao & Cai, 2023). Different assets contain different levels of risk. Broadly, financial assets can be classified as risk-free and risky assets. Stocks and mutual funds comprise different levels of risk; however, financial assets such as cash or bank deposits are secured in their par value (Qiao & Cai, 2023). Various prior studies have studied the relationship between financial market participation and subjective well-being. Rao et al. (2016) found that investing in stocks or mutual funds is strongly associated with happiness. Merkle et al. (2014) explored the relationship between portfolio risk and happiness.

Interestingly, Apergis et al. (2019) concluded that higher levels of happiness lead to higher shares of risky assets in financial portfolios. Qiao and Cai (2023) reported that the value of holding stocks and funds has no significant effect on improving happiness. Stock market participation is considered an indicator of consumer financial well-being (Xia et al., 2014). Based on the above studies, it seems that investments in stocks and mutual funds are associated with happiness. Hence, the following hypothesis is formulated:

- **H01 :** There is no significant relationship between holding risky assets and investors' happiness.

Holding Risk-Free Assets and Investors' Happiness

Individual subjective well-being was regarded as important because investing and retaining risk-free assets may be considered a stable type of wealth (Chen et al., 2020). There is some literature to provide supporting evidence for the view that holding risk-free assets has an association with happiness. Qiao and Cai (2023) proved that the value of certificates of deposit has a significant effect on improving happiness. Shim et al. (2012) evaluated the impact of savings on young adults' well-being. An American study of workers and retirees found that those who began saving for retirement had greater health and well-being than those who did not (Noone et al., 2009). Similarly, Brown et al. (2005) discovered that heads of British homes who saved money each year had a stronger feeling of well-being than those who did not. The following hypothesis is put forth while taking into account the prior empirical support:

- **H02 :** There is no significant relationship between holding risk-free assets and investors' happiness.

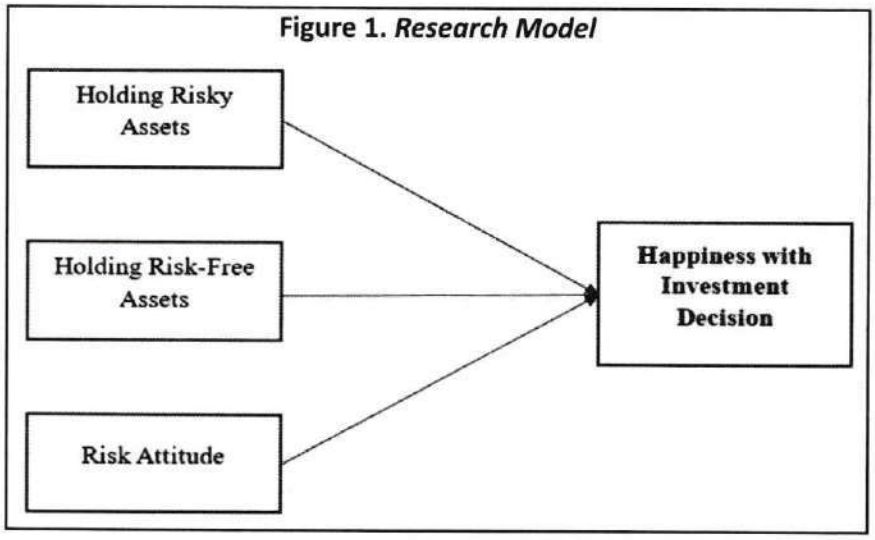
Risk Attitude and Investors' Happiness

The extent to which a person is inclined to take on financial risk is known as their risk attitude (Chen et al., 2020). We attempted to measure risk attitude. Individual risk attitudes must be assessed for various managerial and financial decision-making areas (Fellner & Maciejovsky, 2007). Apergis et al. (2019) suggested that happiness plays a vital role in financial decisions because it can influence risk tolerance. Similarly, Saurabh and Nandan (2019) examined the impact of financial knowledge and financial socialization on the financial satisfaction of an individual. Rodrigues and Gopalakrishna (2023) studied the predictors of financial risk-taking propensity among working adults. The study was conducted in Tier II cities in India. Coleman (2003) has also focussed on relating risk attitude to the willingness to hold risky assets. Similarly, Shim et al. (2012) evaluated the impact of financial attitude and financial well-being of young adults. Therefore, the following hypothesis is formulated:

- **H03 :** There is no significant relationship between risk attitude and investors' happiness.

The suggested correlation between the independent and dependent variables used for this investigation is illustrated in Figure 1. Moreover, we have chosen to assess the demographic variations in investors' satisfaction and risk attitude.

Figure 1. ***Research Model***



There isn't much literature to provide supporting evidence to the socio-demographic factors on investors' happiness and risk attitude. However, a few previous studies attempted to explore these associations. For instance, Kannadhasan (2015) investigated whether demographic parameters such as gender, age, marital status, income, occupation, and education, alone or in combination, could be utilized to differentiate among retail investors in terms of financial risk tolerance (FRT) and risk-taking behavior (FRB). Similarly, Grable (1997) investigated whether the factors of gender, age, marital status, occupation, self-employment, income, race, and education might be used alone or in combination to distinguish between levels of investor risk tolerance. Bollen and Posavac (2018) studied the impact of gender on asset allocation recommendations.

Similarly, Manzoor et al. (2023) evaluated the impact of demographic characteristics on the investment behavior of individual investors in North India. Against this backdrop, an empirical investigation on the impact of demographic variables viz gender, marital status, age, income, and family size is required. Hence, the following hypotheses are formulated:

- **H04 :** There is no gender difference in investors' happiness.
- **H05 :** There is no gender difference in risk attitude.
- **H06 :** There is no significant difference in investors' happiness according to marital status.
- **H07 :** There is no significant difference in risk attitude according to marital status.
- **H08 :** There is no significant difference in investors' happiness according to income.
- **H09 :** There is no significant difference in risk attitude according to income.
- **H010 :** There is no impact of the age of the investors on their risk attitude.
- **H011 :** There is no impact of the family size of the investors on their risk attitude.

Methodology

Type of Research and Sampling

This is an empirical investigation based on the applications of descriptive research design. A sample survey of recently hired people with less than five years of work experience was carried out. Most of the participants are residents of Vidarbha, a geographic region in Maharashtra State, India. The sample size was determined by using Cochran's (Cochran, 1977) formula for an infinite population with a 95% confidence level and 5% sampling error. The minimum sample size computed by using Cochran's formula was 384. The researchers surveyed 409 newly employed individuals, which is much above the minimum sample size required. Snowball and purposive sampling strategies were used to choose the participants. In particular, when the target population is infinite, both non-probability sampling strategies are applied. Table 1 provides information on the sample characteristics.

Table 1. ***Sample Characteristics***

Characteristics	Choices	No. of Respondents	%
Gender	Male	173	42
	Female	236	58

Marital Status	Married	60	15
	Unmarried	349	85
Education	Under Graduate	35	09
	Graduate	88	21
	Post Graduate	286	70
Monthly Gross Income (in ₹)	Below ₹ 25,000	175	43
	Between ₹ 26,000 – ₹ 50,000	207	51
	Above ₹ 50,000	27	06
Work Experience (in years)	Less than 1 year	35	09
	1 – 3 years	317	77
	3 – 5 years	57	14

N = 409.

Measures

The data was gathered from June 19, 2023 to July 12, 2023 by administering a well-structured questionnaire designed by the researchers. As mentioned earlier, this study is highly inspired by the work of Chen et al. (2020). The survey instrument constitutes the socio-demographic characteristics viz; gender, age, education, marital status, occupation, work experience, and family size. Holding risky and non-risky assets were the two factors used to gauge the respondents' involvement in the financial market. The sources of these two scales were Chen et al. (2020). First, it was inquired of the respondents if they had ever made any investments in investment products. Subsequently, their behavior as holding risk-free assets was measured by asking them whether they had a savings account or a fixed deposit account. The responses were measured on a binary scale of "yes" and "no" type.

Similarly, the respondents' behavior in holding risky assets was measured by asking them whether they had invested in stocks or mutual funds. The responses were measured on a binary scale of "yes" and "no" type. Both these variables were coded as 0 for not performing the activity and 1 for performing the activity.

The pleasure scale for investment decisions was taken from Larsen et al. (1985). It is a single item 5-point scale ranging from *"very unhappy"* to *"very happy."* The respondents were asked, "How do you feel how happy you are with your investment decision?" The risk attitude scale was adapted from Chen et al. (2020), which is made up of a single item. The risk attitude is a single-item 5-point scale ranging from "not willing to take any risk" to "high risk and high return project." The question was worded as "What extent of risk are you willing to take while choosing investment products?"

Every scale was changed to fit the parameters of the research project. Ten respondents were then asked to pre-test the questionnaire in order to analyze the questions' appropriateness and intelligibility. After pre-testing, a few questions were changed to ensure that the most pertinent data was gathered. As the scales on "risk attitude" and "happiness with investment decision" are made up of a single item and the scales on "holding risky assets" and "holding risk-free assets" are binary responses; therefore, the reliability measure Cronbach's alpha was not computed.

Data Collection

The questionnaire was subsequently transformed into an electronic Google survey form (Linge et al., 2023). Telephone numbers of the potential respondents were gathered by using numerous known respondents. The prospective respondents received a link to the electronic survey form in each of their personal WhatsApp

windows. Following the questionnaire, the participants were requested to provide the contact information of prospective respondents. The link was also posted in the various relevant WhatsApp groups to generate maximum responses.

Additionally, the link was asked to be forwarded to any known potential contacts of the respondents. Also, they were asked to share the link in the pertinent and well-known WhatsApp groups to which they belonged. A regular follow-up was taken by initiating telephone calls. The potential respondents were motivated to participate in the survey throughout the data collection period. Data analysis is done by using linear multiple regression and multivariate analysis of variance (MANOVA) using the SPSS computer program.

Analysis and Results

The sample constitutes 173 (42%) male and 236 (58%) female investors. A total of 60 (15%) married and 349 (85%) unmarried investors were there in the sample. In terms of respondents' educational backgrounds, there were 35 (09%) undergrads, 88 (21%) and 286 (70%) postgrads. A total of 175 (43%) respondents earned less than ₹ 25,000 per month, 207 (51%) earned between ₹ 26,000/- to ₹ 50,000/- per month, and only 27 (6%) respondents earned more than ₹ 50,000/- in a month. A total of 35 (9%) respondents possessed work experience of less than one year, 317 (77%) possessed 1–3 years of work experience, and 57 (14%) respondents possessed 3–5 years of work experience.

Participation in the Financial Market

Table 2 indicates that 93% of newly employed individuals had participated in the financial markets. The statistics on holding risk-free assets show that 98% of the participants had savings accounts either in a bank or post office. Interestingly, it was found that only 40% of the newly employed young investors invested in fixed deposit schemes. A total of 98% of the participants held either a savings account or an FD. Only 54% of young investors who had recently started their careers bought shares, and 86% invested in mutual fund schemes when it came to holding riskier assets. A total of 92% of the participants invested either in a share or in a mutual fund scheme.

Table 2. ***Financial Market Participation***

Characteristics	Choices	No. of Respondents	%
Investment in any financial product	Yes	380	93
	No	29	07
	Total	409	100
Holding Risk-Free Assets			
Having a savings account with a bank or post office	Yes	399	98
	No	10	02
	Total	409	100
Investment in fixed deposits	Yes	162	40
	No	247	60
	Total	409	100
Holding either a savings account or an FD	Yes	401	98
	No	08	02
	Total	409	100

Holding Risky Assets			
Investment in shares	Yes	222	54
	No	187	46
	Total	409	100
Investment in any mutual fund scheme	Yes	352	86
	No	57	14
	Total	409	100
Investment in either shares	Yes	378	92
or mutual funds	No	31	08
	Total	409	100

Impact of Risk Attitude, Holding Risk-Free Assets, and Holding Risky Assets on Investors' Happiness

The main objective of this study is to evaluate the impact of three parameters of investors' happiness, viz., risk attitude, holding risk-free assets, and holding risky assets on their happiness with investment decisions. The hypothesis is that there is no relationship between risk attitude and investors' happiness (H01), holding risk-free assets and investors' happiness (H02), and holding risky assets and investors' happiness (H03). These hypotheses were tested by performing multiple correlation and multiple linear regression analysis at a 0.05 significance level.

The results of multiple correlation analysis (Table 3) show that risk attitude has a low, positive, and significant relationship with investors' happiness ($r = 0.268, p < 0.05$). Therefore, H01 is rejected. The relationship between

Table 3. *Mean, SD, and Correlations*

Hypotheses	Dependent Variable : Investors' Happiness	Mean	*SD*	Correlation Coefficient	*p*-value	Result
H01	Risk Attitude	3.513	0.9474	0.268**	0.00	Significant
H02	Holding Risk-Free Assets	0.980	0.1387	0.225**	0.00	Significant
H03	Holding Risky Assets	0.924	0.2650	0.194**	0.00	Significant

Note. ** The results are significant at the .05 significance level.

Table 4. *Factors Affecting Investors' Happiness*

Factors Affecting Investors' Happiness	Regression Coefficient	*t*-value	Sig.	Result
Intercept	2.398	9.980	0.000*	Significant
Risk Attitude (*X*1)	0.161	4.759	0.000*	Significant
Holding Risk-Free Assets (*X*2)	0.786	3.249	0.001*	Significant
Holding Risky Assets (*X*3)	0.218	1.700	0.090	Non-Significant
R^2	0.115			
Adjusted R^2	0.108			
F	17.487	–	0.00*	Significant
N	409	–	–	

Note. * Results are significant at the 0.05 significance level.

holding risk-free assets and investors' happiness is also found to be significant ($r = 0.225$, $p < 0.05$). Therefore, H02 is rejected. Similarly, the relationship between holding risky assets and investors' happiness is also found to be significant ($r = 0.194$, $p < 0.05$). Hence, H03 is also rejected.

The results of multiple linear regression analysis (Table 4) show a significant overall impact of all three independent variables on investors' happiness ($F = 17.487$, $p < 0.05$) with $R^2 = 0.115$, suggesting that the listed factors predict 11.5% of the variation. The results indicate that (Table 4) the regression coefficients of risk attitude ($\beta = 0.161$, $p < 0.05$) and holding risk-free assets ($\beta = 0.786$, $p < 0.05$) are found to be significant. However, the regression coefficient of holding risk-free assets is found to be insignificant ($\beta = 0.218$, $p > 0.05$). Therefore, 2.398 + 0.161 (Risk Attitude) + 0.786 (Holding Risk-Free Assets) is the expected investors' pleasure score. The greatest predictor of pleasure with investment decisions was found to be risk attitude ($r = 0.268$, $p < 0.00$) followed by risk-free assets ($r = 0.225$, $p < 0.00$).

Impact of Demographic Variables on Attitude Toward Financial Risk and Investors' Happiness

One of the objectives of this study is to evaluate whether there are any demographic differences (gender, marital status, and income) in risk attitude and investors' happiness. The descriptive statistics are presented in Table 5. The hypothesis is that "there is no impact of gender, marital status, and income on risk attitude and investors' happiness." Multivariate analysis of variance (MANOVA) was performed to test the differences. Table 6's findings indicate that there is no gender difference in risk attitude ($p > 0.05$). Therefore, H05 is accepted. Similarly, it is found that risk attitude doesn't differ according to marital status ($p > 0.05$). Therefore, H07 is accepted. However, it is found that there is a significant difference in the risk attitude of the investors of different income groups ($p < 0.05$). Therefore, H09 is accepted. The results of Tukey's post hoc test show that investors with less than ₹ 25,000 monthly income prefer to invest in products with average risk and average returns (mean = 3.2). However, investors with ₹ 25,000 to ₹ 50,000 (mean = 3.96) and with more than ₹ 50,000 (mean = 4.22) monthly income prefer to invest in products with slightly higher risk and slightly higher return projects.

As far as investors' happiness is concerned, it is found to differ significantly according to gender ($p < 0.05$). Therefore, H04 is rejected. Female investors were found to be happier (mean = 3.94) than male investors (mean = 3.92). However, no significant difference in investors' happiness is noticed for marital status ($p > 0.05$).

Table 5. ***Descriptive Statistics of Risk Attitude and Investors' Happiness***

Variables	Mean	*SD*	Description
Attitude toward financial risk	3.51	0.95	The investors are willing to invest in projects that assume slightly higher risk and give slightly higher returns.
Investors' Happiness	3.94	0.67	The investors are happy with their investment decisions.

Table 6. ***Multivariate Analysis of Variance Test (MANOVA) (Wilk's Statistics)***

Effect	Wilk's Lambda	*F*	*p*-value	Result
Gender	0.984	3.218	0.041*	Significant
Marital Status	0.998	0.301	0.740	Non-significant
Income	0.936	6.608	0.000*	Significant

Note. * Results are significant at a 0.05 significance level.

Therefore, H06 is accepted. Investors' happiness is found to differ for investors belonging to different income groups ($p < 0.05$). Therefore, H08 is rejected. The results of Tukey's post hoc test indicate that there is no significant difference in the happiness of the investors having less than ₹ 25,000 (mean = 3.87) and ₹ 26,000 to ₹ 50,000 (mean = 3.95) monthly income. Similarly, the investors with ₹ 26,000 to ₹ 50,000 (mean = 3.95) and more than ₹ 50,000 monthly income were found to have the same happiness level.

Using Wilks' criterion, it is found that the main effects are significant for two independent variables, viz, gender ($WL = 0.984, p < 0.05$) and income ($WL = 0.936, p < 0.05$) on both the dependent variables, viz, risk attitude and investors' happiness. However, the overall effect of marital status on both the dependent variables, viz, risk attitude and investors' happiness, is found to be non-significant ($WL = 0.998, p > 0.05$).

Tests of between-subjects effects were performed on the data. Table 7 summarizes the findings of the hypotheses testing.

Impact of Age and Family Size on Attitude Toward Financial Risk

Another objective of this study is to evaluate the impact of age and family size of investors on their risk attitudes. The hypotheses are that there is no impact of age and family size on risk attitude. The results of correlation analysis (Table 8) show that age has a low, positive, and significant relationship with attitude toward financial risk ($r = 0.215, p < 0.05$). Therefore, H010 is rejected. However, family size does not show a significant relationship with attitude toward financial risk ($r = 0.048, p > 0.05$). Therefore, H011 is accepted.

Table 9 indicates a significant overall impact of age and family size on attitude toward financial risk ($F = 10.48$, $p < 0.05$) with $R^2 = 0.049$, suggesting that 4.9% of the variation in attitude toward financial risk is explained by age and family size. The regression coefficient of age ($\beta 1 = 0.902, p < 0.05$) is found to be significant. However, the regression coefficient of family size is found to be insignificant ($\beta 2 = 0.068, p > 0.05$). Therefore, the predicted attitude toward financial risk score is equal to 0.901 + 0.092 (Age).

Table 7. *Tests of Between-Subjects Effects*

Source	Dependent Variable	*MS*	*F*	*p*-value	Result
Gender	Risk Attitude	0.027	0.032	0.858	Non-significant
	Happiness	2.517	5.822	0.016*	Significant
Marital Status	Risk Attitude	0.352	0.423	0.516	Non-significant
	Happiness	0.141	0.327	0.568	Non-significant
Income	Risk Attitude	8.996	10.822	0.000*	Significant
	Happiness	1.766	4.085	0.018*	Significant

Note. * Results are significant at a 0.05 significance level.

Table 8. *Mean, SD, and Correlations*

Dependent variable : Attitude toward financial risk	Mean	Std. Deviation	Correlation Coefficient	*p*-value	Result
Age	25.083	2.2290	0.215	0.00*	Significant
Family Size	4.469	0.7274	0.048	0.168*	Non-Significant

Note. $N = 409$ * Results are significant at a 0.05 significance level.

Table 9. *Factors Affecting Attitude Toward Financial Risk*

Factors Affecting Attitude Toward Financial Risk	Regression Coefficient	*t*-value	Sig.	Result
Intercept	0.901	1.515	0.130	Non-Significant
Age (*X*1)	0.092	4.472	0.000	Significant
Family Size (*X*2)	0.068	1.080	0.281	Non-Significant
R^2	0.049			
Adjusted R^2	0.044			
F	10.48	–	0.00	Significant
N	409	–	–	

Discussion

To understand the factors influencing newly employed individuals' happiness, we tested a regression model that is influenced by the work of Chen et al. (2020). The suggested model included one dependent variable, investors' pleasure, and three independent variables: owning risky assets, holding risk-free assets, and risk attitude. The findings demonstrate how risk attitude positively and significantly affects investors' level of satisfaction. The results are consistent with Chen et al. (2020) and Rao et al. (2016). The Karl Pearson's correlation coefficient of the relationship between holding risk-free assets is found to be positive and significant at a 0.05 significance level. This result is also consistent with Chen et al. (2020). The relationship between holding risk-free assets and happiness is found to be sounder than that of holding risky assets and happiness. Still, the findings (Delis & Mylonidis, 2015) indicate that pleasure decreases the likelihood of making investments in riskier financial instruments. We also investigated the demographic differences in investors' happiness and risk attitudes. The results show that risk attitude doesn't differ according to gender. This result is in contrast to Coleman (2003). The result of Coleman (2003) shows that women expressed a higher level of risk aversion than that of men. However, this study does not determine the differences in marital status and income of the investors.

Conclusion

This study evaluates the impact of financial market participation and risk attitude of newly employed individuals on their happiness. Financial market participation is divided into two variables based on different levels of risk in holding the financial assets, viz, holding risk-free assets and holding risky assets. The results indicate that 93% of newly employed individuals have participated in the financial markets; 98% of the participants hold any of the risk-free assets, i.e., either a savings account or an FD, and 92% of the participants invested in risky assets. i.e., either in a share or in a mutual fund scheme. All three variables, viz, holding risk-free assets, holding risky assets, and risk attitude, were found to have a significant impact on investors' happiness. This study also evaluated the demographic differences in risk attitude and investors' happiness. The results show that risk attitude doesn't differ according to gender and marital status. However, risk attitude is found to differ according to different income groups. As far as investors' happiness is concerned, it is found to differ significantly according to gender and income. However, no significant difference in investors' happiness is noticed for marital status. This study also attempts to examine the relationship between the age and family size of investors with their financial risk attitude. The results indicate that age has a low, positive, and significant relationship with attitude toward financial risk. However, family size does not show a significant relationship with attitude toward financial risk.

Managerial/Theoretical Implications/Policy Implications

The results of this study add to the existing literature on investors' happiness and their participation in financial markets, especially concerning newly employed youth in India. The findings have significant implications for global investors in terms of understanding their peers' investment behavior. Additionally, this study has significant management implications for comprehending teenage investing behavior and its diverse aspects, including demographic variations. The study's findings might also be useful to financial counselors. By organizing their sales presentations and awareness campaigns, they could help their clients comprehend the overall Indian investing landscape. The study's findings may provide policymakers with valuable information for future planning and revision.

Limitations of the Study and Scope for Further Research

This study provides comprehensive insights into the determinants of investors' happiness, though it has a few limitations. One multiple linear regression analysis technique was used to evaluate the impact of holding risk-free and risky assets and risk attitude on investors' happiness. More sophisticated techniques like structural equation modeling could be utilized in future studies by introducing mediating and moderating variables. Second, this study is conducted in Vidarbha, a geographic area in MS, India, on newly employed individuals. Future studies may involve different target populations in other settings. Three, this study attempted to evaluate the determinants of investors' happiness. Financial market participation, risk attitude, and demographic characteristics are the factors of investors' happiness. However, future studies may consider the other factors of investors' happiness.

Authors' Contribution

Dr. Ashish A. Linge and Dr. Adil Jiwani conceived the idea of the topic and searched the relevant literature. Dr. Ashish A. Linge prepared the questionnaire. Dr. Adil Jiwani and Dr. Baldeo B. Kakde gathered the required primary data. Dr. Ashish A. Linge analyzed the data and wrote the manuscript in consultation with both the authors and supervised the study. He has also done editing and proofreading of the manuscript. Dr. Baldeo B. Kakde prepared the diagrams and tables and he also generated citations and references.

Conflict of Interest

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

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Research Paper

Anisotropic Bianchi Type-V Perfect Fluid Cosmological Models in *f(R, T)* Gravity

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Abstract— This paper deals with the study of anisotropic Bianchi type-V cosmological model filled with perfect fluid in the framework of *f(R, T)* gravity, where *R* and *T* are the Ricci scalar and trace of the energy-momentum tensor respectively. To solve the field equations completely, we have considered two different cases: (i) the expansion scalar of the space-time is proportional to the shear scalar (Collins et al., 1980) which gives a relationship between metric potentials and (ii) the law of variation of Hubble's parameter proposed by Berman (1983) which yields the constant deceleration parameter. We have studied some physical and kinematical parameters of both the models and discussed their behavior graphically. The constructed cosmological models are singularity free, expanding and do not approach isotropy throughout the evolution of universe. In the first case, universe decelerates in a standard way, while the second model represents both decelerating and accelerating phase of expansion. Also, the energy conditions are discussed for both the models.

Keywords— Bianchi type-V, *f(R, T)* gravity, Perfect fluid, Anisotropic, Energy conditions.

1. Introduction

In recent times, the discovery of an accelerating expansion of the universe has attracted much attention of the researchers. The astrophysical observations such as high redshift supernova experiment [1-5], Wilkinson Microwave Anisotropy Probe (WMAP) experiment [6, 7], fluctuation of cosmic microwave background radiation (CMBR) [8, 9] and large scale structure (LSS) [10, 11], and Baryon Acoustic Oscillations (BAO) [12] indicate an accelerating expansion of the universe caused by the presence of some kind of repulsive force in the universe which is repelling the cosmic objects farther apart, and suggest that this cosmic acceleration is driven by mysterious form of energy with a large negative pressure, termed as dark energy (DE) [13-18].

Einstein's general theory of relativity (GTR) is an amazing achievement in the modern physics, which has pioneered the use of modern mathematics in physical theories. The GTR has established itself as a very successful theory in describing the gravitational phenomena, dynamics of the solar system, and evolution of the universe, through its gravitational field equations and construction of cosmological models. Amazingly, the large scale structure of the universe has been still best described by the field equations of GTR. However, it is said that this theory does not fully account for certain aspects of present day cosmology. For example, GTR does not fully incorporate Mach's principle, it does not avoid singularity problem and does not explain the modern scenario of accelerated expansion of the universe. Hence several theories of gravitation have been proposed as alternative to GTR. In order to study and explain the accelerating expansion of the universe, two methods have been proposed; one way is to investigate various dark energy candidates playing major role due to modification in the energy momentum tensor in the field equations of GTR and the other is to modify GTR. Einstein was the first who gave the concept of dark energy by introducing the cosmological constant Λ which is now considered as the most suitable candidate for dark energy. In recent years several probable candidates for dark energy, namely, quintessence [19-23], *k*-essence [24-26], phantom energy [27, 28], quintom [29, 30], tachyon [31, 32], chameleon [33], holographic dark energy (HDE) [34-37], Ricci DE [38], new age graphic DE [39, 40], Chaplygin gas [41], extended Chaplygin gas [42, 43] and the generalized Chaplygin gas [44], etc. characterized by their equation of state (EoS) parameter $\omega = p_\Lambda / \rho_\Lambda$ have been proposed and accordingly the cosmological models are being constructed and studied. In the second approach to explain the accelerating expansion of the universe, in the recent past, many modified theories of gravity have been developed by altering Einstein-Hilbert (E-H) action of GTR.

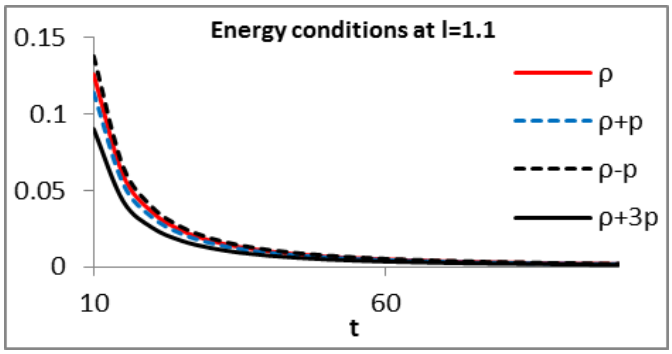

Figure 11(c): Plots of energy conditions for model 2, with l = 1.1, and $k = \gamma = 1,\ m = 2,\ \beta = 0.5$.

From Figure 10, it is observed that all the energy conditions except SEC are satisfied in the model 1. The SEC is also satisfied at late times.

The energy conditions for model 2 are depicted in Figure 11(a, b, c) at l = 0.27, 1, 1.1. It is observed that only SEC is satisfied for model 2 at l = 0.27, while all the energy conditions are satisfied at l = 1 and l = 1.1.

8. Results and Conclusion

Here we have constructed anisotropic Bianchi type-V cosmological models with perfect fluid in the framework of *f(R, T)* gravity proposed by Harko et al. [48]. Two different cosmological models are constructed by solving the field equations in two different cases: (i) the expansion scalar of the space-time is proportional to the shear scalar (Collins et al., [83]) which yields a relationship between metric potentials, taken as $Y = Z^n$; and (ii) the law of variation of Hubble's parameter proposed by Berman [53]: $H = \beta a^{-l}$ (where $\beta > 0$ and $l \geq 0$ are constants), which yields the constant deceleration parameter. The models so constructed are free from singularities for $n \neq 1$ and $l \neq 0, 3$, respectively.

Model 1: It is free from singularities for $n \neq 1$. The values of the parameters *V*, *a*, *H*, θ, σ^2, A_m, ρ and *p* shows that the universe is anisotropic for $n \neq 1$, and evolves with constant volume and expands exponentially. The condition stated by Collins and Hawking [84], i.e., $\lim_{t\to\infty} \frac{\sigma}{\theta} = 0$, does not hold for $n \neq 1$, and hence the model dose not approach isotropy throughout the evolution of the universe. The deceleration parameter q = 2 shows that the universe decelerates in a standard way, which is not in accordance with the present scenario of accelerating universe. This result is similar to the results discussed by Huang *et al.* [85], Reddy *et al.* [51] and Rao *et al.* [86], respectively, in the study of five dimensional *f*(*R*) gravity, Kaluza-Klein cosmological model in *f*(*R*, *T*) gravity and Bianchi type-I cosmological model with perfect fluid in *f*(*R*, *T*) gravity. The matter energy density is positive and a decreasing function of time. As the matter pressure is negative throughout the evolution of the universe, the perfect fluid behaves like a dark energy of phantom type. It is observed from the graph of EoS parameter ω that the universe is matter dominated ($\omega > 0$) at the initial epoch and it remain present in the quintessence region ($\omega > -1$) at late times. It is observed that the overall energy $\Omega < 1$ for a very short initial period of time and then it increases rapidly with time so that $\Omega > 1$; and hence, according to observational results of SNe Ia and CMB experiments, the behavior of the universe is open initially for a very short period, but then it is closed throughout the evolution. The Hubble's parameter *H* is a decreasing function of time and it remains positive but close to zero at late times, and $H > 0$ and $q > 0$, shows the decelerating expansion of the universe. All the energy conditions except SEC are satisfied in this model 1, and at late times SEC is also satisfied. Overall, the derived model resembles with the existing models with perfect fluid, particularly with the perfect fluid models studied by Reddy *et al.* [51] and Rao *et al.* [86].

Model 2: It is free from singularities for $l \neq 0, 3$. But the pressure and density are infinite at t = 0, the model has initial singularity. The universe starts with a zero volume which increases with time. The model is anisotropic for $l \neq 0$. Also, $\lim_{t\to\infty} \frac{\sigma}{\theta} = 0$ does not hold for $l \neq 0$, and hence the model dose not approach isotropy throughout the evolution of the universe. It is observed that, under the law of variation of *H*, the value of deceleration parameter is constant. The model represents decelerating phase of expansion for $l > 1$, and accelerating phase of expansion for $l < 1$ and $l = 0$, and expansion with constant rate for l = 1. For accelerating cosmic expansion the observed value of q at present epoch is -0.73 [87], and it is at l = 0.27. Hence the behavior of cosmological parameters are discussed graphically at l = 0.27 ($l < 1$, for accelerating phase), l = 1(for steady state expansion) and l = 1.1 ($l > 1$, for decelerating phase). For all these assumed values of l, it is observed that the universe expands with very high rate initially which slower down with time; and for l = 1, 1.1, the perfect fluid behaves like a dark energy of phantom type. Also, for l = 0.27, at later time, ρ becomes negative and remains negative throughout the evolution of the universe, which causes the repulsion of ordinary matter. This is closest to the real phenomenon called Casimir effect. In this case, if the universe is open then it will either expand indefinitely or it eventually turns out into a big rip. Graphical behavior of EoS parameter shows that the universe is matter dominated ($\omega > 0$) in the early stage and then remain present in quintessence region ($\omega > -1$) at later times. For l = 0.27, the universe is closed ($\Omega > 1$) at an initial epoch and at later times it is open ($\Omega < 1$), while for $l \geq 1$ it is closed throughout the passage of time. Only the SEC is satisfied for model 2 at l = 0.27, while all the energy conditions are satisfied at l = 1 and l = 1.1.

Thus, the results obtained in case of both the constructed models are compatible with the existing observations, and hence the models are physically acceptable.

Conflict of Interest
Authors declare that they do not have any conflict of interest.

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Research Paper

Zero-Mass Scalar Field with Interacting and Non-interacting Two Fluids in *f* (*R*, *T*) Gravity

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Abstract—This paper deals with the investigation of an accelerated expansion of a spatially homogeneous and isotropic flat Friedman-Lemaitre-Robertson-Walker (FLRW) universe in presence of zero-mass scalar fields associated with non-interacting and interacting barotropic fluid and dark energy in the framework of *f* (*R*, *T*) gravity. The exact solutions to the field equations have been obtained in two cases: power law and exponential law of volumetric expansion. Some physical and geometrical properties have been investigated for both power and exponential law models in non-interacting and interacting cases; in particular, the energy conditions and density parameters. The physical stability of the derived cosmological models has also been examined. We find that the models with exponential volumetric expansion are open, have accelerating expansion and physically stable; while, the models with power law volumetric expansion are open in both accelerating and decelerating cases, but physically stable and unstable in decelerating and accelerating case respectively.

Keywords—FLRW space-time, *f* (*R*, *T*) gravity, Dark Energy, Zero-mass scalar field, Interacting and Non-interacting, Physical stability.

1. Introduction

In recent years, the discovery of an accelerated cosmic expansion has led to the advancement in modern cosmology. The cosmological observations including high redshift supernova experiment [1-5], Wilkinson Microwave Anisotropy Probe (WMAP) experiment [6, 7], fluctuation of cosmic microwave background radiation (CMBR) [8, 9] and large scale structure (LSS) [10, 11] have produced large theoretical and observational evidence for an accelerated expansion of the universe. But still the reason for an accelerated expansion of the universe is not fully confirmed. It is said that the Einstein's general theory of relativity (GTR) does not explain the modern scenario of accelerated cosmic expansion. Thus, a number of theories alternative to GTR have been proposed by the researchers in order to investigate the cause of accelerated cosmic expansion. Astrophysical observations suggest that there is some kind of repulsive force in the universe which is pushing the cosmic objects farther apart in the space, and that this accelerated cosmic expansion is driven by mysterious dark energy (DE) with a large negative pressure [12-18]. The observational evidences of DE [1-7] suggest that nearly two-third and one-fourth parts of the universe's mass consist of DE and dark matter (DM) respectively, and the remaining consists of baryonic matter. The DE part of the universe is usually characterized by the dynamically variable quantity called as an equation of state (EoS) parameter, denoted by ω, and it is equal to the ratio of spatially homogeneous pressure to the energy density of DE. In order to explain the accelerated cosmic expansion, two methods have been suggested in the literature; one is to investigate different DE candidates and the second is to modify GTR. A number of probable DE candidates have been proposed in recent years. The cosmological constant Λ [15, 19, 20] is the simplest among all the DE candidates which is characterized by $\omega = -1$. The most commonly used primary DE candidates are scalar field models, such as time varying quintessence model [21-25] characterized by $-1 < \omega < -1/3$ in which DE density decreases over time as $\rho \propto a(t)^{-3(1+\omega)}$ ($a(t)$ is the scale factor) [26, 27], and *k*-essence [28-30], and phantom energy with $\omega < -1$ [31, 32]. Some other candidates of DE are quintom [33, 34], tachyon [35, 36], chameleon [37], holographic dark energy (HDE) [38-41], Ricci DE [42], new age graphic DE [43, 44], Chaplygin gas [45], extended Chaplygin gas [46, 47] and the generalized Chaplygin gas [48, 49], etc.

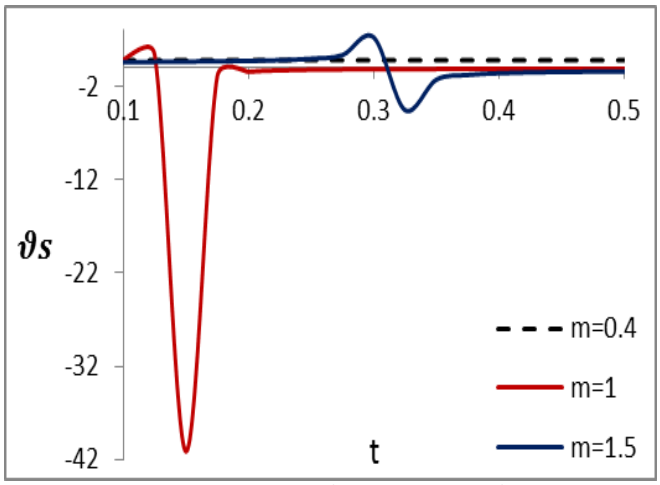

Figure 27: The plot of sound speed Vs. *t* for $\alpha = \rho_0 = h = 1,\ c_1 = 100$, $\omega_m = 0.5,\ \delta = 0.8$ in interacting two-fluid model with power law volumetric expansion.

(2) Exponential models:

In our non-interacting and interacting two-fluid models with exponential volumetric expansion, we obtained the sound speeds as

$$\vartheta_s = \left[\frac{\frac{3k(3\alpha+1)h^2}{(2\alpha+1)c_2^2 e^{6kt}} + \frac{3k\rho_0 \omega_m (1+\omega_m)}{c_2^{1+\omega_m} e^{3k(1+\omega_m)t}}}{\frac{3k(\alpha+1)h^2}{(2\alpha+1)c_2^2 e^{6kt}} + \frac{3k\rho_0 (1+\omega_m)}{c_2^{1+\omega_m} e^{3k(1+\omega_m)t}}} \right], \qquad (63)$$

and

$$\vartheta_s = \left[\frac{\frac{3k(3\alpha+1)h^2}{(2\alpha+1)c_2^2 e^{6kt}} + \frac{3k\rho_0 \omega_m (1+\omega_m-\delta)}{c_2^{1+\omega_m-\delta} e^{3k(1+\omega_m-\delta)t}}}{\frac{3k(\alpha+1)h^2}{(2\alpha+1)c_2^2 e^{6kt}} + \frac{3k\rho_0 (1+\omega_m-\delta)}{c_2^{1+\omega_m-\delta} e^{3k(1+\omega_m-\delta)t}}} \right]. \qquad (64)$$

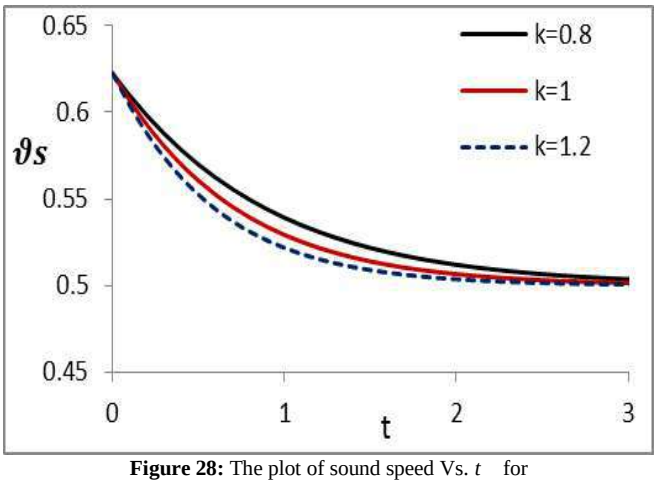

Figure 28: The plot of sound speed Vs. *t* for $\alpha = \rho_0 = h = 1,\ c_2 = 25$ and $\omega_m = 0.5$ in non-interacting two-fluid model with exponential volumetric expansion.

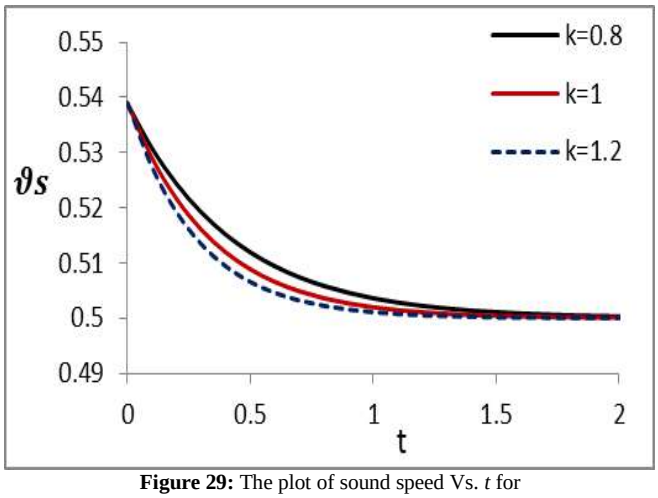

Figure 29: The plot of sound speed Vs. *t* for $\alpha = \rho_0 = h = 1,\ c_2 = 25$, and $\omega_m = \delta = 0.5$ in interacting two-fluid model with exponential volumetric expansion.

Figures 28 and 29 depict the graphical behavior of sound speeds given by (63) and (64), respectively.

It is observed from the figures that in case of interacting fluids, the sound speed is slightly decreased than in case of non-interacting fluids. But, in both non-interacting and interacting cases the sound speed ϑ_s satisfies the condition: $0 < \vartheta_s < 1$, throughout the evolution of the universe. Thus, our non-interacting and interacting two-fluid models with exponential volumetric expansion are physically stable.

8. Discussion and Conclusions

In this paper we have studied the two-fluid scenario coupled with zero-mass scalar fields in the *f* (*R*, *T*) theory of gravity for isotropic flat FLRW space-time. The non-interacting and interacting two-fluids models have been considered and discussed by assuming power law ($V = c_1 t^{3m}$) and exponential law ($V = c_2 e^{3kt}$) of volumetric expansion. The derived power law cosmological models exhibit both decelerating as well as accelerating phase of expansion, and shows physical stability and instability, depending on the values of *m*. The models with exponential law of volumetric expansion are accelerating and physically stable for all $k \geq 0$. Both the models are shear free and isotropic throughout the evolution of the universe. In both non-interacting and interacting two-fluid models with power law of volumetric expansion, the parameters such as ρ_Λ , p_Λ , ω_Λ , ρ_m , p_m , ϑ_s, etc., behave in a same way but with only a slight increase/decrease in their values, while the energy conditions and overall density parameters are the same. The same things are observed are in case of both non-interacting and interacting two-fluid models with exponential law of volumetric expansion.

- The power law model has initial singularity, i.e., the universe starts evolving with a big-bang, and it expands with decreasing rate; and it is free from a big rip. The

power law of volumetric expansion yields a constant deceleration parameter whose value depends on *m*. The values $0<m<1$, and $m=1$, and $m<0$, $m>1$ correspond to the universe's decelerating expansion, expansion with constant rate, and accelerating expansion, respectively.

For $0<m<1$(case of decelerating expansion), the EoS parameter (ω_Λ) of DE has a constant positive value 0.78 (approx.) showing the matter dominance of the universe. In this case, all type of energy conditions are satisfied and the speed of sound $\vartheta_s \approx 0.8$, i.e., $0<\vartheta_s<1$ throughout the evolution of the universe, which shows the model is physically stable and hence acceptable.

For $m \geq 1$(case of accelerating and constant expansion), at early stage of evolution of the universe, there is a rapid transition from matter dominated region $(\omega_\Lambda > 0)$ to quintessence region $(-1<\omega_\Lambda<0)$ and then to a phantom region $(\omega_\Lambda<-1)$, which is a Quintom DE scenario stated by Zhang [85]; and later on it remains present in the quintessence region $(-1<\omega_\Lambda<0)$ throughout the evolution, which is acceptable as per the SNe Ia observational data. In this case, all the energy conditions are satisfied except SEC and it is due to an accelerating cosmic expansion. The speed of sound, $\vartheta_s<0$ throughout the evolution of the universe, shows the model is physically unstable.

The value of overall density parameter Ω is lying between 0.35 and 0.5 (i.e., $\Omega<1$), showing the universe is open, which is not strictly compatible with the present-day observations of a flat universe, but resembles with the results favouring a universe with spatial curvature [6-7].

- The model with exponential law of expansion is free from any kind of singularity, starts expanding with some nonzero fixed volume (c_2), and it expands exponentially with the time. The model is shear free and isotropic throughout the evolution of the universe. An assumed exponential law of expansion yields constant negative value (-1) of a deceleration parameter which indicates an accelerating expansion of the universe. The EoS parameter (ω_Λ) of DE component has a fixed negative value less than -1 initially, it increases with time and approaches towards -1, but does not cross the phantom divide or cosmological constant ($\omega_\Lambda=-1$) region, and it remains present in the phantom region throughout the evolution of universe. This is found compatible with the cosmological tests based on present data, including SNe Ia data as well as CMB anisotropy and mass power spectrum. Thus our derived model represents early stage evolution as well as the present universe. It is observed that the DE energy density dominates the evolution of universe throughout the time, which may be the probable cause for accelerating expansion of the present universe. The value of the total density parameter is less than 1, and hence our derived model predicts an open universe. This is not strictly compatible with the observational results as the present day universe is very close to the flat universe. It is observed that only the weak energy condition is satisfied in this model. The sound speed ϑ_s satisfies the condition: $0<\vartheta_s<1$ throughout the evolution of the universe. Thus, the model with exponential volumetric expansion is physically stable.

In summary, we found that the models with exponential volumetric expansion are open, have accelerating expansion and physically stable; while, the models with power law volumetric expansion are open in both accelerating and decelerating cases, but physically stable and unstable in decelerating and accelerating case respectively. So, our results are in fair resemblance with the relevant observations found in [1-11, 66, 72-77] with the exception that the present-day observational results shows universe is very close to flat. Thus, the solutions obtained in this paper may be useful for exploration and understanding of various characteristics of DE models in the evolution of universe within the scope of *f*(*R*, *T*) theory of gravitation.

Conflict of Interest

Authors declare that they do not have any conflict of interest.

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Minimally interacting two fluid cosmological model in the framework of scale covariant theory

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Abstract

In this paper we have studied minimally interacting two fluid cosmological model in the framework of scale covariant theory by considering Bianchi type III metric in the presence of matter and radiation field. Here, we have assumed the exponential volumetric law to construct this model and considered the equation of state $p_m = \gamma\rho_m$ to find matter density, radiation density and parameters of matter and radiation density. Lastly, we have discussed some physical and kinematical parameters.

Keywords: Bianchi Type III; Two Fluid; Scale Covariant Theory; EoS.

1. Introduction

In recent years from various observational data it is observed that the universe is undergoing an accelerated expansion due to which there has been considerable interest in deriving the cosmological models for various theories of gravitation. The general theory of relativity provides mathematically precise and physically sound theory of gravitation for constructing the cosmological models of the universe. But, it is not sufficient to explain the current phase of the universe. So, various attempts have been made to modify the Einstein's field equations in which alternating theories and modified theories of gravitation are introduced. In recent years there has been lot of interest of researchers in constructing the cosmological models using alternative theories of gravitation such as Lyra Geometry [1], Brans Dicke Theory [2], Barber's first and second self-creation theory [3], Saez and Ballester theory [4]. The Scale covariant theory introduced by Canuto et. al. [5] which is optional to Einstein's general theory of gravitation. It provides the necessary theoretical framework in which it becomes sensible to discuss the possible variation of the gravitational constant G. A. Beesham [6] have examined the Bianchi type I cosmological model in scale covariant theory. Also, S. Ram et. al. [7] investigated spatially homogeneous Bianchi type V cosmological model in the scale covariant theory. The scale covariant theory of gravitation is derived by associating the mathematical operation of scale transformation with the physics of using different dynamical systems to measure space time distances. In Scale covariant theory Einsten's field equations are in gravitational units and physical quantities are in atomic units. D. R. K. Reddy et. al. [8] investigated Exact Bianchi type II, VIII and IX cosmological model in scale covariant theory, Reddt et. al. [9] studied five dimensional minimally interacting holographic dark energy model in Brans-Dicke theory of gravitation, Naidu et. al.[10] investigated Bianchi type-III dark energy model in a Saez-Ballester scalar-tensor theory, [11] M. Zeyauddin et. al. investigated Bianchi type VI cosmological models in Scale-Covariant theory, R. Venkateswarlu [12] investigated Cylindrically symmetric cosmic strings in scale covariant theory of gravitation, Katore et. al. [13] studied Magnetized dark energy cosmological models in scale covariant theory, Katore et. al. [14] studied Bianchi type III dark energy cosmological model in scalar tensor

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The energy density and density parameters for $\gamma = 1$ are

$$\rho_m = \infty, \rho_r = \infty, \Omega_m = \infty \text{ and } \Omega_r = \infty$$

5. Conclusion

The constructed cosmological model is singularity free also we have discussed two different cases of the universe case I for dust model when $\gamma = 0$ we observe that in this case H is constant for $t \to \infty$ and deceleration parameter indicates q = -1 indicates that the expansion of the universe is accelerated which is in good agreement with observational data of the present phase of the universe. Average mean parameter A_m is also nonzero constant which shows that the model is anisotropic. Also, the energy density for matter and radiation vanishes for t tends to infinity and corresponding density parameters are vanishes. In case II we obtain Zeldowich universe for $\gamma = 1$. For this universe also the Hubble parameter and expansion scalar are constant as t tends to infinity. The deceleration parameter q=-1 showing that the universe is accelerating. The anisotropic mean parameter A_m shows that the model is anisotropic, the energy density and density parameter of this model tends to infinity. $\frac{\sigma^2}{\theta^2} = \frac{(n+1)^2+4}{3(n+2)^3(m+k\exp(-mt))} \neq 0$ in all the cases. Thus in all the cases the model is anisotropic and accelerating which can be thought as of realistic model of the universe.

Compliance with ethical standards

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Disclosure of conflict of interest

No conflict of interest to be disclosed.

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PHYSICAL ACCEPTABILITY OF THE RENYI HOLOGRAPHIC DARK ENERGY MODEL UNDER THE HUBBLE'S CUTOFF IN $f(T, B)$ GRAVITY

N. T. Karte[1], Kaplana Pawar[2], A. K. Dabre[3]

The paper deals with the investigations of the behaviour and physical acceptability of the spatially homogeneous and isotropic FLRW space-time filled with pressureless matter and Rényi holographic dark energy under the Hubble's IR-cutoff in the framework of f (T, B) gravity. We have calculated some cosmological parameters to study the astrophysical consequences of the constructed model. We discussed their behaviour during the cosmic evolution, in particular, the statefinder and EoS parameters. It is found that the constructed Rényi holographic dark energy model travels from Phantom, ΛCDM, and lastly enters & remains in Quintessence dark energy era with the increase in redshift.

Keywords: $f(T, B)$ *gravity: Renyi holographic dark energy: Hubble's cutoff: redshift*

1. Introduction

Cosmology aims to comprehend the universe on a large scale. Over recent years, one of the greatest challenges faced by cosmologists is to explain the nature and mechanism of cosmic acceleration [1-3], which has been confirmed by some observational data such as type Ia supernova [4-7], baryon acoustic oscillations (BAO) [8], weak lensing [9] and large scale structure (LSS) [10-12] etc. One of the key issues in modern cosmology and high-energy theoretical physics has been determining the phenomenological explanation of cosmic acceleration [13]. The dark energy (DE),

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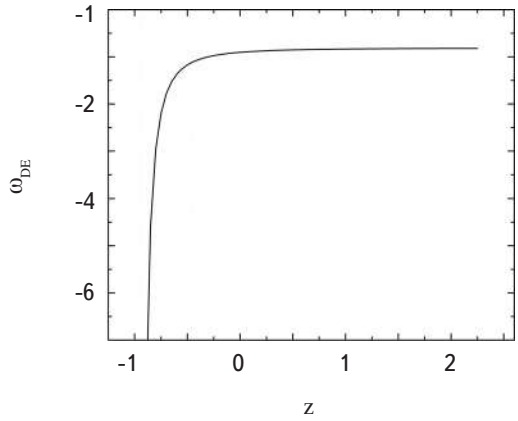

Fig.5. Variation of EoS parameter of Rényi HDE density with Hubble's *IR*-cutoff vs redshift for $d = 2$, $\mu = 0.5$, $\lambda = 0.005$, $\delta = 6$, $\alpha = 0.1$, $\beta = 0.01$, $m = 0.001$ and $n = 1$.

The graphical behaviour of the EoS parameter of Rényi HDE density with Hubble's *IR*-cutoff versus redshift for the appropriate choice of constants is shown in Fig.5. From the figure it is observed that we live in a phantom-dominated universe since the constructed model corresponds to $\omega_{DE} < -1$ for $-1 < z < -0.25$. Later on, it is also observed that $\omega_{DE} = -1$ for $z = -0.25$ which demonstrates that the universe passes through ΛCDM epoch and lastly for all $-0.25 < z$ the universe enters in Quintessence era i.e. $\omega_{DE} > -1$ and remains in the Quintessence DE region, since the EoS parameter lies in $-0.90 < \omega_{DE} < -0.82$ which is relatively close to ΛCDM region. These observations are fairly supported by [60,62,75,76]. For a late epoch the statefinder diagnostic parameters validated the observation.

6. Conclusions

In this work, authors have investigated the behaviour of the Rényi HDE model in $f(T, B)$ gravity under the Hubble's *IR*-cutoff by considering the power law form of an average scale factor obtained by Pawar et al. [71]. We have considered the spatially flat FLRW cosmological model and the $f(T, B) = \alpha B^m + \beta T^n$ gravity formalism. The physical acceptability of the model has been checked with the help of statefinder diagnostic and the EoS parameter of the model. The values of some physical and geometrical parameters and their graphical behaviour with time and redshift are obtained.

From the expressions of cosmological parameters and their graphical behaviour at $\mu = 0.5$ and $\lambda = 0.005$, it is observed that the constructed model starts to expand with a very small constant volume which increases with the increasing cosmic time. The model experiences an accelerating expansion throughout its evolution. It is observed

that the model is isotropic and shear-free. The values of diagnostic statefinder parameters ($r < 1$, $s > 0$) confirms the constructed model is in Quintessence region.

The energy density of Rényi HDE model under Hubble's *IR*-cutoff is found to be increasing with an increase in redshift throughout its evolution. Furthermore, from the observations of the EoS parameter it is been found that initially, we live in a phantom-dominated universe, later on for a short period the universe passes through ΛCDM epoch and lastly, it enters and remains in the Quintessence DE era in which the values of EoS parameter are relatively close to ΛCDM region, which is as expected from the statefinder diagnostics parameter. The results so obtained are fairly supported by [60,62,75,76]. Thus the derived Rényi HDE model of the universe under Hubble's *IR*-cutoff in $f(T, B)$ gravity is found physically acceptable.

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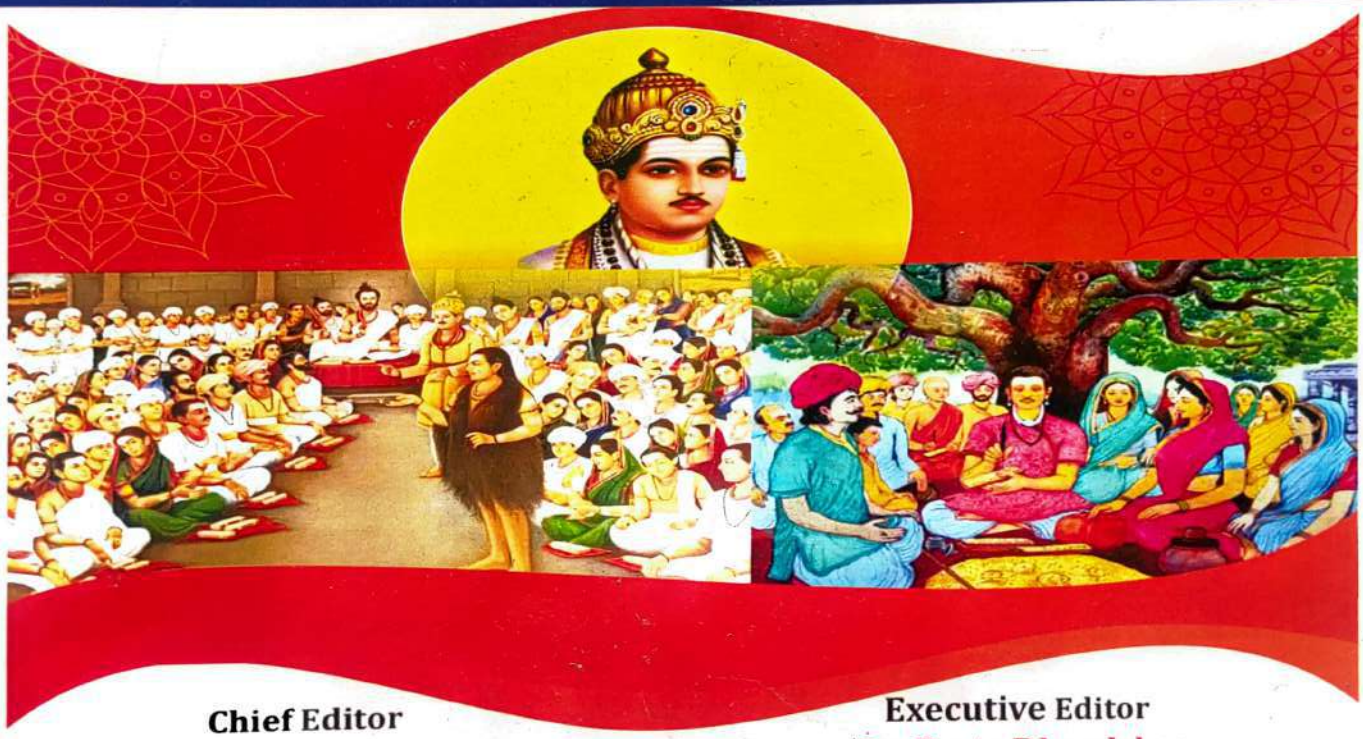

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"महात्मा बसवेश्वरांच्या विचारांची प्रासंगिकता"

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नबीरा महाविद्यालय, काटोल

प्रस्तावना :-

भारतीय संतपरंपरेत ज्यांनी आपल्या ज्ञानाने समाजातील अनिष्ट रूढी, प्रथा, परंपरा आणि कुप्रथा नष्ट केल्या त्या परंपरेतील अग्रणी संत म्हणून महात्मा बसवेश्वरांचा उल्लेख विशेषत्वाने करावा लागतो. बाराव्या शतकात इ.स.११०५ मध्ये कर्नाटकातील विजापूर जिल्ह्यातील इंगळेश्वर-बागेवाडी या गावात बसवेश्वरांचा जन्म झाला. त्यांच्या जन्म काळाविषयी मतभेद असले तरी सामान्यतः त्यांचा जन्म वैशाखातील अक्षय तृतीयेला झाल्याचे मानले जाते. बसवेश्वरांचा जन्म अग्रहार ब्राह्मण कुटुंबात झाला असे असले तरी बसवेश्वरांनी समाजातील चातुवर्ण्य व्यवस्था, कर्मकांड, अंधश्रद्धा, यज्ञयाग, पशुहत्या, अस्पृश्यता अनेक देव देवतांचे पूजन यासारख्या गोष्टी भ्रामक असून त्यापासून मुक्ततेसाठी त्यांनी लिंगायत धर्माची स्थापना केली. व धार्मिक मुक्ततेचे रक्षणकर्ता म्हणून त्यांना ओळखले जाते.[१]

भारतीय संसदीय लोकशाही व्यवस्थेचे अग्रदूत :-

पाश्चात्य तत्त्वज्ञानातून स्वीकारलेली राजकीय व्यवस्थेची चौकट आपण अभ्यासतो, परंतु भारतीय संत परंपरेतील बसवेश्वरांनी हे कार्य मध्ययुगातच सुरू केले होते. आज ज्या संसदेचा विचार आपण करतो व भारतीयशासन व्यवस्थेचा महत्त्वाचा भाग मानतो त्या संसदेच्या निर्मितीची बीजे बसवेश्वरांनी आपल्या "अनुभव मंटपाची " स्थापना करून रुजवलेली दिसून येते या अनुभव मंटपात सर्व धर्मातील लोक एकत्र येऊन सामाजिक अडचणींवर कशी मात करावीयावर चर्चा करण्याचेकार्य करीत असत. या माध्यमातून त्यांनी स्वातंत्र्य, समता, आणि बंधुतेच्या तत्त्वाचा विचार समाजात रुजविला. याच अनुभव मंटपात सर्वांनी आपले विचार निर्भीडपणे मांडले पाहिजे असे त्यांचे मत होते.यातूनच त्यांच्या विचार स्वातंत्र्याबद्दलची मतेही लक्षात येतात. सध्या स्थितीत शासनकर्ते व प्रशासकांनी या बाबींचा विचार प्रकर्षाने करायला पाहिजे तेव्हाच देशात निर्माण होणारी गरिबी, हिंसा, जातीय विद्वेष व असमानता यासारख्या सामाजिक समस्या सोडवता येईल.[२]

समाजवादी विचारसरणी :-

श्रमाला प्रतिष्ठा मिळावी यासाठी आणि गरजेनुसार संपत्तीचे वितरण व्हावे यासाठी त्यांनी 'दासोह सिद्धांत ' मांडला. या सिद्धांतात आपण कमविलेले धन स्वतःपुरतेच न वापरता समाजहितासाठी त्याचा वापर करावा असा विचार बसवेश्वरांनी मांडला.त्यांच्या या विचारामुळेच समाजात समरसता निर्माण होऊन व्यावसायिक लोकांनी समभावाने कार्य केले तसेच याच काळात अनेक उद्योगही निर्माण झाले. ग्रीक, रोमन,ज्यू, यहुदी, आणि ख्रिश्चन इत्यादी संस्कृतीचे विश्लेषण करताना पाश्चात्य विचारवंत मार्टिन लिपसेट म्हणतोकी, मानवी वंशाचा प्राचीन इतिहासश्रमाबद्दल स्पष्टपणे तुच्छता दर्शवितो. ग्रीक लोकांनी कामाला शाप मानले होते. परंतु बसवेश्वरांनी ऐहिकआणि परमार्थिक जीवनाचे साधन म्हणून कायकाला म्हणजेच श्रमाला महत्त्व दिले आहे.[३]कार्लाईल म्हणतो,**'work is worship'**तर बसवेश्वर म्हणतात,**'work is heaven'**कर्म हाच कैलास आहे. यावरून त्यांची कर्माविषयीची भूमिका दिसून येते. बसवेश्वर म्हणतात, न्याय मार्गाने संपत्ती निर्माण करावी व अतिरिक्त संपत्ती निर्माण करू नये. यावरून त्यांच्या विचारातील समाजवादी तत्त्वे विशेषत्वाने जाणवतात व आजही त्या विचारांची प्रासंगीकता दिसून येते आर्थिक असमानता टोकाची वाढलेल्या समाजात समाजवादी तत्त्वांची गरज आजही तितकीच महत्त्वाची आहे.

सामाजिक सुधारणा :-

आज सर्वच व्यक्ती स्वतःला विज्ञानयुगातील म्हणत असले तरीही रोटी-बेटी व्यवहार आणि विवाहसंस्थेला फार मोठ्या प्रमाणात धक्का लावण्याचे प्रकर्षाने टाळतात.परंतु मध्ययुगात बाराव्या शतकात बसवेश्वरांनी पुढाकार घेऊन आंतरजातीय विवाह घडवून आणला. त्यांनी मागास जातीतील संत हरळया यांचा मुलगा शीलवंत व मधुरस ब्राह्मण मंत्र्यांची मुलगी कलावती यांच्यात विवाह घडवून आणला. बाराव्या शतकातील हे कार्य खूपच क्रांतिकारी म्हणावे लागेल. त्यांनी चातुर्वर्ण्य व्यवस्था, कर्मकांड, जातीव्यवस्था, वर्णव्यवस्था व समाजातील व्यभिचार यावर भीषण प्रहार केला. व्रतवैकल्य बळीप्रथा यामध्ये सामाजिक सुधारणा घडवून आणल्या. आजही याच सामाजिक सुधारणेच्या विचारांची गरज प्रकार्षानेजाणवते यातच त्यांच्या सामाजिक सुधारणा विषयक विचारांचे महत्त्व दिसून येते.

बसवेश्वरांचे जाती निर्मूलनाचे कार्य :-

"जी जातच नाही ती जात" अशी आपल्या भारतातील जाती व्यवस्था आहे. याप्रकारे महात्मा बसवेश्वरांनी जातीप्रथेबद्दलची चिंता व्यक्त केली आहे. त्यांनी जातीप्रथा निर्मूलन करण्यासाठी संपूर्ण आयुष्य खर्ची घातले. जातीय भावना नष्ट करण्यासाठी त्यांनी इष्टलिंगदीक्षा देणे सुरू केले. त्यांच्या मते, लिंग धारण केल्यानंतर पूर्वाश्रमिची जात नष्ट होते. मग त्यांच्यात रोटी-बेटी व्यवहार व्हावयास काही हरकत नाही. अशा पद्धतीने जातीभेद निर्मूलन आंदोलन त्यांनी सुरू केले.[४] महात्मा बसवेश्वरांनी सर्वसामाजिक सुधारणा नुसत्या बोलून दाखविल्या नाही तर त्याला कार्याची जोडसुद्धा त्यांनी दिली. म्हणजेच

बसवेश्वर हे खऱ्या अर्थाने कर्ते सुधारक होते. ते मंत्रिपदावर असताना अस्पृश्यांच्या घरी जेवण घेत असत. त्यांचा खाजगी सचिव अपन्ना हा पूर्वाश्रमीचा न्हावी होता. राजाच्या पागेतील सेवक सोड्डळ बाचरस यांच्याशी त्यांची मैत्री होती. यासारख्या अनेक उदाहरणातून त्यांनी जातीप्रथेचे खंडन केलेले दिसून येते. जातीप्रथेबद्दल त्यांच्या ओवीतून त्यांनी विचार मांडले आहेत. ते खालीलप्रमाणे,

"चांभार उत्तम तो दुर्वास
कश्यप लोहार, कौंडण्य तो न्हावी
तिन्ही लोकी बरवी प्रसिद्धीती
जातीचे श्रेष्ठत्व हाची वेडाचार"५

यातून त्यांचे विचार किती पुरोगामी स्वरूपाचे होते याचा प्रत्यय येतो.

स्त्री- पुरुष समानतेचा विचार :-

बसवेश्वराच्या काळात स्त्रियांची स्थिती अत्यंत हलाखीती असलेली दिसून येते.स्त्रियांची गणना शूद्रांच्या बरोबरीने केली जात होती. मुलीचा जन्म झाला तर सुतक पाळल्याजात. अशा प्रकारच्या पक्षपाती वागणुकीमुळे स्त्रिया स्वतःला दुर्बल, अबला समजत असे. तसेच शिक्षणापासून वंचित असल्याने ती अंधश्रद्धेच्याहीआहारी जात असे. बालविवाह प्रथेमुळे तिचे बालपणसुद्धा कोमेजून जात असे तसेच सतीप्रथाही सुरू होती. आर्य संस्कृतीने प्रभावित झालेल्या वैदिक धर्मांनी उच्चवर्णीय स्त्रियांनाही धर्म संस्कार मुक्तीची द्वारे बंद केली. एवढेच नव्हे तर तिला जमीन आणि संपत्ती मध्ये न्याय्य वाटा न मिळाल्याने गुलाम बनविले व दास्यत्व पत्करावे लागले.६ या अशा परिस्थितीत महात्मा बसवेश्वरांनी स्त्रीमुक्तीसाठी अनेक प्रयत्न केलेले दिसून येते. यामध्ये स्त्रियांना त्या काळातील अनुभव मंटपात सहभागी करून घेतले. त्यातील काही स्त्रिया उत्तम कवयित्री झाल्या. अनेक प्रकारच्या काव्यसंपदा त्यांनी निर्माण केल्या.'कायकवे कैलास' हा मंत्र त्यांनी दिला. याचा अर्थ श्रम हेच सर्वस्व, श्रम हाच कैलास होय. यातून त्यांनी श्रमाचे महत्त्व प्रतिपादन केले आहे. ते म्हणतात की, प्रत्येकाने श्रम करूनच पोट भरले पाहिजे. त्यांच्या अनुभव मंटपातील स्त्रियांनाही उदरनिर्वाहासाठी कोणता तरी व्यवसाय करणे अनिवार्य होते. याप्रकारे बसवेश्वरांनी कामाला महत्त्व देऊन कृतीशील समाज निर्मितीचा मार्ग प्रशस्त केला.७

निष्कर्ष :-

जगातील प्रत्येकच धर्माने मानवतेची शिकवण दिलेली आहे. परंतु तरीसुद्धा अनेक दैवत असल्यामुळे हिंदू धर्मातील लोकांचा वैचारिक गोंधळ मोठ्या प्रमाणात दिसून येतो. त्याला पर्याय म्हणून एकेश्वरवादाचा पुरस्कार बसवेश्वर यांनी केलेला आहे. बसवेश्वर हे धर्मसुधारक नसून नवी समाजरचना निर्माण करण्यासाठी धर्माचा माध्यम म्हणून वापर करणारे सुधारक होते.८ त्यांच्या कार्यातून नवसमाजनिर्मितीची व सर्व सामान्यांचा उद्धार कसा करता येईल याची प्रचीती येते. यातून बसवेश्वरांच्यालेखी तथाकथित धार्मिक कर्मकांड आणि त्यातून होणारे शोषण याला विरोध होता. असेच दिसते त्यांनी निर्माण केलेला लिंगायत संप्रदाय हा जातीभेद निर्मूलन करणारा व समतावादी आणि सर्वसमावेशक संप्रदाय होता. परंतु नंतरच्या काळात या संप्रदायातील लोकांना ते टिकून ठेवण्यात यश आले नाही. तरीसुद्धा बसवेश्वरांचे विचार हे कालातीत असलेले दिसून येतात. त्यामुळेच त्यांच्या विचारांची प्रासंगिकता आजही दिसून येते.

संदर्भ :-

१ मोगलेवार उल्हास,'जगतज्योती महात्मा बसवेश्वर आणि त्यांचे तत्त्वज्ञान' पृष्ठ क्र.१४, प्रथम आवृत्ती,२०२३
२ कित्ता, पृष्ठ क्र.२९.
३ कित्ता, पृष्ठ क्र.८७.
४ कित्ता,पृष्ठ क्र.१०७.
५ मोगलेवारसुधाकर,'बसवन्ना' पृष्ठ क्र.६२ प्रथम आवृत्ती २००५.
६ मोगलेवार उल्हास,'वीरशैव धर्म पंथातील स्त्री साहित्य', पृष्ठ क्र.५३,प्रथम आवृत्ती २०२१
७ मोगलेवरउल्हास,'जगतज्योती महात्मा बसवेश्वर आणि त्यांचे तत्त्वज्ञान' पृष्ठ क्र.५६, प्रथम आवृत्ती२०२३
८ मोगलेवारसुधाकर,'बसवन्ना', पृष्ठ क्र.१७६,प्रथम आवृत्ती २००५

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या संस्थेचे त्रैमासिक

।। संशोधक।।

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* प्रकाशक *

श्री. संजय मुंदडा

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विविध प्रकारच्या आक्रमकतेचा आंतर विद्यापीठ स्तरावर खेळणाऱ्या व्हॉलीबॉल खेळाडूंच्या क्रीडा प्रदर्शनावरील प्रभाव - एक चिकित्सक अभ्यास

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१.० प्रस्तावना :

भारतात व्हॉलीबॉल हा खेळ अत्यंत लोकप्रिय व सर्वदूर (शहरी व ग्रामीण भागात) खेळण्यात येणारा क्रीडाप्रकार आहे. किंबहुना हौशी व व्यावसायिक अशा दोन्ही प्रकारांमध्ये या खेळाची लोकप्रियता फार मोठी आहे. या कारणाने व्हॉलीबॉल खेळाशी संबंधित सखोल संशोधन करण्याला वावदेखील खूप आहे. आज व्हॉलीबॉल खेळाला फार महत्त्व आलेले आहे. व्हॉलीबॉल खेळामुळे सांघिक कार्याचा अनुभव, संघाबद्दल किंवा आपल्या समूहाबद्दल अभिमान, मी सर्वांचा सर्वजण माझे, खिलाडूवृत्ती आणि नेतृत्त्व गुणविकास यांना वाव मिळतो. तसेच जागरुकता, चापल्य, श्रेष्ठत्व, विरवृत्ती, हिम्मत इत्यादी वैयक्तिक गुणांचा विकास याच खेळाच्या माध्यमातून अगदी सहजपणे होण्यास मदत होते. खेळामुळे स्नायूसंवर्धन सुयोग्य हालचालीतील समन्वयाबरोबर शारीरिक सृदृढतेची वाढ होते. खेळामुळे शारीरिक, मानसिक, भावनिक, क्षमतांचा विकास होतो हे आता सर्वमान्य झालेले आहे. व्हॉलीबॉल खेळ ही उत्स्फूर्त, आनंददायक, नवनिर्माणकारी व मनुष्याचा सर्वोत्तम विकास करणारी अशी स्वाभाविक कृती आहे.

खेळाचे स्वरूप हे नेहमी अनिश्चित असते. म्हणून कोणत्याही व्यक्तिला सतत एकाच प्रकारची संधी मिळत नाही किंवा दिली जात नाही. खेळाडू जेंव्हा कठिण परिस्थितीतही आपल्या प्रदर्शनाला सौंदर्यपूर्ण बनवितो त्याचवेळी तो आपली ओळख निर्माण करतो. असाच खेळाडू आपले प्रयास व प्रदर्शनात अधिक सफल होतो आणि अशाच खेळाडूवर अधिक भरवसा ठेवला जातो हे त्याच्या उत्तमतेचे लक्षणच होय. व्हॉलीबॉल सारख्या खेळात विभिन्न गुण व तांत्रिक ज्ञान असणाऱ्या खेळाडूंचाच संघात समावेश होतो असेच खेळाडू काही वैशिष्ट्यांमुळे खेळ प्रतिभेच्या रूपात ओळखले जातात. यांतील अनेक प्रतिभासंपन्न खेळाडूंनी केवळ आपल्या राष्ट्रालाच गौरवान्वित केले नसून त्यांनी जगातील लोकांच्या मनात आपले स्थान पक्के केले आहे. त्यांचे कौशल्य, तंत्राचे ज्ञान, त्यांचा संयम, आक्रमकता पाहून जग विस्मयचकित झाले आहे. व्हॉलीबॉल खेळाडूंच्या क्रीडा कौशल्याला प्रभावित करणारे घटक बरेच आहेत, त्यापैकी महत्वाचे घटक म्हणजे जैविक घटक ज्यात शरीरयष्टी, अंतस्त्राव ग्रंथी, विविध क्षमता बुद्धिमत्ता व कार्यशक्ती, व मानसिक योग्यतेचा प्रभाव यांचा समावेश होतो तर बाह्य घटक ज्यामध्ये कुटुंब, शाळा, कुटुंबाची आर्थिक स्थिती, शेजार व मित्र, व भौतिक वातावरण यांचा प्रभाव होतो. या सर्व बाबींचा विचार करून प्रस्तुत संशोधनकार्यात विविध प्रकारच्या आक्रमकतेचा आंतर विद्यापीठ स्तरावर खेळणाऱ्या व्हॉलीबॉल खेळाडूंच्या क्रीडा प्रदर्शनावर काय प्रभाव होतो याचा चिकित्सक अभ्यास करण्यात आला आहे.

२.० संशोधन पद्धती :

कोणतेही कार्य करतांना निश्चित असे उद्दिष्ट ठरवून त्या उद्दिष्टापर्यंत पोहचण्याकरिता निश्चित मार्गक्रम व दिशा, उद्देश ठरविणे आवश्यक आहे. म्हणून संशोधनाची कार्यपद्धती समजावून घेण्यात आली व प्रस्तुत संशोधनासाठी मुख्यतः सर्वेक्षण पद्धतीचा अवलंब करण्यात आला. प्रस्तुत संशोधन करण्यासाठी संशोधन क्षेत्र म्हणुन महाराष्ट्र राज्याची निवड करण्यात आली. प्रस्तुत अध्ययन हे वस्तुनिष्ठ असावे या संदर्भात काळजी घेतली आहे. प्रस्तूत अध्ययनात महाराष्ट्रातील सर्व विद्यापीठांचा अध्ययन विश्व म्हणून विचार करण्यात आला. संशोधन करण्यासाठी संशोधन क्षेत्र म्हणून महाराष्ट्र राज्यातील निवडक विद्यापीठाचा विचार करण्यात आला असुन या विद्यापीठातील आंतर विद्यापीठ स्तरावर खेळणाऱ्या सर्व व्हॉलीबॉल खेळाडूंचा जनसंख्या म्हणुन विचार करण्यात आला.

गैर संभाव्यता पद्धतीतील सहेतुक किंवा उद्देश्यपूर्ण पद्धतीचा (Purposive/Objective Sampling) अवलंब करून नमुना निवडण्यात आला. प्रस्तुत संशोधनकार्यात तथ्य संकलनाकरीता महाराष्ट्रातील आंतर विद्यापीठ स्तरावर खेळणाऱ्या एकुण ११५ व्हॉलीबॉल खेळाडूंची नमूना म्हणून निवड करण्यात आली होती. तथ्यांचे योग्य संकलन व विश्लेषण यासाठी वर्णनात्मक संशोधन आराखडयाची निवड करण्यात आली होती. या संशोधनकार्यात माहिती संकलित करण्याकरिता प्रमाणीकृत पद्धतीचा वापर करण्यात आला. व्हॉलीबॉल खेळाडूंच्या आक्रमकतेचा त्यांच्या क्रीडा प्रदर्शपसवरील प्रभावाचे मापन करण्याकरीता डॉ. एम. के. सुल्तानीया यांची ॲग्रेशन इन्व्हेंटरी (Aggression Inventory) व स्वनिर्मित लघु प्रश्नावलीचा वापर करण्यात आला. तथ्यांचे विश्लेषण करण्याकरीता सांख्यकीय तंत्रातील विविध चाचणींचा (वारंवारीता व बहुलक) उपयोग करण्यात आला व त्या आधारावर निष्कर्ष काढण्यात आले. अभ्यासातील विविध घटक, पडताळण्याकरीता व संशोधनाचा आराखडा लक्षात घेता व्हॉलीबॉल खेळाडूंच्या कौशल्याला प्रभावित करणाऱ्या मानसिक घटकांचा अभ्यास करण्यासाठी काई वर्ग मूल्य सांख्यिकीय चाचणीचा वापर करण्यात आला. संभाव्यता पातळी ०.०५ निर्धारीत करण्यात आली. वरील सर्व प्रक्रियानंतर प्राप्त झालेले निष्कर्ष जास्तीत जास्त वस्तुनिष्ठ कसे राहतील याची दखल घेण्यात आली.

३.० सांख्यिकीय विश्लेषण व संशोधनाचे परिणाम

३.१ शाब्दिक किंवा शारीरिक आक्रमकतेचा क्रीडा प्रदर्शनावरील प्रभाव

सारणी क्र १: शाब्दिक किंवा शारीरिक आक्रमकतेचा क्रीडा प्रदर्शनावरील प्रभाव दर्शविणारी सारणी

क्रीडा प्रदर्शनावरील प्रभाव	संख्या	टक्केवारी
सकारात्मक	६९	६०.०
काहीही-नाही	३४	२९.६
नकारात्मक	१२	१०.४
एकूण	११५	१००.०

काई-वर्गमूल्यः ४३.११७; स्वातंत्र्यांशः२; तालिका मूल्यः५.९९; p मूल्यः ०.०५

प्रस्तुत संशोधनकार्यात शाब्दिक किंवा शारीरिक आक्रमकतेचा व्हॉलीबॉल खेळाडूंच्या क्रीडा प्रदर्शनावर होणारा प्रभाव याबाबत प्राप्त परिणाम दर्शविण्यात आले आहे. सारणीत दर्शविलेल्या माहितीनुसार ६०.० टक्के व्हॉलीबॉल खेळाडूंच्या क्रीडा प्रदर्शनावर शाब्दिक किंवा शारीरिक आक्रमकतेचा सकारात्मक प्रभाव झाला असून २९.६ टक्के व्हॉलीबॉल खेळाडूंच्या क्रीडा प्रदर्शनावर याचा काहीही प्रभाव झाला नसल्याचे आढळले. त्याचप्रमाणे १०.४ टक्के व्हॉलीबॉल खेळाडूंच्या क्रीडा प्रदर्शनावर शाब्दिक किंवा शारीरिक आक्रमकतेचा नकारात्मक प्रभाव झाला असल्याचे दिसुन आले.

३.२ अप्रत्यक्ष आक्रमकतेचा क्रीडा प्रदर्शनावरील प्रभाव

सारणी क्र २: अप्रत्यक्ष आक्रमकतेचा क्रीडा प्रदर्शनावरील प्रभाव दर्शविणारी सारणी

क्रीडा प्रदर्शनावरील प्रभाव	संख्या	टक्केवारी
सकारात्मक	७२	६२.६
काहीही-नाही	३५	३०.४
नकारात्मक	८	७.०
एकूण	११५	१००.०

काई-वर्गमूल्यः ५३.८६६; स्वातंत्र्यांशः२; तालिका मूल्यः५.९९; p मूल्यः ०.०५

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प्रस्तुत संशोधनकार्यात अप्रत्यक्ष आक्रमकतेचा व्हॉलीबॉल खेळाडूंच्या क्रीडा प्रदर्शनावर होणारा प्रभाव याबाबत प्राप्त परिणाम दर्शविण्यात आले आहे. सारणीत दर्शविलेल्या माहितीनुसार ६२.६ टक्के व्हॉलीबॉल खेळाडूंच्या क्रीडा प्रदर्शनावर अप्रत्यक्ष आक्रमकतेचा सकारात्मक प्रभाव झाला असून ३०.४ टक्के व्हॉलीबॉल खेळाडूंच्या क्रीडा प्रदर्शनावर याचा काहीही प्रभाव झाला नसल्याचे आढळले. त्याचप्रमाणे ७.० टक्के व्हॉलीबॉल खेळाडूंच्या क्रीडा प्रदर्शनावर अप्रत्यक्ष आक्रमकतेचा नकारात्मक प्रभाव झाला असल्याचे दिसुन आले.

३.३ क्षोभ प्रवणता प्रकारच्या आक्रमकतेचा क्रीडा प्रदर्शनावरील प्रभाव

सारणी क्र ३: क्षोभ प्रवणता प्रकारच्या आक्रमकतेचा क्रीडा प्रदर्शनावरील प्रभाव दर्शविणारी सारणी

क्रीडा प्रदर्शनावरील प्रभाव	संख्या	टक्केवारी
सकारात्मक	१४	१२.२
काहीही-नाही	५९	५१.३
नकारात्मक	४२	३६.५
एकूण	११५	१००.०

काई-वर्गमूल्यः २६.९४१; स्वातंत्र्यांशः२; तालिका मूल्यः५.९९; p मूल्यः ०.०५

प्रस्तुत संशोधनकार्यात क्षोभ प्रवणता प्रकारच्या आक्रमकतेचा व्हॉलीबॉल खेळाडूंच्या क्रीडा प्रदर्शनावर होणारा प्रभाव याबाबत प्राप्त परिणाम दर्शविण्यात आले आहे. सारणीत दर्शविलेल्या माहितीनुसार १२.२ टक्के व्हॉलीबॉल खेळाडूंच्या क्रीडा प्रदर्शनावर क्षोभ प्रवणता प्रकारच्या आक्रमकतेचा सकारात्मक प्रभाव झाला असून ५१.३ टक्के व्हॉलीबॉल खेळाडूंच्या क्रीडा प्रदर्शनावर याचा काहीही प्रभाव झाला नसल्याचे आढळले. त्याचप्रमाणे ३६.५ टक्के व्हॉलीबॉल खेळाडूंच्या क्रीडा प्रदर्शनावर क्षोभ प्रवणता प्रकारच्या आक्रमकतेचा नकारात्मक प्रभाव झाला असल्याचे आढळले.

३.४ नकारात्मकतेचा क्रीडा प्रदर्शनावरील प्रभाव :

सारणी क्र ४: नकारात्मकतेचा क्रीडा प्रदर्शनावरील प्रभाव दर्शविणारी सारणी

क्रीडा प्रदर्शनावरील प्रभाव	संख्या	टक्केवारी
सकारात्मक	६	५.२
काहीही-नाही	४६	४०.०
नकारात्मक	६३	५४.८
एकूण	११५	१००.०

काई-वर्गमूल्यः ४४.६८२; स्वातंत्र्यांशः२; तालिका मूल्यः५.९९; मूल्यः ०.०५

प्रस्तुत संशोधनकार्यात नकारात्मकतेचा व्हॉलीबॉल खेळाडूंच्या क्रीडा प्रदर्शनावर होणारा प्रभाव याबाबत प्राप्त परिणाम दर्शविण्यात आले आहे. सारणीत दर्शविलेल्या माहितीनुसार ५.२ टक्के व्हॉलीबॉल खेळाडूंच्या क्रीडा प्रदर्शनावर नकारात्मकतेचा सकारात्मक प्रभाव झाला असून ४०.० टक्के व्हॉलीबॉल खेळाडूंच्या क्रीडा प्रदर्शनावर याचा काहीही प्रभाव झाला नसल्याचे आढळले. त्याचप्रमाणे ५४.८ टक्के व्हॉलीबॉल खेळाडूंच्या क्रीडा प्रदर्शनावर नकारात्मकतेचा प्रभाव नकारात्मक झाला असल्याचे आढळले.

३.५ संताप प्रकारच्या आक्रमकतेचा क्रीडा प्रदर्शनावरील प्रभाव

सारणी क्र ५: संताप प्रकारच्या आक्रमकतेचा क्रीडा प्रदर्शनावरील प्रभाव दर्शविणारी सारणी

क्रीडा प्रदर्शनावरील प्रभाव	संख्या	टक्केवारी
सकारात्मक	१३	११.३
काहीही-नाही	४७	४०.९
नकारात्मक	५५	४७.८
एकूण	११५	१००.०

काई-वर्गमूल्यः २५.९५; स्वातंत्र्यांशः२; तालिका मूल्यः५.९९; मिूल्यः ०.०५

प्रस्तुत संशोधनकार्यात संताप प्रकारच्या आक्रमकतेचा व्हॉलीबॉल खेळाडूंच्या क्रीडा प्रदर्शनावर होणारा प्रभाव याबाबत प्राप्त परिणाम दर्शविण्यात आले आहे. सारणीत दर्शविलेल्या माहितीनुसार ११.३ टक्के व्हॉलीबॉल खेळाडूंच्या क्रीडा प्रदर्शनावर संताप प्रकारच्या आक्रमकतेचा सकारात्मक प्रभाव झाला असून ४०.९ टक्के व्हॉलीबॉल खेळाडूंच्या क्रीडा प्रदर्शनावर याचा काहीही प्रभाव झाला नसल्याचे आढळले. त्याचप्रमाणे ४७.८ टक्के व्हॉलीबॉल खेळाडूंच्या क्रीडा प्रदर्शनावर संताप प्रकारच्या आक्रमकतेचा नकारात्मक प्रभाव झाला असल्याचे आढळले.

३.६ अपराधबोध प्रकारच्या आक्रमकतेचा क्रीडा प्रदर्शनावरील प्रभाव

सारणी क्र ६: अपराधबोध प्रकारच्या आक्रमकतेचा क्रीडा प्रदर्शनावरील प्रभाव दर्शविणारी सारणी

क्रीडा प्रदर्शनावरील प्रभाव	संख्या	टक्केवारी
सकारात्मक	१९	१६.५
काहीही-नाही	३५	३०.४
नकारात्मक	६१	५३.०
एकूण	११५	१००.०

काई-वर्गमूल्यः २३.४४६; स्वातंत्र्यांशः२; तालिका मूल्यः५.९९; मिूल्यः ०.०५

प्रस्तुत संशोधनकार्यात अपराधबोध प्रकारच्या आक्रमकतेचा व्हॉलीबॉल खेळाडूंच्या क्रीडा प्रदर्शनावर होणारा प्रभाव याबाबत प्राप्त परिणाम दर्शविण्यात आले आहे. सारणीत दर्शविलेल्या माहितीनुसार १६.५ टक्के व्हॉलीबॉल खेळाडूंच्या क्रीडा प्रदर्शनावर अपराधबोध प्रकारच्या आक्रमकतेचा सकारात्मक प्रभाव झाला असून ३०.४ टक्के व्हॉलीबॉल खेळाडूंच्या क्रीडा प्रदर्शनावर याचा काहीही प्रभाव झाला नसल्याचे आढळले. त्याचप्रमाणे ५३.० टक्के व्हॉलीबॉल खेळाडूंच्या क्रीडा प्रदर्शनावर अपराधबोध प्रकारच्या आक्रमकतेचा नकारात्मक प्रभाव झाला असल्याचे आढळले.

४.० निष्कर्ष :

४.१ शाब्दिक किंवा शारीरिक आक्रमकतेचा क्रीडा प्रदर्शनावरील प्रभाव

प्राप्त परिणामांवरून असे निदर्शनास येते की, संशोधन क्षेत्रातील बहुतांश व्हॉलीबॉल खेळाडूंच्या क्रीडा प्रदर्शनावर शाब्दिक किंवा शारीरिक आक्रमकतेचा सकारात्मक प्रभाव झाला असल्याचे निदर्शनास आले.

४.२ अप्रत्यक्ष आक्रमकतेचा क्रीडा प्रदर्शनावरील प्रभाव :

प्राप्त परिणामांवरून असे निदर्शनास येते की, संशोधन क्षेत्रातील बहुतांश व्हॉलीबॉल खेळाडूंच्या क्रीडा प्रदर्शनावर अप्रत्यक्ष आक्रमकतेचा सकारात्मक प्रभाव झाला असल्याचे निदर्शनास आले.

४.३ क्षोभ प्रवणता प्रकारच्या आक्रमकतेचा क्रीडा प्रदर्शनावरील प्रभाव

प्राप्त परिणामांवरून असे निदर्शनास येते की, संशोधन क्षेत्रातील बहुतांश व्हॉलीबॉल खेळाडूंच्या क्रीडा प्रदर्शनावर क्षोभ प्रवणता प्रकारच्या आक्रमकतेचा काहीही प्रभाव झाला नसल्याचे निदर्शनास आले.

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४.४ नकारात्मकतेचा क्रीडा प्रदर्शनावरील प्रभाव :

प्राप्त परिणामांवरून असे निदर्शनास येते की, संशोधन क्षेत्रातील बहुतांश व्हॉलीबॉल खेळाडूंच्या क्रीडा प्रदर्शनावर नकारात्मकतेचा प्रभाव नकारात्मक झाला असल्याचे निदर्शनास आले.

४.५ संताप प्रकारच्या आक्रमकतेचा क्रीडा प्रदर्शनावरील प्रभाव:

प्राप्त परिणामांवरून असे निदर्शनास येते की, संशोधन क्षेत्रातील बहुतांश व्हॉलीबॉल खेळाडूंच्या क्रीडा प्रदर्शनावर संताप प्रकारच्या आक्रमकतेचा नकारात्मक प्रभाव झाला असल्याचे निदर्शनास आले.

४.६ अपराधबोध प्रकारच्या आक्रमकतेचा क्रीडा प्रदर्शनावरील प्रभाव :

प्राप्त परिणामांवरून असे निदर्शनास येते की, संशोधन क्षेत्रातील बहुतांश व्हॉलीबॉल खेळाडूंच्या क्रीडा प्रदर्शनावर अपराधबोध प्रकारच्या आक्रमकतेचा नकारात्मक प्रभाव झाला असल्याचे निदर्शनास आले.

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Relevance of Physical Education in NEP 2020

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Abstract: *It is being expressed by many educationists that India can become a world superpower based on the new education system. Prime Minister has brought out the National Punishment Policy,* 2020*, which has been prepared in consultation with everyone. With its introduction, a wide discussion of education has started in the country. According to Gandhi, education is the holistic and excellent development of body, mind and soul of the child and man. Swami Vivekananda also said that education is to express the innate perfection of man. Amid all these discussions, there was a need to come up with a new National Education Policy to address the shortcomings of the* 1986 *Education Policy. Students cannot develop fully by studying the relevant subject only. Students need to have knowledge of Arts, Physical Education, Vocational Education and Competitive Examinations for complete development. Emphasis is also placed on recruitment of prospective teachers in all states and Union Territories for this purpose. There is discussion of quality promotion in teacher recruitment as per requirement. The primary goal is to radically change the school's working environment and culture, so that both teachers and students can develop to their maximum potential. In accordance with this, the present research paper reflects on the new national education policy and the condition and requirement of physical education.*

Keywords: New National Education Policy,(2020) Physical Education, Sports, Health

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I. INTRODUCTION

First of all it is necessary to consider what 'education' is. The literal meaning of education is the process of learning and teaching, but if we look at its wider meaning, education is a continuous social process in any society which has some purpose and through which human inner powers are developed and behavior is improved. Through education, a person is made a competent citizen by increasing his knowledge and skills. It is noteworthy that with the announcement of the New Education Policy 2020, the Ministry of Manpower has been renamed as the Ministry of Education. This policy is expected to bring about transformational reforms in school and higher education in the country. Under its goals, it aims to achieve 100% schooling by 2030 as well as universalization of education from pre-school to secondary level. Currently the National Education Policy 2020 also emphasizes the importance of teachers for quality education. Which states that in order to identify and develop the specific potential of each student, teachers and parent's needs to be sensitive to their potential So that the academic and other abilities of the students can be fully developed? Entering the experimental realm of higher education can open doors of immense possibilities that can liberate individuals and communities from the vicious circle of adversity Therefore, providing high quality educational opportunities to all should be given top priority. Teachers truly shape the future of children and both students and teachers together build our prosperous nation. Meritorious students and qualified teachers have always been outstanding citizens of the society due to their full contribution. According to ancient civilizations, good teachers work to impart prescribed knowledge, skills and moral values to students. The National Education Policy 2020 has given special attention to the quality of teacher education, recruitment, placement, service conditions and status of teachers' rights. Only by paying attention to the above facts will the quality of education and enthusiasm of teachers reach the desired level. A sense of high standard and respect for teachers as per the ancient civilization will also be revived in the students. There is a need for motivation and empowerment among teachers and students to make our nation a better nation. Lack of good educational institutions in rural areas has been going on for centuries, leaving the young generation behind in learning and teaching. Special attention has been given to this in the National Education Policy and B.Ed. A provision has been

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made for allotment of scholarships on the basis of merit to the students studying in the course. Four years B.Ed. This includes the provision of guaranteed employment in local areas to students (especially girls) after successful graduation, so that these students can serve as model and higher education teachers in the local area. Excellent teachers will be encouraged to work in rural areas and especially in teacher shortage areas. A major incentive for teaching students in rural areas is the provision of local accommodation in and around the school. It is the responsibility of the teacher to maintain the relationship in the community, so that the student can get an ideal and educational environment which is not possible due to frequent change of teachers. Therefore, it has been said by the government that the transfer of the teacher should be done only when it is urgent (at least). Emphasis has been laid on further development of Teacher Eligibility Test (TET) to select teachers through special competitive examinations. Teacher recruitment is an integral part of this process, for which all the interviews are conducted in local language to accurately assess the performance of any individual. By doing this, special emphasis is placed on the fact that the teachers will be able to communicate with the students in the vernacular.

Objectives of Physical Education:

- The overall development of the students is the main objective of this education. Its main objective is to develop the students mentally and intellectually.
- It is a means of preparing students as contributors to society. By which he can adapt to the society in future.
- Through this education, the art and quality of being healthy is explained to the students, as a healthy mind is created in a healthy body.
- Due to this education, emotional development of the students takes place. It works to control their emotional aspects.

This education is given to develop the muscles of the students. With the help of which they remain active continuously.

Physical Education in the context of School Education:

In the early 19th century, physical education became a subject in schools (in the form of German and Swedish gymnastics). Their influence on human health became more and more recognized. In the early 20th century, the main learning goals for students were personal hygiene and exercise for physical health. Educationist Thomas Wood described a sole emphasis on health as extremely limiting and detrimental to the development of the whole child. The educational community then adopted Wood's holistic approach to physical education and incorporated basic movement and physical skills for activities and sports into the core academic curriculum. Over the past 15 years, physical education has re-evolved as a link between physical activity and its outcomes (eg, physics and health) and the science of healthy living and the skills needed to enable children to lead active lifestyles. Sallis and McKenzie (1991) published a seminal article stating that physical education is a "holistic but physically active approach, including teaching social, cognitive, and physical abilities and accomplishing other goals through movement." Sallis and McKenzie (1991) posit two major goals of physical education: 1) preparing children and youth for physical exercise and 2) physical exercise during physical education. These goals reflect the lifelong benefits of improved physical education that enable children and youth to be active adults throughout their lives.

Education system& Criteria:

To follow an effective and transparent process in recruitment and promotion of teachers based on periodic performance appraisal.

National Professional Standards for Teachers (NPST) will be developed by National Council for Teacher Education by 2022.

A 'National Curriculum Framework for Teacher Education (NCFTE)' will be developed by the National Council for Teacher Education in consultation with NCERT.

By 2030, the minimum degree qualification for teaching will be a 4-year integrated B.Ed. Graduation will be mandatory.

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Provisions relating to Higher Education:

Under NEP-2020, it is targeted to increase the 'Gross Enrollment Ratio' in higher educational institutions from 26.3% (year 2018) to 50%, with 3.5crore new students to be created in higher educational institutions.

Under NEP-2020, a multiple entry and exit system has been adopted in undergraduate courses, under which students in 3 or 4 year undergraduate programs can exit the course at multiple stages and will be awarded the relevant degree or certificate (certificate). After 1 year, Advanced Diploma after 2 years, Bachelor Degree after 3 years and Bachelor Degree with Research after 4 years).

An 'Educational Bank of Credit' will be provided to digitally save the marks or credit obtained from various higher educational institutions, so that students can be awarded degrees based on their performance in various institutions.

Under the new educational policy M.Phil was cancelled.

Physical Education under New Education Policy:

Along with education of children, the government is also taking big steps for their sports and physical development. In fact, the Ministry of Human Resource Development, which is involved in formulating the National Education Policy, has been receiving several suggestions to make inclusion of physical education in the curriculum mandatory. The ministry has also started discussions in this regard. At present, physical education is included in the curriculum on an optional basis, but students do not take it seriously due to the burden of core subjects. Therefore, it is being considered for its compulsory inclusion in the curriculum. After internal consideration, the Ministry will also consult the States in this regard. Apart from this, the Ministry has taken the initiative to include NCC as a major subject. Officials in the ministry say that NCC and physical education are becoming irrelevant subjects in schools. Even in the National Education Policy 2020, physical education is described as essential for the holistic development of a child and the use of sports as a pedagogy in the learning process is advised. Keeping this in mind, the Delhi Board of School Education has drawn up a well-planned curriculum of physical education that will be run from class 1 to 12, under which not only selected school children will participate, but all students will participate and it will be compulsory. Under this curriculum every child will undergo a fitness test and an expert group of physical educators can evaluate the fitness test related to the health of the children and modify the physical education curriculum as needed. In such a scenario, this effort will definitely take the physical education and physical education to greater heights by giving them a new identity.

Holistic Education with Sports Integration:

Multidisciplinary and holistic education is part of the core principles of NEP. Along with subjects like science and social sciences, the curriculum should include sports and fitness that provide a holistic, useful and satisfying learning experience. At the school level, the National Education Policy, 2020 proposes the integration of sports or the use of physical activities in educational practices to enhance students' cognitive abilities while promoting their physical and mental health. Sports-integrated education will help students achieve the fitness level envisioned in the Fit India movement and help them adopt fitness as a lifelong approach. It will develop in them skills like cooperation, self-initiative, teamwork and responsibility. The National Education Policy, 2020 also proposes other ways to increase exposure of school students to sports and other activities. It offers greater flexibility and choice of subjects, allowing students to choose physical education as part of the curriculum. The policy proposes 'bagless' days for students to participate in local businesses and other activities such as sports and gardening. The National Education Policy, 2020 encourages creation of clubs including sports, yoga and health and wellness at schools, school campuses, and districts and beyond. Higher education institutions will have departments for subjects like sports, art and music to provide a multidisciplinary and inspiring environment. Credit will be awarded for such subjects in graduate programs. For adult education, the policy proposes the development of an educational curriculum framework. Along with basic literacy, numeracy and education, the framework will cover life skills (health care and awareness, child care and education and family welfare).

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II. CONCLUSION

We can understand the importance of physical education in a way that the very old adage that a healthy mind resides in a healthy body. If you are not physically healthy, you will feel weak inside and your mind will also be sad. So having a healthy body is essential for a healthy mind. Physical education is needed to keep the body healthy. So this proves how important physical education is for a healthy body and a healthy mind. Thus it can be seen that the basic objective of the National Education Policy 2020 is to develop well-rounded human beings capable of rational thought and action which includes compassion and empathy, courage and resilience, scientific thinking and creative imagination, moral values and emotions. It aims to produce productive citizens who can contribute well to building an inclusive and pluralistic society as envisaged by the Constitution so that India can regain its status as a global leader and play a leading role in the development of humanity.

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