



**The Standard fireworks Rajaratnam College for Women (Autonomous),  
Sivakasi – 626 123, Tamilnadu, India.**

(Affiliated to Madurai Kamaraj University, Re-accredited with 'A+' Grade by NAAC,  
College with Potential For Excellence by UGC & Mentor Institution under UGC PARAMARSH)

**In collaboration with**

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**Publishers**

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## Preface

The Standard Fireworks Rajaratnam College for Women, established in 1968 in the heart of the Karisal region to promote women's education, continues to flourish under the leadership of Chairperson Mrs. Thilagavathi Ravindran, Secretary Mrs. Aruna Ashok, and Principal Dr. R. Sudha Periyathai. Our college has evolved into a hub of excellence, housing advanced research centers and hosting international conferences of high academic caliber.

In continuation of this legacy, the Postgraduate and Tamil Research Departments, in collaboration with the *MUTHARASI - Art Literary Culture Tamil Journal*, are organizing a one-day **International Conference on “Interdisciplinary Modern Research.”** This academic event marks a significant milestone in the Tamil-speaking scholarly world.

As Tolkappiyar rightly said, “**விருந்தே தானும் புதுவது கிளந்த யாப்பின் மேற்றே**” The research articles in this volume reflect evolving academic needs, spanning disciplines such as Social Sciences, Physics, Biology, Information Technology, Management, Environment, Commerce, and Economics. These contributions not only enrich academic discourse but also broaden perspectives and encourage deeper thinking.

This publication emphasizes that **true progress lies in transcending disciplinary boundaries.** The clarity, depth, and innovative approach of the contributors highlight the uniqueness of this volume. It stands as essential reading for students, researchers, and educators interested in contemporary and future-facing scholarship.

We express our sincere gratitude to the college management, Principal Dr. R. Sudha Periyathai, and *MUTHARASI - Art Literary Culture Tamil Journal* for entrusting us with this initiative. Special thanks to the faculty of the Postgraduate and Tamil Research Departments for their valuable support. It is with great pride and joy that we present this volume to you.

Sivakasi  
09.10.2025

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### வாழ்த்துரை

‘தீபம் எரிகின்றது  
ஜோதி தெரிகின்றது  
காலம் மலர்கின்றது  
கனவு பலிக்கின்றது’



காலம் ஒருநாள் மாறும் என்று நம்மை வாழ்வில் நம்பிக்கை கொள்ள வைத்த கவிஞர் கண்ணதாசனின் கவிதை வரிகள் இவை. உலகின் மூத்த மொழியாகவும், இலக்கிய வளமிக்க மொழியாகவும், நம் உயிர் மூச்சாகவும் திகழும் நம் தமிழ் அணங்கிற்கு மேலும் அழகு சேர்க்கும் விதமாக "பல்துறைசார் நவீன ஆய்வுகள்" என்ற தலைப்பில் நடைபெறும் பன்னாட்டுக் கருத்தரங்கில் நூற்றுக்கும் மேலான பூமாலைகள் கட்டுரைத் தொகுப்பில் இடம் பெற்றுள்ளன.

‘கலைச்செல்வங்கள் யாவும் கொணர்ந்து இங்கு சேர்ப்பீர்’ என்ற கட்டளைக்கு ஏற்ப நடைபெறும் இந்த பன்னாட்டுக் கருத்தரங்கில் பல துறை சார்ந்த நவீன ஆய்வுகள் குறித்து எடுத்துரைக்கப்பட உள்ளன. உலகத்தின் எல்லா மூலைகளிலும் உள்ள அனைவரையும் இணைக்கும் பட்டு நூலாகத் திகழும் தமிழ் மொழியை இப்பன்னாட்டு கருத்தரங்கு மேலும் பலப்படுத்தும் என்பதில் ஐயமில்லை. இந்திகழ்வு சீருடனும் சிறப்புடனும் நடைபெற வாழ்த்தி மகிழ்கின்றேன்.

இக்கருத்தரங்கு நடைபெற அனுமதி அளித்து ஆதரவளித்த எம் கல்லூரி நிர்வாகத்தினருக்கு எனது நன்றியை தெரிவித்துக் கொள்கின்றேன். இப் பன்னாட்டுக் கருத்தரங்கினை நேர்த்தியாக ஒருங்கிணைத்த கருத்தரங்க ஆலோசகர், ஒருங்கிணைப்பாளர்கள் மற்றும் ஒருங்கிணைப்பு குழுவினர்கள் அனைவருக்கும் எனது பாராட்டுகளை உரித்தாக்குகின்றேன். இக்கருத்தரங்கில் பங்கு பெற்று சிறப்புரை ஆற்ற இருக்கும் சிறப்பு விருந்தினர்கள் மற்றும் கட்டுரை நல்கிய தமிழ் ஆர்வலர்கள், ஆசிரியப் பெருமக்கள், ஆய்வாளர்கள் அனைவருக்கும் எனது பாராட்டினைத் தெரிவித்துக் கொள்கின்றேன்.

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## **01. ALLEVIATION OF HEAVY METAL STRESS BY BIOADSORBENTS**

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### **Abstract**

Environmental pollution is not a new phenomenon, yet it remains the world's greatest problem facing humanity, and the leading environmental causes of morbidity and mortality. Man's activities through urbanization, industrialization, mining and exploration are at the forefront of global environmental pollution. Huge amount of waste water, the effluent are released from all industries. Most of the effluents and wastes contain heavy metals in an amount sufficient enough to cause toxicity to crop plants (Khan and Siddhu, 2006). Wastewater may contain various heavy metals including Zn, Cu, Pb, Mn, Ni, Cr and Cd, depending upon the type of activities, it is associated with. The impact of copper sulphate (2mM, 4mM, 6mM, 8mM and 10mM) on the morphometric, biochemical and enzymatic characteristics of *Trigonella foenum-graecum* L. was analyzed after 21 days. The reduction in all the growth characteristics and biomass accumulation was parallel with reduction in carbohydrate and pigment content. The protein content and nitrate reductase also decreased with increasing concentration of copper sulphate. An increased leaf nitrate, free amino acids, L-proline, peroxidase and catalase indicated the stress nature of the plant. Applications of low cost environment friendly bioadsorbent (*Azolla*) alleviate the stress caused due to heavy metal toxicity. A significant increase in germination percentage, growth, biochemical and enzymatic characteristics was noted in the bioadsorbent treated experimental plant than when they were treated with various concentration of heavy metal alone.

**Key words:** Heavy metal, phytotoxicity, catalase, peroxidase, Bioadsorbent, *Azolla*.

### **INTRODUCTION**

In the current anthropocene, environmental pollution is a global problem that is inextricably linked with rapid industrialization and urbanization. Industrialization is an important tool for the development of any nation. Sources of heavy metal pollution are mainly by point sources such as emission, discharge from industries, mining and non-point sources such as excessive use of insecticides / pesticides / fertilizers. Some common heavy metal contaminants are Cd, Cr, Cu, As, Hg, Pb and Ni, and they occur either naturally in soil or due to the excessive use of agricultural chemicals, urban waste and contaminated water (Yadav et al., 2010). Mining, metallurgy, agrochemicals, agricultural and urban wastes and industrial applications are the main source of copper to the environment. Copper (Cu) is one of the essential micronutrient for the growth of the plants (Kabir et al., 2009) and helps to maintain cellular homeostasis. Elevated amount of copper damage the internal structure and ultimately inhibits the growth of the plant.

Fenugreek (*Trigonella foenum-graecum* L.) locally known as, methi belonging to the family-Leguminosae and Sub family-Papilionaceae. It is cultivated worldwide as a semiarid crop. Fenugreek is generally cultivated as leafy vegetable, condiment and medicinal purpose. Its fresh and tender leaves contain iron, calcium, protein, vitamins and essential amino acids.

Azolla is a free floating water fern, which occurs in the symbiotic association with N<sub>2</sub> fixing blue green alga *Anabaena azollae*. It has high rate of N<sub>2</sub> fixation making its biomass rich in nitrogen and protein. It is mainly used as green manure in agriculture and also used for bioremediation of waste water and reclamation of saline soils. Both living as well as the non-viable biomass of *Azolla* can be used for reclamation of heavy metal. It can uptake and accumulate nutrients several times more than its requirement then slowly releases these nutrients as it decomposes. *Azolla* exhibits a remarkable ability to concentrate metals Cu, Cd, Cr, Ni, Pb and nutrients directly from pollutants.

## **MATERIALS AND METHODS**

### **Seed Collection and treatment**

Healthy and viable seeds of *Trigonella foenum-graecum* L. were procured from a seed vendor, certified by Tamilnadu Seed Certification Department, Rajapalayam, Tamilnadu. Seeds were surface sterilized with 0.1% mercuric chloride for 2 minutes and rinsed twice with distilled water. To evaluate the germination efficiency, spread the seeds on the sterilized petridishes lined with filter paper and irrigated with 5ml of different concentration of copper sulphate (2mM, 4mM, 6mM, 8mM and 10mM) and also amended with bioadsorbent respectively. Triplicates were maintained for each concentration along with control.

### **Seedling treatment**

In the first set of experiment, Surface sterilized seeds were sown and allowed to grown in different earthen pots containing uniformly mixed garden soil (sand, red soil and black soil (1:1:1 ratio)). After 07 days, seedlings of *Trigonella foenum-graecum* L. were treated with various concentration of copper sulphate (2mM, 4mM, 6mM, 8mM and 10mM). After 15 days of heavy metal treatment, various morphometric, biochemical and enzymatic characteristics were analyzed. *Azolla*, an aquatic fern was grown in plastic troughs and were then harvested and allowed to dry, powdered and used as bioadsorbent. In the second set of experiment, 10 days old seedlings of *Trigonella foenum-graecum* L. were treated with bioadsorbent- *Azolla* biomass (5gm) integrated with various concentration of copper sulphate. Triplicates were maintained for both control and experimental plants.

### **Growth and Biochemical parameters.**

Various morphometric characters such as root length shoot length, fresh and dry biomass [Arts H. H and Marks P.L. (1971)] after 21 days of sowing were measured. 21 days old plants of *Trigonella foenum-graecum* L. were used for analyzing the biochemical parameters such as chlorophyll a, chlorophyll b, total chlorophyll and carotenoid [Wellburn and Lichtenthaler (1984)] Total soluble sugar [Jayaraman,(1981)] Protein [Lowry et al., (1951)] free amino acid content [Jayaraman, (1981)] Proline [Bates et al., (1973)] leaf nitrate [Cataldo et al., (1978)] invivo nitrate reductase activity [Jaworski (1971)] Catalase activity [Kar and Mishra, (1976)] Peroxidase [Addy and Goodman, (1978)]

### **Statistical analysis**

Growth parameters were determined with ten independent replicates. Biochemical characters and enzymatic assay were carried with five replicates. The data were reported as mean and in parentheses represent the percent activity.

**Table I - Effect of various concentration of copper sulphate on the growth of Trigonella foenum-graecum L.**

S. No	Parameters	Control (Water)	Concentration of Copper sulphate				
			2mM	4mM	6mM	8mM	10mM
1.	Shoot length (cm)	15.4 (100)	14.62 (95)	12.28 (80)	11.7 (76)	10.04 (65)	9 (58)
2.	Root length (cm)	12.84 (100)	11.9 (93)	10.34 (81)	9.6 (75)	7.5 (58)	6.9 (53)
3.	Fresh weight (gm)	0.512 (100)	0.498 (97)	0.47 (92)	0.352 (67)	0.324 (63)	0.278 (54)
4.	Dry weight (gm)	0.328 (100)	0.208 (63)	0.19 (58)	0.136 (41)	0.088 (27)	0.074 (23)

Values are average of three observations. Values in parentheses are percentage activity with respect to control.

**Table I - A Effect of various concentration of copper sulphate with bioadsorbent on the growth of Trigonella foenum-graecum L.**

S. No	Parameters	Control (Water+ Bioadsorbent)	Concentration of copper sulphate				
			2mM	4mM	6mM	8mM	10mM
1.	Shoot length (cm)	16.26 (100)	15.04 (92)	14.1 (87)	12.24 (75)	11 (68)	10.5 (65)
2.	Root length (cm)	13.38 (100)	12.04 (90)	11.6 (87)	10.34 (77)	8.68 (65)	7.82 (58)
3.	Fresh weight(gm)	0.604 (100)	0.508 (84)	0.49 (81)	0.376 (62)	0.342 (57)	0.296 (49)
4.	Dry weight(gm)	0.354 (100)	0.248 (70)	0.228 (64)	0.166 (47)	0.122 (34)	0.112 (31)

Values are average of three observations. Values in parentheses are percentage activity with respect to control.

**Table II - Effect of various concentration of copper sulphate on the pigment content of Trigonella foenum-graecum L.**

S.No	Parameters	Control (Water)	Concentration of copper sulphate				
			2mM	4mM	6mM	8mM	10mM
1.	Chlorophyll – a (mg/g LFW)	0.222 (100)	0.211 (95)	0.200 (90)	0.190 (86)	0.176 (79)	0.170 (77)
2.	Chlorophyll – b (mg/g LFW)	0.326 (100)	0.295 (90)	0.276 (85)	0.258 (79)	0.240 (74)	0.221 (68)
3.	Total chl (mg/g LFW)	0.173 (100)	0.162 (94)	0.156 (90)	0.145 (84)	0.136 (79)	0.125 (72)
4.	Carotenoids (mg/g LFW)	7.067 (100)	6.649 (94)	6.276 (89)	5.296 (75)	4.848 (69)	4.819 (68)

Values are average of three observations. Values in parentheses are percentage activity with respect to control.



**Table II - A Effect of various concentration of copper sulphate with bioadsorbent on pigment content of Trigonella foenum-graecum L.**

S.No	Parameters	Control (Water+ Bioadsorbent)	Concentration of copper sulphate				
			2mM	4mM	6mM	8mM	10mM
1.	Chlorophyll – a (mg/g LFW)	0.212 (100)	0.202 (95)	0.194 (91)	0.180 (85)	0.168 (79)	0.157 (74)
2.	Chlorophyll – b (mg/g LFW)	0.342 (100)	0.317 (93)	0.296 (87)	0.282 (82)	0.261 (76)	0.241 (70)
3.	Total chlorophyll (mg/g LFW)	0.180 (100)	0.171 (95)	0.161 (89)	0.153 (85)	0.142 (79)	0.136 (76)
4.	Carotenoids (mg/g LFW)	7.162 (100)	6.867 (96)	6.295 (88)	5.870 (82)	5.259 (73)	4.826 (67)

Values are average of three observations. Values in parentheses are percentage activity with respect to control.

**Table III - Effect of various concentration of copper sulphate on the biochemical characters of Trigonella foenum-graecum L.**

S.No	Parameters	Control (Water)	Concentration of copper sulphate				
			2mM	4mM	6mM	8mM	10mM
1.	Total soluble sugar (mg/g LFW)	20.322 (100)	17.25 (85)	12.41 (61)	5.16 (25)	3.06 (15)	1.77 (9)
2.	Protein (mg/g LFW)	14.872 (100)	13.15 (88)	9.58 (64)	6.76 (45)	3.81 (26)	1.84 (12)
3.	Free Amino acid (mg/g LFW)	7.348 (100)	9.20 (125)	10.62 (145)	11.85 (161)	14.77 (201)	16.63 (226)
4.	Proline (mg/g LFW)	7.511 (100)	10.26 (137)	11.64 (155)	16.26 (217)	19.73 (263)	27.6 (367)
5.	Leaf Nitrate (µg/hrs)	7.42 (100)	11.5 (155)	15.31 (206)	18.8 (253)	22.73 (306)	26.46 (357)

Values are average of three observations. Values in parentheses are percentage activity with respect to control.

**Table III - A Effect of various concentration of copper sulphate with bioadsorbent on biochemical characters of Trigonella foenum-graecum L.**

S.No	Parameters	Control (Water+ Bioa)	Concentration of copper sulphate				
			2mM	4mM	6mM	8mM	10mM
1.	Total soluble sugar (mg/gLFW)	24.193 (100)	20.32 (84)	17.25 (71)	8.752 (36)	5.967 (25)	3.387 (14)
2.	Protein (mg/g LFW)	52.851 (100)	39.20 (74)	33.55 (63)	26.54 (50)	23.35 (44)	20.280 (38)
3.	Free Amino acid (mg/g LFW)	1.777 (100)	2.725 (153)	4.266 (240)	5.807 (327)	6.992 (393)	8.098 (456)
4.	Proline (mg/g LFW)	1.28 (100)	1.311 (102)	1.72 (134)	2.017 (158)	2.075 (162)	2.564 (200)
5.	Leaf Nitrate (µg/hrs)	5.333 (100)	7.333 (138)	11 (206)	14.22 (267)	18.11 (340)	21.333 (400)

Values are average of three observations. Values in parentheses are percentage activity with respect to control.

**Table IV - Effect of various concentration of copper sulphate on the enzymatic activities of *Trigonella foenum-graecum* L.**

S.No	Parameters	Control (Water)	Concentration of copper sulphate				
			2mM	4mM	6mM	8mM	10mM
1.	Nitrate reductase ( $\mu$ mole/30 min)	0.627 (100)	0.530 (85)	0.433 (69)	0.352 (56)	0.258 (41)	0.183 (29)
2.	Catalase (N mole ml)	0.005 (100)	0.006 (120)	0.007 (140)	0.008 (160)	0.009 (180)	0.010 (200)
3.	Peroxidase ( $\mu$ mole/g LFW)	86.369 (100)	130.904 (152)	226.720 (263)	288.798 (334)	351.430 (407)	398.110 (461)

Values are average of three observations. Values in parentheses are percentage activity with respect to control.

**Table IV - A Effect of various concentration of copper sulphate with bioadsorbent on the enzymatic activities of *Trigonella foenum-graecum* L.**

S.No	Parameters	Control (Water+ bioabsor)	Concentration of copper sulphate				
			2mM	4mM	6mM	8mM	10mM
1.	Nitrate reductase ( $\mu$ mole/30 mn)	0.675 (100)	0.636 (94)	0.530 (79)	0.433 (64)	0.352 (52)	0.258 (38)
2.	Catalase (N mole ml)	0.003 (100)	0.004 (133)	0.005 (167)	0.006 (200)	0.007 (233)	0.008 (266)
3.	Peroxidase ( $\mu$ mole/g LFW)	8.502 (100)	13.765 (162)	18.623 (219)	23.143 (272)	27.53 (324)	28.744 (338)

Values are average of three observations. Values in parentheses are percentage activity with respect to control.

### Result and Discussion

Effect of five different concentrations (2mM, 4mM, 6mM, 8mM and 10mM) of copper sulphate on the growth, biochemical and enzymatic activities are represented in Table I, II, III & IV.

Germination percentage and growth parameters decline gradually with increasing concentration of copper sulphate. The germination was found to be 95%, 84%, 73% and 63% in 2mM, 4mM, 6mM and 8mM respectively. The minimum percentage of germination was observed at 10mM as 52 %. The result coincides with the findings of Ramasubramanian et al., 2015 in cowpea. The decrease in seed germination may be due to the breakdown of stored food material in the seed or the toxic effect of copper. Similar results were reported in Sorghum (Metwali et al., 2013) and in Triticale (Brezoczki and Fillip 2017) subjected to copper stress. Minimum shoot length of 62% and root length of 18% was observed at 10mM. The reduction in shoot length persists due to retardation of cell division, differentiation and elongation Metwali et al., 2013 in Sorghum. It was revealed that reduction in root growth was primarily attributed to the binding of heavy metals to sulphhydryl groups which regulates cell division in plants (Verma et al., 2011). Copper affected root more than shoot attributed to the fact that roots receive copper ions in soils via apoplastic transport, resulting in higher

accumulation of copper in the roots (Drazkiewicz et al., 2005). A maximum reduction of fresh weight and dry weight was observed in 10mM concentration. According to Manivasaga perumal et al., 2011 a reduction in biomass in higher concentration of heavy metal might be due to inhibiting rate of photosynthesis, low level of protein formation as well as hampered carbohydrate translocation. In *Polygonum convolvulus* reduction in biomass, seed production and plant mortality was observed due to Cu toxicity (Mohnish pichhode 2015).

Similarly chlorophyll-a, chlorophyll-b, total chlorophyll and carotenoid content diminished with increasing concentration of the heavy metal. Copper dust imparts adverse effect on various photosynthetic processes in the leaves of many tree species (Mohnish Pichhode 2015). Excess amount of Cu is cytotoxic and induces stress which leads to retardation in plant growth and chlorosis (katara et al., 2015). High concentrations of heavy metals degrade photosynthetic enzymes activities and photosynthetic electron transport chain was blocked which resulted in reduction of chlorophyll content (Thapar et al., 2008).

Sugar content was decreased from 87% to 50% from 2mm to 10mM respectively when compared to control is due to the photosynthetic inhibition or stimulation of respiration rate. Reduction may be due to copper induced alternation of carbohydrate metabolism which was homologous to the findings of Ramasubramanian et al., (2015). Gradual decline in protein content was found to be observed with the increasing concentration of copper which might be due to the interference of copper in the enzyme activity, involved nitrogen metabolism. (Tandon and Srivastava 2004). Accumulation of copper in the experimental plants may induce lipid peroxidation in them and fragmentation of protein occurs due to toxic effects of reactive oxygen species which resulted in reduced protein content.

Free amino acid ranges from 16.632mg/g/LFW in 10mM concentration treatment to 9.204mg/g/LFW in 2mM concentration. A reduction in soluble protein level eventually leads to an increase in free amino acid content. Proline content ranges from 27.6mg/g/LFW in 10mM concentration treatment to 10.266mg/g/LFW in 2mM concentration which was homologous to the findings of Ramasubramanian et al., 2017 and Murugalakshmi Kumari 2017 with heavy metal treated seedlings. Increase in leaf nitrate values in 2mM, 4mM, 6mM, 8mM and 10mM treatments were 155%, 206%, 253%, 306% and 357% respectively homologous to the findings of Duraipandian et al., 2016 in *Eleusine coracana*. It may be attributed to low photosynthetic rate which limits energy and declining power potential for physiological activities.

In comparison to control condition, the percent decrease in *in vivo* nitrate reductase values in 2mM, 4mM, 6mM, 8mM and 10mM concentrations were 85%, 69%, 56%, 41% and 29% respectively. Catalase and peroxidase elevated to a greater extent with increasing concentration of the heavy metal. The observed increase in peroxidase activity can be correlated with the reduction in chlorophyll content, fresh weight and dry weight.

Effect of bioadsorbent (*Azolla* biomass) integrated with 5 different concentrations (2mM, 4mM, 6mM, 8mM and 10mM) of copper sulphate on the growth, biochemical and enzymatic activities are represented in Table IA, IIA, IIIA & IVA. Addition of bioadsorbent nullify the toxicity of copper sulphate and the growth parameters such as root length, shoot length, fresh and dry weight increased in all the concentration compared to heavy metal alone treated plants. *Azolla* biomass has been used as a bioadsorbent for the removal of copper from industrial waste water [Bilal et al., 2013].

Percentage of seed germination and all growth parameters and a huge biomass accumulation showed increasing trend from 2mM concentration to 10mM concentration of copper sulphate treated



with the bioadsorbent -Azolla biomass. This may be due to the fact that the bioadsorbent -Azolla biomass released certain adsorbed products such as nutrients and growth regulators which become available to the plants. Pigment content, soluble sugar and protein content elevated and free amino acid, proline and leaf nitrate content shows gradual reduction after the application of bioadsorbent in all the concentration indicates the active promotive nature of Azolla biomass on plant growth and metabolism. Datura biomass – bioadsorbent has the ability to relieve the toxicity of paper mill effluent and an increase in the pigment content was reported in *Lycopersicum esculentum*. [Selvarathi and Ramasubramanian (2010)]

The result of the present study clearly stated that the addition of bioadsorbent to the various concentration of copper sulphate showed improved germination percentage, root length, shoot length, biomass, biochemical parameters and enzymatic activities compared to the heavy metal alone treated plants. As Azolla biomass can efficiently remediate the toxicity of heavy metal, it can be safely used for the irrigation purpose to promote sustainable agriculture.

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## 02. THE INFLUENCE OF YOGA ON MENTAL HEALTH: AN INTEGRATED ANALYSIS OF EMPIRICAL EVIDENCE AND CLASSICAL YOGA PHILOSOPHY

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### Abstract

This research paper presents a comprehensive analysis of yoga's influence on mental health, integrating findings from contemporary scientific research with foundational principles derived from classical yoga texts. While modern empirical studies increasingly validate yoga's efficacy in treating conditions such as anxiety, depression, PTSD, and stress-related disorders, the ancient yogic tradition has always centered on understanding and mastering the mind as the path to liberation from suffering (duhkha). This paper synthesizes evidence from systematic reviews, meta-analyses, and neurobiological studies with insights from core texts including the Yoga Sutras of Patanjali, the Bhagavad Gita, and the Haṭha Yoga Pradipika. The analysis reveals a remarkable convergence: modern science confirms the mechanisms (e.g., HPA axis regulation, neuroplasticity, autonomic balance) underlying the mental health benefits described in classical texts as resulting from the cessation of mental fluctuations (citta vrtti nirodhah) and the overcoming of afflictions (klesas). This integrated perspective positions yoga not merely as a complementary therapy, but as a sophisticated psychophysiological system offering timeless wisdom and practical tools for cultivating mental resilience, emotional regulation, and enduring well-being. Recommendations for future research and clinical implementation are discussed.

**Keywords:** Yoga, Mental Health, Anxiety, Depression, PTSD, Stress, Yoga Sutras, Bhagavad Gita, Haṭha Yoga, Neuroplasticity, HPA Axis, Mindfulness, Klesas, Citta

### 1. Introduction

Mental health disorders constitute a global crisis, with the World Health Organization (WHO, 2022) reporting that billions of people worldwide are affected by conditions like anxiety, depression, and post-traumatic stress disorder (PTSD). Conventional treatments, while essential, often face limitations regarding accessibility, side effects, and incomplete efficacy for many individuals. Concurrently, yoga, an ancient Indian discipline with roots spanning over 5,000 years, has surged in global popularity as a holistic approach to well-being. Modern science has begun to rigorously investigate its impact on mental health, yielding compelling evidence of its benefits (Cramer et al., 2018; Saeed et al., 2019).

However, viewing yoga solely through the lens of contemporary research overlooks its profound historical and philosophical foundation. Classical yoga texts, particularly the Yoga Sutras of Patanjali (circa 400 CE), define yoga explicitly as a science of the mind: "**Yogas citta vrtti nirodhah**" (Sutra 1.2) – "Yoga is the cessation of the fluctuations of the mind." The entire system, as elaborated in texts like the Bhagavad Gita and the Haṭha Yoga Pradipika, is designed to diagnose the causes of mental suffering and prescribe a systematic path towards mental liberation (kaivalya) and serenity (prasada).



This paper aims to bridge these two perspectives. It synthesizes robust empirical evidence on yoga's efficacy for specific mental health conditions with the rich theoretical framework and practical methodologies articulated in foundational yoga scriptures. By doing so, it seeks to provide a deeper, more holistic understanding of how and why yoga exerts its powerful influence on mental health, demonstrating that modern scientific validation aligns with and illuminates the ancient wisdom of yoga as a comprehensive system for psychological well-being.

## 2. Methodology

This paper employs a narrative synthesis approach, integrating two distinct bodies of knowledge:

1. **Empirical Evidence Review:** A targeted review of high-impact scientific literature published primarily within the last 15 years was conducted. Searches utilized databases (PubMed, PsycINFO, Google Scholar)
2. **Classical Text Analysis:** Core yoga texts were analyzed for their explicit teachings on the nature of the mind (citta), the causes of suffering (klesas), and the prescribed path to mental liberation. Primary texts included:
  - Yoga Sutras of Patanjali (with authoritative commentaries, e.g., Vyasa, Svami Satchidananda, B.K.S. Iyengar)
  - Bhagavad Gita (Chapter 6 specifically on yoga, and key verses throughout)
  - Hatha Yoga Pradipika (focusing on sections linking physical practices to mental states)
  - Interpretive works by modern masters (e.g., T.K.V. Desikachar, Svami Sivananda) bridging classical wisdom and modern application.

The synthesis involved identifying convergences, complementarities, and insights gained by juxtaposing scientific findings with classical philosophical and practical frameworks.

## 3. Empirical Evidence: Yoga's Impact on Mental Health Conditions

Modern research provides substantial evidence for yoga's efficacy across a spectrum of mental health challenges:

### 3.1 Stress Reduction

Yoga consistently demonstrates significant reductions in perceived stress and physiological stress markers. Meta-analyses (Pascoe et al., 2017) confirm its effectiveness in lowering perceived stress scores. Mechanistically, yoga down regulates the Hypothalamic-Pituitary-Adrenal (HPA) axis, reducing cortisol secretion (Thirthalli et al., 2013). It also enhances Parasympathetic Nervous System (PNS) activity via vagal nerve stimulation, improving Heart Rate Variability (HRV) and counteracting Sympathetic Nervous System (SNS) "fight-or-flight" dominance (Streeter et al., 2012). This aligns with the yogic goal of creating steadiness and ease (sthira sukham asanam - YS II.46) conducive to mental calm.

### 3.2 Anxiety Disorders

Robust evidence supports yoga's efficacy for Generalized Anxiety Disorder (GAD), social anxiety, and panic disorder. Meta-analyses report moderate to large effect sizes for reducing anxiety symptoms compared to controls (Cramer et al., 2018; Saeed et al., 2019). Proposed mechanisms include increased GABAergic activity (Streeter et al., 2010), enhanced mindfulness reducing catastrophic thinking, and breathwork (pranayama) directly countering hyperventilation and physiological arousal. This resonates with classical texts emphasizing breath regulation as a primary tool for calming the mind (Haṭha Yoga Pradipika II.2).

### 3.3 Depression

Yoga is effective as an adjunctive treatment for depression. RCTs and meta-analyses show clinically meaningful reductions in depressive symptoms (da Silva et al., 2009; Sathyanarayanan et al., 2022). Mechanisms involve HPA axis normalization, potential increases in serotonin/dopamine, elevation of Brain-Derived Neurotrophic Factor (BDNF) supporting neuroplasticity (Naveen et al., 2013), and psychological benefits like reduced rumination, increased self-compassion, and enhanced self-efficacy. This reflects the yogic path of overcoming attachment (raga) and aversion (dvesa) – key klesas linked to depressive states – through practices fostering contentment (santosa) and self-study (svadhyaya).

### 3.4 Post-Traumatic Stress Disorder (PTSD)

Yoga, particularly trauma-sensitive forms, shows promise in alleviating PTSD symptoms (intrusions, hyper arousal, avoidance, negative mood). RCTs with veterans and trauma survivors report significant symptom reduction (van der Kolk et al., 2014; Rhodes et al., 2016). Mechanisms include improved interoceptive awareness (countering dissociation), amygdala downregulation, PNS activation calming hyperarousal, and fostering a sense of bodily agency. This directly addresses the yogic understanding of trauma as a profound disturbance in the mind-field (citta) and the need for safe reconnection with the present moment and bodily experience through mindful practice.

### 3.5 Overall Psychological Well-being

Beyond symptom reduction, yoga enhances positive mental health: improved mood, self-esteem, life satisfaction, resilience, emotional regulation, sleep quality, and quality of life (D'Souza et al., 2018). This holistic improvement stems from the combined effects of physical activity, stress reduction, mindfulness cultivation, ethical practice, and the philosophical emphasis on inner peace and contentment (santoṣa), aligning with the ultimate goal of citta prasadanam (serenity of mind - YS I.33).

## 4. Classical Yoga Framework: The Mind, Suffering, and the Path to Liberation

Classical texts provide the foundational understanding of the mind and the systematic path to transform it:

### 4.1 The Nature of the Mind (Citta) and Suffering (Duḥkha)

Patanjali defines the mind (citta) as a composite of intellect (buddhi), ego (ahamkara), and mind-stuff (manas). Its inherent nature is fluctuation (vrtti), leading to suffering when the Seer (puruṣa) mistakenly identifies with these fluctuations (avidya - ignorance). Suffering (duhkha) arises from this misidentification and the subsequent operation of the Klesas.

### 4.2 The Root Afflictions (Klesas)

Patanjali identifies five primary causes of suffering (YS II.3-9):

- **Avidya (Ignorance):** Mistaking the transient (body, mind, emotions) for the eternal Self (puruṣa). The root of all other klesas.
- **Asmita (Egoism):** Identifying the power of the Seer with the instruments of seeing (mind-body).
- **Raga (Attachment):** Clinging to pleasurable experiences based on memory.
- **Dvesa (Aversion):** Avoiding painful experiences based on memory.
- **Abhinivesah (Fear of Death):** The instinctual clinging to life flowing from ignorance.

These klesas are the universal precursors to anxiety, depression, anger, greed, and all mental distress. Modern concepts like cognitive distortions, maladaptive attachments, and existential anxiety find clear parallels here.

#### 4.3 The Eightfold Path (Astanga Yoga)

Patanjali prescribes the systematic path of Aṣṭāṅga Yoga (YS II.29) to still the mind's fluctuations and overcome the klesas:

- **Yamas (Ethical Restraints):** Non-violence (ahiṃsa), truthfulness (satya), non-stealing (asteya), continence (brahmacharya), non-possessiveness (aparigraha). Mental Health Impact: Reduce inner conflict, guilt, fear, aggression; foster social harmony and integrity.
- **Niyamas (Personal Observances):** Purity (sauca), contentment (santoṣa), discipline (tapas), self-study (svadhyaya), surrender (isvara praṇidhana). Mental Health Impact: Sauca creates mental clarity; santoṣa counters craving/anxiety; tapas builds resilience; svadhyaya fosters self-awareness; isvara praṇidhana alleviates the burden of control.
- **Asana (Posture):** "Sthira sukham asanam" (YS II.46) - Steady, comfortable posture. Mental Health Impact: Prepares the body for meditation; reduces physical distraction; cultivates focus and present-moment awareness; calms the nervous system.
- **Pranayama (Breath Regulation):** Extension and control of vital energy (prāṇa). Mental Health Impact: Directly influences the mind; calms agitation; clears energy blockages; regulates ANS (calming SNS, activating PNS); key tool for managing stress and anxiety (Hatha Yoga Pradipika II.2).
- **Pratyahara (Sense Withdrawal):** Conscious withdrawal of senses from external objects. Mental Health Impact: Crucial Bridge to internal practices; reduces sensory overload; fosters inner stillness; breaks reactive craving/aversion cycles.
- **Dharana (Concentration):** Fixing the mind on a single point. Mental Health Impact: Trains attention; counters distraction; builds mental focus; reduces rumination.
- **Dhyana (Meditation):** Uninterrupted flow of awareness. Mental Health Impact: Cultivates deep self-observation without judgment; fosters witnessing of thoughts/emotions as transient; promotes detachment (vairagya), emotional regulation, insight, and deep calm (Bhagavad Gītā VI.17-20).
- **Samadhi (Absorption):** Profound union where meditator, meditation, and object merge. Mental Health Impact: Ultimate goal; involves transcending the egoic mind (asmita) and klesas, leading to liberation (kaivalya) and the cessation of suffering.

#### 4.4 The Bhagavad Gītā's Contribution

The Gita contextualizes yoga amidst life's challenges, emphasizing paths like Karma Yoga (selfless action), Bhakti Yoga (devotion), and Jnana Yoga (knowledge), all converging on Dhyana Yoga (meditation). Key mental health themes include equanimity in action ("Yogaḥ karmasu kausalam" - II.50), mind control as essential for peace ("As a lamp in a windless place..." - VI.19), and the mind as friend or enemy depending on self-mastery (VI.5).

#### 4.5 Hatha Yoga's Role

The Hatha Yoga Pradipika focuses on asana, prāṇayama, mudra, and bandha to purify the body and balance energy (prāṇa) and channels (nāḍis), explicitly stating these practices prepare the mind for Raja Yoga (meditation - HYP I.1). Techniques like nāḍī sodhana (alternate nostril breathing)



are prescribed specifically to calm the mind (HYP II.7-11), directly linking physical practices to mental states.

### 5. Synthesis: Convergence of Science and Classical Wisdom

The integration of empirical evidence and classical philosophy reveals profound convergences:

1. **Diagnosis Convergence:** Modern psychology identifies cognitive distortions, maladaptive attachments, trauma responses, and neurobiological dysregulation as causes of mental illness. Classical yoga diagnoses the root as the klesas (avidya, asmita, raga, dvesa, abhinivesah) operating within the fluctuating mind-field (citta). Both perspectives recognize suffering stems from misperception, attachment, aversion, and loss of self-awareness.
2. **Mechanism Convergence:**
  - **Stress/Anxiety:** Science shows HPA axis downregulation and PNS activation via yoga. Classical texts prescribe pranayama and asana specifically to calm the mind and vital energy, achieving the same physiological state described as serenity (prasada).
  - **Depression:** Science links yoga to neurotransmitter modulation, increased BDNF/neuroplasticity, and reduced rumination. Classical texts link suffering to raga (attachment to pleasure lost) and dvesa (aversion to pain present), prescribing practices like santosa (contentment), svadhyaya (self-study), and dhyana (meditation) to detach from these afflictions and cultivate inner stability.
  - **PTSD:** Science highlights yoga's role in improving interoception, regulating the amygdala, and calming hyperarousal. Classical texts emphasize the need to safely reconnect with the present moment and bodily experience (through mindful asana and pranayama) to overcome the dissociation and fear rooted in avidya and abhinivesah.
  - **Neuroplasticity:** Modern science demonstrates yoga's ability to change brain structure and function (increased gray matter, decreased amygdala reactivity). Classical texts describe the path of yoga as fundamentally transformative, purifying the mind-field (citta) and ultimately leading to liberation (kaivalya) – a state of consciousness beyond the limitations of the conditioned mind.
3. **Methodology Convergence:** The Eight Limbs provide a comprehensive framework. Modern research validates components:
  - **Yamas/Niyamas:** Foster psychological safety, ethical grounding, and positive relationships – foundational for mental health.
  - **Asana/Pranayama:** Directly impact physiology (ANS balance, stress hormones) and prepare the mind for focus, as confirmed by psychophysiological studies.
  - **Pratyahara/Dharaṇa/Dhyana:** Cultivate mindfulness, attentional control, emotional regulation, and insight – core targets of modern psychotherapies like Mindfulness-Based Stress Reduction (MBSR) and Cognitive Behavioral Therapy (CBT), which share strong parallels with yogic practices.
4. **Goal Convergence:** While modern medicine often focuses on symptom reduction, classical yoga aims for citta prasadanam (serenity) and kaivalya (liberation). However, the process of achieving these goals inherently involves alleviating suffering. Modern research confirms that yoga practice leads to reductions in specific symptoms (anxiety, depression) and

enhancements in overall well-being (resilience, life satisfaction), representing significant steps towards the yogic ideals of mental peace and freedom.

## 6. Limitations and Considerations

- **Heterogeneity:** Variations in yoga styles, protocols, instructor training, and study designs in research; diverse interpretations of classical texts.
- **Mechanistic Specificity:** While convergences are clear, establishing direct causal links between specific yogic practices (e.g., a particular pranayama), specific klesas, and specific neurobiological changes requires further investigation.
- **Accessibility and Context:** Classical texts were written for specific cultural and historical contexts. Modern application requires sensitive adaptation. Access to qualified instruction, especially for clinical populations, is crucial.
- **Complementary Role:** Yoga, whether understood classically or scientifically, is best positioned as a complementary approach alongside conventional treatments for severe mental illness, not a replacement.

## 7. Conclusion and Future Directions

This integrated analysis demonstrates that yoga's profound influence on mental health is not a modern discovery but is deeply embedded in its ancient philosophical and practical framework. Classical yoga texts provide a sophisticated diagnosis of mental suffering (the klesas) and a systematic, holistic path to liberation (Aṣṭanga Yoga). Modern empirical research rigorously validates the efficacy of yoga practices for alleviating symptoms of stress, anxiety, depression, and PTSD, while elucidating the neurobiological and psychophysiological mechanisms (HPA axis regulation, ANS balance, neuroplasticity, enhanced mindfulness) that underpin these benefits.

The convergence is striking: the mental states cultivated by yoga practice – serenity (prasada), emotional stability, resilience, clarity, and ultimately liberation from suffering (kaivalya) – are precisely the states associated with optimal mental health identified by contemporary psychology and neuroscience. Yoga offers a unique synthesis of ethical discipline, physical practice, breath control, sensory mastery, concentration, meditation, and philosophical understanding, providing a comprehensive toolkit for cultivating mental well-being.

### Future Directions:

1. **Mechanistic Research:** Utilize advanced neuroimaging (fMRI, EEG) and physiological measures to investigate the specific impacts of different yogic components (e.g., yamas vs. pranayama vs. dhyana) on brain function, stress biomarkers, and symptom reduction, linking findings to concepts like klesa reduction.
2. **Protocol Standardization & Personalization:** Develop evidence-based, standardized protocols for specific conditions while honoring the classical principle of viniyoga (adaptation to the individual). Research predictors of response to personalize interventions.
3. **Longitudinal Studies:** Conduct long-term studies to assess the durability of mental health benefits and the potential for deeper transformative effects aligning with classical goals.
4. **Implementation Science:** Investigate effective models for integrating yoga, informed by both evidence and classical wisdom, into diverse healthcare settings (hospitals, clinics, and community mental health), schools, and workplaces.

5. **Cross-Cultural Dialogue:** Foster ongoing dialogue between yoga scholars, practitioners, scientists, and clinicians to deepen mutual understanding and refine applications, ensuring respect for yoga's roots while maximizing its therapeutic potential.

In conclusion, yoga represents a powerful, time-tested, and scientifically validated system for understanding and transforming the mind. By embracing both its empirical evidence and its classical wisdom, we unlock a deeper appreciation of yoga as a profound path to mental health, offering not just symptom relief, but the potential for lasting peace, resilience, and the realization of our fullest human potential.

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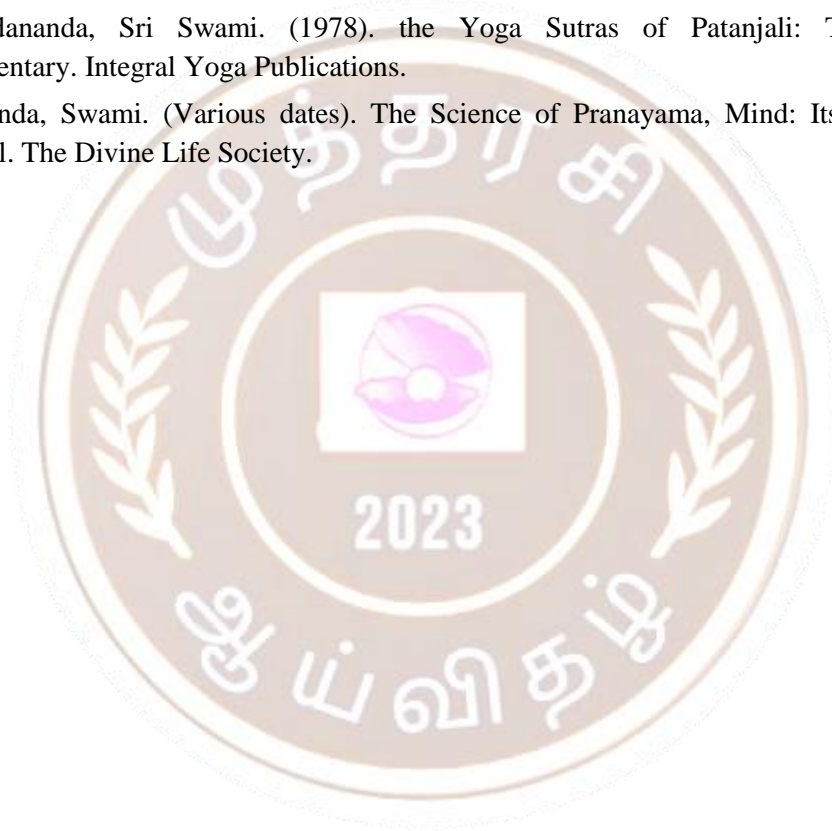
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### 03. SCIENTIFIC AND SPIRITUAL VIEW OF 6 AADHARAM, A BRIDGE TO HIGHER CONSCIOUSNESS

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#### Abstract:

The Six Aadharams Muladharam, Swadhisthanam, Manipurakam, Anakatham, Vishudhiand Ajnai occupy a central place in Siddha medicine and Fundamental philosophy, forming an essential subset of the 96 Thathuvasthat define human existence. In the spiritual tradition, these Adharams are dynamic energy centres, each governing specific physiological functions, emotional states, and stages of consciousness. From a scientific perspective, they correlate with complex neural networks, endocrine glands, and bioenergetic flows that sustain life and regulate well-being. As energy ascends through these six centers via refined yogic practice and disciplined living, the individual transitions from gross bodily awareness to subtle mental clarity, culminating in expanded states of perception. This convergence of Siddha metaphysics and modern biophysiology reveals the Adharams not merely as symbolic points, but as living interfaces between the physical body, the subtle body, and cosmic intelligence. Understanding and harmonizing these centres thus provides a profound bridge from physiological balance to the awakening of higher consciousness where health, awareness, and spiritual realization meet in a unified continuum.

**Keywords:** Aadharam, Siddha Medicine, Plexus, Endocrine glands, Activation, Balance of human body

#### 1. Introduction

According to the ancient literature of Siddha, It is said that the Siddha system of medicine originated from Primary Siddhar. Shiva who taught it to his consort Parvathi. Parvathi then passed it on to Nandi and Nandi taught about it to nine devatas. 18 prominent siddhars are the main contributors to this system of medicine.[1]

Siddha medicine is one of the primitive traditional system of medicine in the world. According to Siddha system, human body is made up of 96 Thathuvasthat define human existence. These 96 Thathuvasthat are Physical, Physiological, Mental and Intellectual components exists in human body. These 96 Thathuvasthat primarily categorized into two types Moolathaththuvam and Udalaththuvam. Moolathaththuvam refers to the constituents that help form the body's structures, known as Udatkooru, while Udalaththuvam refers to the physical and psychological functions in the human body, known as Udattholijeyal.

The 6 Aadharams form part of the 96 Thathuvasthat, which are the fundamental principles of the Siddha system of Medicine. The Aadharam in the human body which controls the energy levels. It maintains the equilibrium of the body. The disturbance of this equilibrium causes physical and mental illness for human beings. These Aadharams are linked with the endocrine gland in the human body, which maintains homeostasis in the body.[1]

The Aadharam is also referred to as "Chakra" is used to describe the way energy moves in the body. They are associated with interactions of physical, emotional and mental nature. There are many as 88000 chakras in the human body, of which six principal chakras are situated in the spinal region and the seventh just above the crown of the skull. These seven chakras are described as being aligned

in an ascending column from the base of the spine to the top of the head. The seven chakras are associated with seven colours in the rainbow. They are visualised as a Lotus or flowers with different numbers of petals. It is also assumed that out of these seven chakras, five are associated with the five nature elements in Yogic Science with their Sanskrit names, viz Earth (Prithvi), Space (Akash), Water (Aap or Jal), Fire (Agni) and Air (Vayu). All seven chakras have associated colours, sense organs, and organs of action. They are further associated with multiple physiological functions. The names of the seven principal chakras and their respective positions indicative of their physiological aspects.[3]

Chakras play an essential role in our daily experience, whether or not we are of them. This series is intended to help those interested in cultivating a deeper awareness of their chakras gain the understanding necessary to do so. Often times the information one comes across on the chakras is at a surface level, with no real depth or substance. This guide is intended to bridge the surface level awareness with a core understanding of how the chakras function on the various levels of the mind-spirit-triad. If you ever wondered exactly how the chakras work, this is the guide for you. [5]

### Objectives

- To explain the concept of the Six Aadharams in Siddha medicine and their role within the 96 Thathuvass that define human existence.
- To correlate the Six Aadharams with modern scientific perspectives, including neural networks, endocrine glands, and bioenergetic flows.
- To highlight the convergence of Siddha metaphysics and modern biophysiology in understanding the Aadharams as living interfaces between the physical body, subtle body, and cosmic intelligence.
- To emphasize the importance of harmonizing the Aadharams as a pathway to achieving physiological balance, mental clarity, and higher spiritual consciousness.

### 2. Materials and methods

A comprehensive literature review was conducted to gather relevant data on the 6 Aadharam in Siddha Medicine. Multiple scientific databases, including Google Scholar, Science Direct, and PubMed, were systematically searched to identify peer-reviewed articles, clinical studies, and review papers. Some standard Siddha textbooks and classical texts relevant to 6 Aadharam were consulted to provide historical and traditional context.

### 3. Discussion

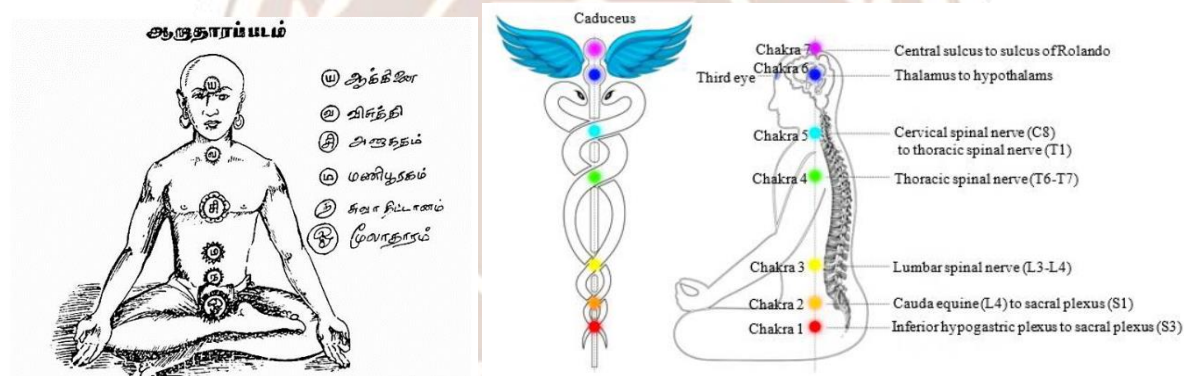
#### 3.1 96 Thathuvass- Fundamental Life Principles

Panchabootham	Five elements	5
Pori	Sense organs	5
Pulan	Five senses	5
Kanmenthiriyam	Motor organs	5
Gnanendriyam	Functions of motor organs	5
Karanam	Intellect	4
Arivu	Self-realization	1
Naadi	Channels of life force	10
Vaayu	Vital nerve force	10
Aasayam	Metabolic sheaths	5

Kosam	Five sheaths	5
Aadharam	Nerve plexus	6
Mandalam	Sheaths of humours	3
Malam	Impurities related to soul	3
Thodam	Humours	3
Edanai	Attachments, desires related to the soul	3
Gunam	Qualities of mind	3
Vinai	Physical and mental acts	2
Raagam	Emotional status of mind	8
Avasthai	Status of consciousness	5
Total Fundamental Principles		96

### 3.2 The 6 Aadharams

Aadharam also called ‘Chakra’ is a Sanskrit word and can translate to ‘wheel’ or a moving circle of energy. It refers to each of the seven basic energy centres in the body starting at the base of your spine and moving all the way up to the top of your head (the crown). Each Chakra directly correlates with the endocrine system and a group of nerve ganglia (spinal nerves). **Therefore each Chakra can be associated with particular parts of the body and particular functions within the body** controlled by the gland in the endocrine system associated with each Chakra.



Above these lies a seventh and ultimate chakra, the sahasrara, imagined as the divine seat of the god lord Shiva. All the chakras are in contact with each other through a complex network of correspondences, and they are also identified with specific colours, shapes, elements, cosmic principles and deity.[4]

The seventh and final Chakra, known as the Crown Chakra or Sahasrara, is represented by a violet symbol and is located at the top of the head. It is considered to be a special Chakra, linked to spiritual and cosmic consciousness and believed to be related to mental illnesses such as Alzheimer's symptom. [2]

### 3.3 Characteristic of 6 Aadharams

Aadharam	Elements	Sensory organ	Sense	Colour	Petals of lotus	Shape	Letter	God	Symbol
Muladharam	Earth	Nose	Smell	Red	Four	Circle Triangle	‘Xk;’	Vigneswarar	



Svadhisdhanam	Water	Tongue	Taste	Orange	Six	Square	‘e’	Brama & Saraswathi	
Manipurakam	Fire	Eye	Sight	Yellow	Ten	Crescent shape	‘k’	Thirumal & Mahaluxmy	
Anakatham	Air	Skin	Touch	Green	Twelve	Triangle	‘rp’	Uruthiran & Uruthiri	
Vishudhi	Akash	Ear	Hearing	Sky blue	Sixteen	Hexagon	‘t’	Maheswaran & Maheswary	
Akijnai	Not associated with any nature element as it is considered beyond the physical elements	6 <sup>TH</sup> Sense	Intuition (Light)	Indigo	Two	Circle	‘a’	Sathashivan & Manonmani	

### 1.1 6 Aadharams Connected with Endocrine System and Nervous System

Aadharam	Location	Nerve plexus	Endocrine gland	Functions
Muladharam	<ul style="list-style-type: none"> <li>Base of the spine &amp; encompasses the last 3 vertebrae, bladder and colon, located between the anus and the genitals</li> </ul>	Root Aadhara	Ovary in Females Testes in Males	<ul style="list-style-type: none"> <li>Physical: Supports foundation of the body, influences legs, feet, bones, immune system, and overall physical stability.</li> <li>Emotional: Provides feelings of safety, security and stability; governs survival instincts.</li> <li>Spiritual: Connects individual consciousness to the earth; grounds spiritual energy into physical existence.</li> </ul>
Svadhisdhanam	<ul style="list-style-type: none"> <li>Right above the Muladharam, in the pelvic region, at the root of the genitals.</li> </ul>	Sacral plexus	Adrenal gland	<ul style="list-style-type: none"> <li>Physical: Affects reproductive organs, kidneys, bladder, and lower abdomen.</li> <li>Emotional: Governs feelings of pleasure, desire, and emotional fluidity; influences</li> </ul>

				<p>emotional resilience and adaptability.</p> <ul style="list-style-type: none"> <li>• Spiritual: Facilitates creative expression and emotional openness; fosters a sense of flow and joy in life.</li> </ul>
Manipurakam	<ul style="list-style-type: none"> <li>• At the level of the naval.</li> </ul>	Solar plexus	Pancreas	<ul style="list-style-type: none"> <li>• Physical: Influences digestion, liver, pancreas, and metabolic functions.</li> <li>• Emotional: Governs self-esteem, confidence, willpower, and personal power.</li> <li>• Spiritual: Supports self-awareness, motivation and the ability to take action; cultivates inner strength.</li> </ul>
Anakatham	<ul style="list-style-type: none"> <li>• Centre of the chest at the heart level.</li> </ul>	Heart	Thymus gland	<ul style="list-style-type: none"> <li>• Physical: Affects the heart, lungs, circulatory system, and chest area. Emotional: Centre of love, compassion, forgiveness, and emotional healing. Spiritual: Connects to unconditional love, universal compassion, and spiritual unity.</li> </ul>
Vishudhi	<ul style="list-style-type: none"> <li>• Neck region</li> </ul>	Cervical plexus	Thyroid gland	<ul style="list-style-type: none"> <li>• Physical: Influences throat, vocal cords, neck and thyroid.</li> <li>• Emotional: Governs communication, self-expression and honesty.</li> <li>• Spiritual: Facilitates authentic expression of inner truth; supports clarity of thought and divine inspiration</li> </ul>
Akjni	<ul style="list-style-type: none"> <li>• Between the eyebrows</li> </ul>	Third eye	pituitary gland	<ul style="list-style-type: none"> <li>• Physical: Associated with the brain, nervous system and pineal gland.</li> <li>• Emotional: Represents spiritual connection and bliss beyond personal emotions.</li> <li>• Spiritual: Acts as a gateway to higher consciousness, divine wisdom and enlightenment.</li> </ul>



**3.5 Each of the seven chakras is associated with specific aromas, gemstones, and metals that can be used to balance and harmonize their energy**

Aadharam	Aroma	Gemstone	Metal	Herb	Musical note	Mantra
Muladharam	Vetiver	Bloodstone, Red Jasper, Black Tourmaline	Iron	Burdock, clove, dandelion, rosemary, paprika, cayenne, allspice, nutmeg	C	"I can't grow from an unsteady foundation."
Svadhishthanam	Sandalwood	Carnelian, Amber, Citrine, Garnet	Calcium	Coriander, calendula, fennel, licorice, cinnamon, vanilla	D	"I always honor others but not before myself."
Manipurakam	Ginger	<u>Yellow</u> Jasper, <u>Sunstone</u> , <u>Tiger's Eye</u>	Magnesium	Anise, celery, cinnamon, lily of the valley, marshmallow, mint, melissa, turmeric, cumin	E	"Self-love starts when I accept all parts of myself."
Anakatham	Roses	Rose quartz, Green aventurine, Rhodonite, Malachite	Zinc	Cayenne, hawthorn berries, jasmine, lavender, marjoram, rose, thyme, cilantro, parsley	F	"When I love myself, loving others comes easily."
Vishudhi	Peppermint	Amazonite, Aquamarine, Turquoise, Blue lace Agate	Copper	Coltsfoot, blackberry, elderberry, common sage, salt, lemongrass, bay laurel, chamomile, eucalyptus, geranium	G	"I speak my truth, always."
Akajnai	Lavender	Sodalite, Azurite, Lapis Lazuli, Kyanite	Silver	yebright, juniper, mugwort, poppy, mandrake root, blue lotus, cypress	A	"I am open to exploring what cannot be seen."

### 3.5 6 Aadharams Activation and Energy Alignment

Aadharam	Importance	Activation	Essential Mudras for Chakra Activation and Energy Alignment
Muladharam	<ul style="list-style-type: none"> <li>A balanced root chakra helps you feel secure, stable, and connected to the physical world</li> </ul>	<ul style="list-style-type: none"> <li>Practice grounding exercises (e.g., walking barefoot), visualize red light, yoga poses (Mountain Pose, Warrior I), meditate with affirmations like "I am safe," "I am grounded"</li> </ul>	<ul style="list-style-type: none"> <li>Prithvi Mudra: The tip of the thumb touches the tip of the ring finger, with the other fingers extended.</li> </ul>
Svadhishthanam	<ul style="list-style-type: none"> <li>Encourages healthy relationships and emotional stability</li> </ul>	<ul style="list-style-type: none"> <li>Engage in creative activities (painting, dancing, writing), practice hip-opening yoga poses (Butterfly Pose, Pigeon Pose), meditate on the colour orange, use affirmations like "I deserve pleasure," "I am creative"</li> </ul>	<ul style="list-style-type: none"> <li>Jala Mudra: The tip of the thumb touches the tip of the little finger, with the other fingers extended.</li> </ul>
Manipurakam	<ul style="list-style-type: none"> <li>Promotes confidence, self discipline, and empowerment</li> </ul>	<ul style="list-style-type: none"> <li>Practice core-strengthening yoga poses (Boat Pose, Plank Pose), set and achieve personal goals, visualize yellow light, use affirmations like "I am powerful," "I trust myself"</li> </ul>	<ul style="list-style-type: none"> <li>Surya Mudra: The ring finger is bent to touch the base of the thumb, with the thumb pressing on it, while others remain extended.</li> </ul>
Anakatham	<ul style="list-style-type: none"> <li>Fosters healthy, loving relationships and compassion for others</li> </ul>	<ul style="list-style-type: none"> <li>Practice heart-opening yoga poses (Camel Pose, Cobra Pose), engage in acts of kindness and forgiveness, meditate on green or pink, use affirmations like "I am love," "I am open to love"</li> </ul>	<ul style="list-style-type: none"> <li>Padma Mudra: Palms are joined at the base, fingers spread outward like a lotus flower.</li> </ul>
Vishudhi	<ul style="list-style-type: none"> <li>Allows clear, honest communication and expression of true thoughts/feelings</li> </ul>	<ul style="list-style-type: none"> <li>Practice pranayama (Ujjayi breath, alternate nostril breathing), sing or speak your truth, meditate on blue, use affirmations like "I express myself clearly," "I speak my truth"</li> </ul>	<ul style="list-style-type: none"> <li>Vishuddha Mudra: A specific hand gesture for throat chakra balance (details needed).</li> </ul>
Akjni	<ul style="list-style-type: none"> <li>Enhances intuition, foresight, and decision-making</li> </ul>	<ul style="list-style-type: none"> <li>Practice meditation or mindfulness, engage in visualization, do yoga poses (Child's Pose, Forward Fold), use affirmations like "I believe my instinct," "I see honestly"</li> </ul>	<ul style="list-style-type: none"> <li>Jnana Mudra: The tip of the thumb touches the tip of the index finger, forming a circle, with the other fingers extended.[11]</li> </ul>

### 3.6 General Activation Process for All Chakras:

1. Meditation: Quiet the thoughts and focus on each chakra personally, visualising its colour and energy.
2. Breathing exercises (Pranayama): Breathe deeply and slowly to sell power drift throughout the frame.
3. Yoga: carry out yoga poses that specially target the areas related to every chakra.
4. Affirmations: Use advantageous statements to align with the strength of every chakra.
5. Sound therapy: Chanting mantras (e.g., "LAM" for the basis chakra) or the use of tuning forks and singing bowls can also assist stability of the chakras. [11]

Sixchakras refers to “6 atharangal” in the context of Siddha medicine and spirituality, which are believed to be vital energy centres within the body. In the context of Chakra studies for spiritual and cosmic power, meditation is a method for activating, developing, and controlling energy. The Chakras system is a concept in alternative medicine and spirituality that is believed to relate to the flow and balance of energy in the body.

The Chakra system gives a clear map of how and **where the physical body and the psychological body (mind) intersect**. The Chakra System provides a guideline of how certain emotions, traumas and past experiences can still be living in the body and how you can release these emotions by working with the Chakra. **Chakras are part of your physical and subtle bodies.** You can have either excessive or deficient Chakra imbalances. Therefore it is **important to understand the Chakra System to balance your mind, body and soul.**

### Conclusion

In summary, the six chakras refers to “6 Aadharams” are a comprehensive system of energy centres that are essential to the comprehension of human health, both physically and spiritually. In the context of Chakra studies for spiritual and cosmic power, meditation is a method for activating, developing, and controlling energy. These chakras, which are based on ancient traditions, provide a framework for personal development, emotional regulation, and spiritual alignment. Contemporary research and practices, such as energy healing, meditation, and yoga, indicate that the chakras are instrumental in the cultivation of overall well-being by fostering balance and harmony within the body and mind. The chakra system's insights may prove to be a valuable instrument for improving spiritual fulfilment, emotional resilience, and mental clarity as this field continues to develop. A more comprehensive wellness approach that integrates traditional wisdom with contemporary scientific inquiry could result from further investigation of the chakras and their impact on human health.

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## **04. MENTORBOT: VIRTUAL TAMIL COUNSELLOR FOR +2 STUDENTS**

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### **Abstract**

Choosing the right path after higher secondary education is one of the most critical decisions for students, yet many Tamil-speaking learners in Tamil Nadu struggle due to limited access to reliable guidance in their own language. To bridge this gap, the MentorBot – Tamil Higher Education Guidance Chatbot has been developed as an AI-powered virtual counsellor that provides instant, personalized, and culturally relevant support. Artificial Intelligence (AI) enables interactive decision-making, while Natural Language Processing (NLP) and Large Language Models (LLMs) ensure that student queries in Tamil or English are accurately understood and meaningfully answered. The key objectives are to engage students in Tamil, recommend suitable courses and careers, provide details on colleges, scholarships, entrance exams, and vocational opportunities, and deliver context-aware responses. The chatbot is built using React.js for the interface, Tailwind CSS for responsive design, and JavaScript pattern matching for query handling. The primary beneficiaries are +2 school students in Tamil Nadu, who gain access to timely, inclusive, and technology-driven educational guidance.

### **1. Introduction**

Career guidance after higher secondary education (+2) plays a crucial role in shaping a student's academic and professional future. In Tamil Nadu, a significant portion of students face challenges in accessing proper counseling due to the dominance of English-based resources. While information on courses, colleges, and career pathways exists, the lack of Tamil-language interactive platforms prevents many students from fully understanding and utilizing these resources. As a result, students often make uninformed decisions, leading to mismatches between their interests, abilities, and chosen fields of study.

With advancements in Generative AI and Natural Language Processing (NLP), there is an opportunity to design a Tamil-language chatbot that can interact with students in a conversational manner, understand their academic background, preferences, and aspirations, and provide personalized suggestions for higher studies. Such a solution can break the language barrier, make information more accessible, and serve as a virtual counsellor for students from diverse backgrounds.

Artificial Intelligence (AI) is the branch of computer science that enables machines to simulate human intelligence. It allows systems to learn from data, reason, adapt, and make decisions or predictions. AI is widely used in areas like speech recognition, natural language processing, robotics, healthcare, finance, and education. Common types include machine learning (learning from data), deep learning (neural networks), and natural language processing (understanding human language). Artificial intelligence (AI) is technology that enables computers and machines to simulate human learning, comprehension, problem solving, decision making, creativity and autonomy [1].

Generative artificial intelligence (generative AI) [2] is a type of AI that can create new content and ideas, including conversations, stories, images, videos, and music. It can learn human language, programming languages, art, chemistry, biology, or any complex subject matter. It reuses



what it knows to solve new problems. Generative AI can be used for various purposes, like chatbots, media creation, product development, and design.

In general, generative AI operates in three phases: Training, to create a foundation model; Tuning, to adapt the model to a specific application; Generation, evaluation and more tuning, to improve accuracy.

Generative AI begins with a "foundation model"; a deep learning model that serves as the basis for multiple different types of generative AI applications. The most common foundation models today are large language models (LLMs), created for text generation applications. Large language models (LLMs) [3] are a category of foundation models trained on immense amounts of data making them capable of understanding and generating natural language and other types of content to perform a wide range of tasks. However, many companies have spent years implementing LLMs at different levels to enhance their natural language understanding (NLU) and natural language processing (NLP) capabilities. However, many companies, including IBM, have spent years implementing LLMs at different levels to enhance their natural language understanding (NLU) and natural language processing (NLP) capabilities.

To create a foundation model, practitioners train a deep learning algorithm on huge volumes of relevant raw, unstructured, unlabeled data, such as terabytes or petabytes of data text or images or video from the internet. The training yields a neural network of billions of parameters encoded representations of the entities, patterns and relationships in the data that can generate content autonomously in response to prompts. This is the foundation model.

This training process is compute-intensive, time-consuming and expensive. It requires thousands of clustered graphics processing units (GPUs) and weeks of processing, all of which typically costs millions of dollars. Open source foundation model projects, such as Meta's Llama-2, enable gen AI developers to avoid this step and its costs.

Next, the model must be tuned to a specific content generation task. This can be done in various ways, including:

- Fine-tuning, which involves feeding the model application-specific labeled data, questions or prompts the application is likely to receive, and corresponding correct answers in the wanted format.
- Reinforcement learning with human feedback (RLHF), in which human users evaluate the accuracy or relevance of model outputs so that the model can improve itself. This can be as simple as having people type or talk back corrections to a chatbot or virtual assistant.

Another option for improving a gen AI app's performance is retrieval augmented generation (RAG), a technique for extending the foundation model to use relevant sources outside of the training data to refine the parameters for greater accuracy or relevance.

This paper is organized as follows. Section 2 deals with the review of literature in AI. Section 3 describes the overall design of the proposed education chatbot model, which will be referred to as MentorBot. Section 4 provides the results and discussions. Section 5 concludes the work.

## **2. Literature Review**

### **2.1 Artificial Intelligence (AI) in Education**

Artificial Intelligence (AI) has become an essential component in modern education, supporting both teaching and administrative processes. AI-driven systems such as intelligent tutoring systems (ITSs), recommendation engines, and adaptive learning platforms have been shown to

improve student learning outcomes and provide tailored support [4][5]. In the domain of career guidance, AI-based chatbots have emerged as cost-effective tools for providing 24/7 academic counseling, assisting students with course selection, exam preparation, and career exploration [5]. These systems reduce dependency on human counselors and ensure that information is available instantly and in an interactive format.

## 2.2 Generative AI (Gen AI) in Student Guidance

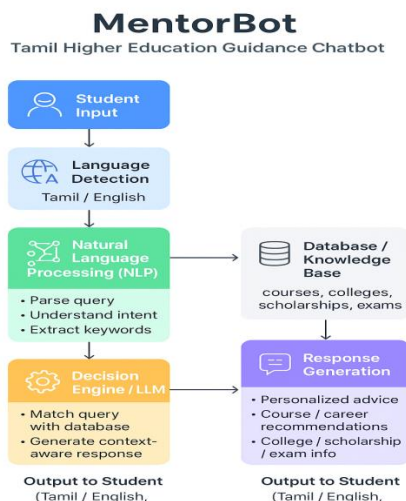
Generative AI refers to models that can generate human-like text, audio, or images. In education, Generative AI—particularly through Large Language Models (LLMs) such as GPT, LLaMA, and PaLM—has demonstrated the ability to generate natural, context-aware responses for learners [6][7]. Compared to traditional rule-based chatbots, Gen AI systems can maintain conversational flow, summarize complex information, and adapt explanations to the learner's context. For student guidance, this means that a chatbot can not only suggest courses but also provide personalized career narratives and explain the implications of each option [6][7]. However, the literature also warns about challenges, including accuracy, factual reliability, and ethical concerns, especially when counseling impacts critical life decisions [8][9].

## 2.3 Natural Language Processing (NLP) for Tamil Language

Natural Language Processing (NLP) is the subfield of AI that focuses on enabling machines to understand and generate human language. Tamil NLP has historically lagged behind English NLP due to limited resources such as annotated corpora and pretrained models. However, with the development of multilingual embedding models such as mBERT, XLM-R, and IndicNLP, Tamil text processing has improved significantly [10][11]. These tools allow for intent recognition, entity extraction, and semantic similarity detection in Tamil, enabling the construction of chatbots that can understand queries like “+2 உயிரியல் பின் என்ன படிக்கலாம்?” or “Bio courses after 12th.” Studies also indicate that code-mixed queries (where students mix Tamil and English, e.g., “bio courses என்ன?”) are highly prevalent in India [10][12]. Thus, NLP systems must be capable of handling transliteration and mixed-language inputs. Despite these advances, research shows a clear gap in Tamil-first educational chatbots for personalized higher education counselling.

## 3. Proposed Model: MentorBot

In this paper, we present an AI powered chatbot designed primarily for Tamil-speaking students in Tamil Nadu who are completing their higher secondary education (+2). It will provide guidance and support by addressing queries related to various academic and career options, including Arts, Science, Commerce, and Vocational streams. In addition, the chatbot will offer information on entrance examinations such as engineering, medical, and law, along with details about career-oriented diploma and certification programs. It will also guide students on available scholarships and financial aid opportunities. Serving as a supportive guidance tool, the chatbot is not intended to replace professional counsellors but will ensure the ethical and responsible use of AI to assist students in making informed decisions about their future. Figure 1 illustrates the schematic diagram of the proposed model.



**Figure 1. Schematic diagram of the proposed model**

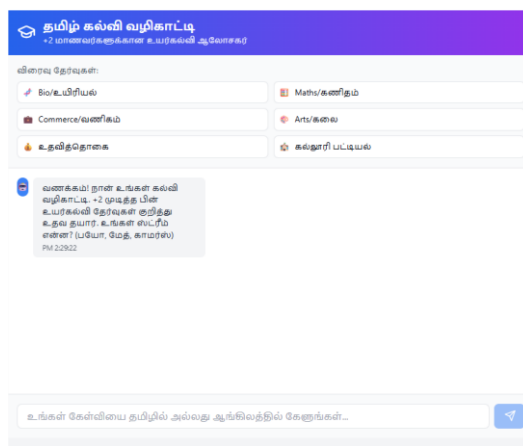
The primary objectives of the proposed model are, (1) to develop a chatbot that interacts with students in Tamil language and understands their queries related to higher education after +2, (2) to provide personalized course and career suggestions based on the student's academic performance, interests, and goals, (3), to integrate information about colleges, entrance exams, scholarships, and vocational courses relevant to Tamil Nadu, and (4) to utilize Natural Language Processing (NLP) and Large Language Models (LLMs) for handling Tamil input and generating meaningful responses.

In this chatbot, AI provides the rule-based logic to match keywords like Bio, Maths, or Scholarship and fetch structured course or exam details. NLP helps understand queries in Tamil, English, or mixed text, detecting intent (course, exam, college, aid) and key entities (e.g., NEET, Commerce). Generative AI (Gen AI) can enhance this by generating natural, context-aware Tamil explanations instead of fixed replies. Finally, LLMs (Large Language Models) can act as the brain behind the chatbot—handling complex queries, remembering conversation context, summarizing information, and producing personalized, counsellor-like responses that feel more human and supportive.

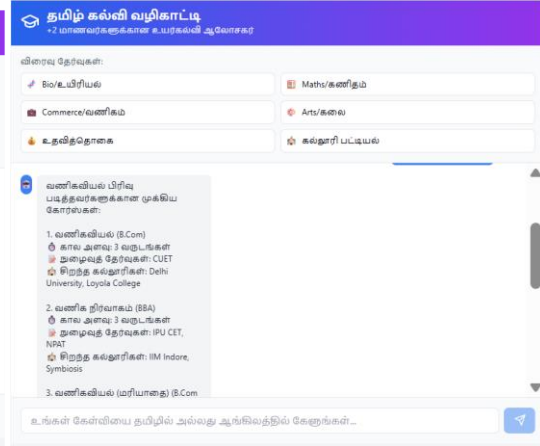
#### **4. Simulation Results and Discussion**

This section presents the details of the complete technology stack and implementation procedure for the MentorBot -Tamil Higher Education Guidance Chatbot designed for +2 students. React.js handles the chat interface and user interactions with components and state management. Tailwind CSS provides responsive design and beautiful styling with utility classes for mobile and desktop views. JavaScript pattern matching recognizes Tamil/English keywords and returns appropriate course information. CodeSandbox or local setup with Create React App for building and testing the chatbot functionality. Final application runs in web browsers through online platforms like Netlify, Vercel, or local development server. Figures 2 to 5 shows the simulation results of the designed bot.

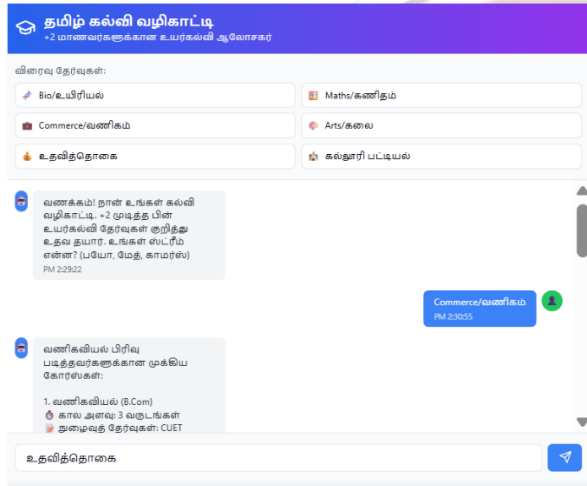




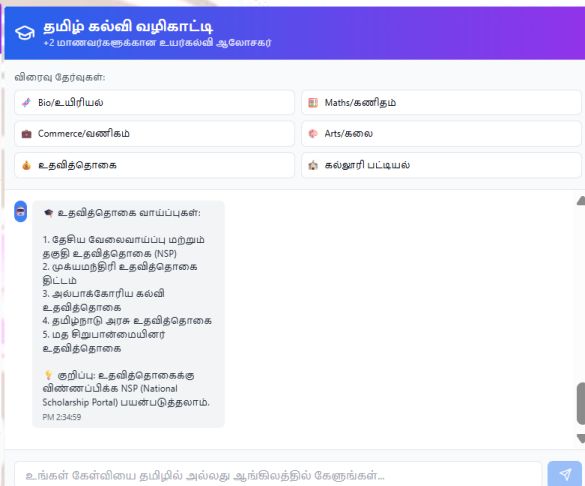
**Figure 2. Home Screen**



**Figure 3. Choices for Commerce**



**Figure 4. Prompting for Scholarships**



**Figure 5. Choices for Scholarships**

## **5. Conclusion & Future Enhancement**

The implementation of an AI-powered educational chatbot for Tamil Nadu students demonstrates the transformative potential of intelligent technologies in career guidance. By combining rule-based AI with NLP, the chatbot effectively addresses student queries in both Tamil and English, while the envisioned integration of Gen AI and LLMs offers the prospect of personalized, context-aware, and emotionally supportive interactions. This research emphasizes that such systems are not replacements for professional counsellors but complementary tools that provide instant, accessible, and interactive guidance. Importantly, the study also identifies gaps in Tamil-language NLP resources and the need for further research in developing culturally and linguistically adaptive chatbots. Ultimately, the chatbot contributes to bridging digital divides in education, empowering students from diverse backgrounds to explore career opportunities with confidence and clarity.

### **Future Enhancement**

The Tamil Higher Studies Chatbot MentorBot can be extended in the following directions:



- Voice-based Tamil Interaction: Enabling speech-to-text and text-to-speech to improve accessibility for rural students.
- Personalized Career Recommendations: Incorporating factors such as academic performance, socio-economic status, and student interests.
- Real-time Data Connectivity: Linking with portals like the National Scholarship Portal (NSP), TNEA (Tamil Nadu Engineering Admissions), and AICTE databases for accurate and timely updates.
- Multimodal Guidance: Presenting career paths through not only text but also infographics, charts, and voice responses in Tamil.

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## **05. A RESEARCH STUDY ON THE NATURE-ORIENTED CULTURAL HISTORY OF VEDIC CIVILIZATION**

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### **Abstract**

This study explores the intricate relationship between nature and cultural practices in the Vedic Civilization. By analyzing Vedic texts, archaeological evidence, and secondary literature, it examines how natural elements influenced societal norms, rituals, architecture, and daily life. The paper emphasizes the ecological consciousness embedded within Vedic traditions and evaluates its relevance in contemporary cultural and environmental studies. Using qualitative content analysis and comparative methods, the study provides a comprehensive understanding of the nature-oriented cultural heritage of early Indian society.

**Keywords:** Vedic Civilization, Cultural History, Nature, Eco-Culture, Vedic Texts, Environmental Consciousness, Rituals, Archaeology, Eco-Cultural Practices

### **Introduction**

The Vedic Civilization, dating approximately from 1500 BCE to 500 BCE, represents one of the earliest complex societies in the Indian subcontinent. Central to this civilization was a profound interconnection between nature and culture. Rivers, forests, mountains, and celestial bodies were not only physical landscapes but also played a significant role in shaping social norms, religious rituals, festivals, and philosophical thought.

Vedic texts such as the Rigveda, Samaveda, and Atharvaveda highlight the spiritual and practical significance of natural elements, illustrating a society deeply attuned to ecological balance. This framework sheds light on the evolution of Indian thought, environmental ethics, and the integration of human life with the natural world.

### **Objectives**

1. To examine the influence of natural elements on Vedic social, religious, and cultural practices.
2. To explore the ecological consciousness reflected in Vedic literature and rituals.
3. To analyze archaeological and textual evidence for understanding nature-oriented practices.
4. To assess the relevance of Vedic ecological and cultural values in contemporary society.

### **Methodology**

The study employs a qualitative research methodology incorporating textual and comparative analysis of primary Vedic texts (Rigveda, Samaveda, Atharvaveda) alongside archaeological findings, supplemented by secondary literature. Data were interpreted to assess the symbolic, spiritual, and practical significance of nature in cultural development.

### **Review of Literature**

1. Vedic Texts and Nature – Scholars such as Stephanie W. Jamison and Joel Brereton have highlighted the centrality of rivers, fire, and forests in Vedic rituals.
2. Ecological Consciousness – Research by N. Balakrishnan demonstrates that Vedic hymns reflect early environmental ethics, emphasizing harmony between humans and nature.
3. Cultural Practices – Archaeological studies by B.B. Lal reveal nature-centric settlement patterns, sacrificial altars, and water management systems in Vedic sites.

## **Nature-Oriented Cultural History of Vedic Civilization**

### **Nature in Vedic Thought**

The Vedic Civilization regarded nature not merely as a backdrop for human life but as an integral, sacred element of existence. Rivers, mountains, forests, sunlight, wind, and fire were personified as deities and played critical roles in rituals, ethics, and cosmology.

**Rivers as Life-Givers:** Rivers such as Sarasvati, Ganga, and Yamuna were central to spiritual, economic, and social life. Vedic hymns praised rivers as life-sustaining forces, emphasizing cleanliness, reverence, and ritual bathing.

**Forests and Mountains:** Forests (vanas) were sacred spaces for meditation, education (Gurukulas), and rituals. Mountains were considered abodes of deities and symbols of stability and cosmic order.

**Sun and Fire Worship:** Surya (Sun) and Agni (Fire) were central in daily and sacrificial rituals, reflecting an understanding of energy cycles and environmental significance.

These practices demonstrate early environmental awareness and ecological ethics embedded in spiritual and daily life.

### **Vedic Rituals and Environmental Integration**

**Vedic rituals reflect deep ecological understanding and sustainable practices:**

**Yajnas (Sacrificial Rituals):** Conducted in harmony with natural elements, Yajnas followed solar and lunar cycles. Ingredients were locally sourced, and waste minimized.

**Seasonal Festivals:** Observances like Ritu Samskaras and agricultural festivals celebrated the cyclical nature of seasons and harvests, reinforcing respect for ecological rhythms.

**Ritual Geometry and Orientation:** Altars and fire pits were constructed according to natural topography and cardinal directions, demonstrating architectural alignment with environmental principles.

These practices illustrate early anthropological principles of eco-cultural adaptation, balancing human activity with nature's cycles.

### **Daily Life and Cultural Practices**

**Nature deeply influenced social and cultural life:**

**Agriculture and Settlement Patterns:** Vedic settlements were located near rivers, fertile plains, and forests. Irrigation systems and water management reflected sophisticated ecological knowledge.

**Diet and Lifestyle:** Predominantly vegetarian diets, seasonal foods, and local herbal medicines reveal awareness of sustainable resource use.

**Clothing and Material Culture:** Use of natural fibers like cotton and wool and dyes from plants shows eco-conscious craftsmanship.

Daily life in Vedic society was harmonized with ecological sustainability, providing a model for modern environmental ethics.

### **Knowledge Systems and Ecological Philosophy**

**Vedic literature reflects a holistic understanding of human-nature interaction:**

**Vedic Hymns:** Rigveda contains numerous hymns praising natural phenomena, emphasizing gratitude and harmony with the environment.

**Philosophical Texts:** Concepts like Rta (cosmic order) and Dharma (ethical duty) encode principles of environmental stewardship and societal balance.

**Medicinal Knowledge:** Atharvaveda describes medicinal plants and natural remedies, highlighting the interdependence of humans and nature.

The Vedic worldview combined spirituality, ethics, and science, laying a foundation for sustainable living practices.



## **Architecture and Urban Planning**

### **The Vedic approach to architecture was nature-centric:**

**Sacred Spaces:** Temples, altars, and hermitages were constructed respecting natural topography, water bodies, and sunlight.

**Village Planning:** Villages were oriented along rivers and forest edges, ensuring access to resources without ecological degradation.

**Material Use:** Structures used locally available, biodegradable materials to minimize environmental impact.

Integration of natural elements in architecture reflects advanced environmental planning and cultural reverence for nature.

### **Comparison with Other Ancient Civilizations**

**Mesopotamia:** Relied on rivers, but rituals were more utilitarian, unlike the Vedic blend of spirituality and ecology.

**Ancient Egypt:** Worshipped the Nile and solar cycles, but heavily engineered irrigation was prioritized over natural harmony.

**China:** Early Chinese culture revered rivers and mountains, similar to Vedic practices, but Vedic texts provide richer philosophical discourse on ecology.

The Vedic Civilization demonstrates a uniquely holistic integration of nature, philosophy, ritual, and daily life.

### **Contemporary Relevance**

#### **Sustainability Models**

Vedic eco-cultural practices can inform modern approaches to sustainable agriculture, architecture, and environmental ethics.

#### **Cultural Heritage Preservation**

Understanding these practices helps preserve intangible cultural heritage linked to nature.

#### **Environmental Education**

Lessons from Vedic ecological consciousness can be incorporated into curricula to foster eco-friendly attitudes.

### **Conclusion**

The Vedic Civilization exemplifies an early model of eco-culture, where natural elements guided social, religious, and philosophical practices. Understanding these principles offers insights into sustainable cultural heritage and informs modern approaches to environmental ethics. The ecological wisdom embedded in Vedic traditions remains relevant today, emphasizing the need for interdisciplinary studies that integrate archaeology, history, and environmental science.

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## **06. ABROGATION OF ARTICLE 370 AND ITS IMPACT ON INHABITANTS OF KASHMIR**

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### **Abstract**

The northern region of India is home to Jammu & Kashmir. After India and Pakistan split up in 1947, the union territory of Jammu and Kashmir became a point of contention between them. UT of Ladakh borders Jammu and Kashmir to the east, the Indian states of Himachal Pradesh and Punjab to the south, Pakistan to the southwest, and Pakistan administrated Kashmir (PAK) to the southwest. Jammu and Kashmir was once one of the biggest princely states of India. The population of J&K is 12,367,013 and the size is 101,387 square kilometres. India's battles with the Jammu and Kashmiri community and Pakistan's struggle for territorial control are central to the complex and protracted conflict over Kashmir. This long-lasting conflict includes political, social, economic, and cultural dimensions and affects millions of individuals in complicated ways. The area under union rule Up until August 5, 2019, Jammu and Kashmir was a state of India. Jammu and Kashmir was designated as Indian union territory on August 5, 2019. The Supreme Court of India removed Article 370 and 35A in Jammu and Kashmir, granting the local population unique status. Curfews and strikes are implemented in the UT as a result of public outcry at the court's decision to revoke article 370 in J&K. In Jammu & Kashmir, all internet and communication services were unavailable. The prolonged closure of businesses and educational institutions has a negative influence on Jammu and Kashmir's economy. The Indian Constitution grants the state of Jammu and Kashmir temporary special autonomy under a clause known as Article 370. When Jammu and Kashmir was incorporated to the Constitution in 1949, it granted the region a unique status inside the Indian Union. The history of Article 370 began with the princely state of Jammu and Kashmir's 1947 accession to India. After Maharaja Hari Singh, the princely state of Jammu and Kashmir, signed the Instrument of Accession in October 1947, the region became a part of India. This enabled the Indian government to assist tribal groups backed by Pakistan in their efforts to stave off an invasion. The Instrument of Accession stated that the state will continue to be autonomous in all domains except foreign policy, finance, communications, and defence. Jammu and Kashmir was granted special safeguards under Article 370 of the 1949 amendment to the Indian Constitution. The state was allowed to enact its own constitution and was granted a tremendous measure of autonomy. When Jammu and Kashmir accepted its own constitution in 1957, it solidified its distinct character. The state possessed authority over several matters, exclusive rights over land and property, and its own flag. It might also indicate someone was a long-term inhabitant. Over the years, a number of presidential decrees have been issued to bring Jammu & Kashmir under the jurisdiction of Indian law. However, the state continued to have its own identity and its people were governed by separate laws. Over time, despite its unique status, Article 370 underwent alterations and revisions. Jammu and Kashmir's autonomy was steadily diminished, and the state's relationship with the Indian Union becomes less clear-cut. The Indian government, led by Prime Minister Narendra Modi, removed Jammu & Kashmir's special status and annulled Article 370 on August 5, 2019. Jammu & Kashmir is well-known for its travel spots. It has tourist attractions for both the summer and the winter.

**Key Words:** Part XXI -foreign affairs- defence– communications-Article 370-Kashmir Despatch-Emergency Powers-legal and political process.

### Introduction

Article 370 granted special autonomous status to Jammu & Kashmir, allowing it to have its own constitution and laws different from the rest of India. The historical origins of Article 370 date back to the time of India's independence and the unique conditions under which Jammu & Kashmir joined India. Over the years, Article 370 faced various amendments and judicial interpretations, reflecting changing political dynamics. The revocation of Article 370 in 2019 led to significant political and social changes in Jammu & Kashmir, including its reorganization into two Union Territories. The long-term effects of the revocation are still unfolding, with ongoing debates about the region's future political and economic landscape. Article 370 was crafted during the drafting of the Indian Constitution. It was designed to grant special autonomous status to Jammu and Kashmir. This provision was included to respect the unique circumstances under which the state acceded to India. The article allowed Jammu and Kashmir to have its own constitution and autonomy over internal matters, except defense, communications, and foreign affairs.

There has been an upsurge in protest and violence in Indian-administered Kashmir since July 2016. The trigger was the killing of Burhan Wani, the leader of the armed group Hizbul Mujahedin by the security forces in that month. There have been numerous clashes between the Indian and Pakistani military across the 'Line of Control', as the border between Indian-administered and Pakistan-administered Kashmir is called.

Incursions by armed groups into Indian-administered Kashmir from Pakistan-administered Kashmir have also continued. In February 2019, more than 40 Indian soldiers were killed in an attack in Pulwama.

On 5 August 2019, the Indian Government suddenly announced the revocation of Article 370 of the Constitution, which grants the state of Jammu and Kashmir considerable political autonomy. The Government says this is a long-overdue measure that will help to stabilise the situation by integrating the state fully into India. But there are fears that this move will only add fuel to the flames.

### Historical Background

Article 370 of the Indian Constitution was a temporary provision that granted special status to the state of Jammu and Kashmir (J&K). Its origins can be traced to the circumstances surrounding J&K's accession to India in 1947. At the time of India's independence, princely states were given the option to join either India or Pakistan. The ruler of J&K, Maharaja Hari Singh, initially sought to remain independent but was forced to accede to India following an invasion by Pakistani-backed tribal militias.

On October 26, 1947, Maharaja Hari Singh signed the Instrument of Accession, bringing J&K under India's dominion but only in matters of defense, foreign affairs, and communications. This led to the need for a constitutional framework that would define J&K's relationship with India, leading to the drafting of Article 370.

### Drafting Process

The drafting of Article 370 was a complex process shaped by negotiations between J&K's political leadership, particularly Sheikh Abdullah, and the Indian government, led by Prime Minister Jawaharlal Nehru and Home Minister Sardar Patel.

1. Sheikh Abdullah's Role: Appointed as the Prime Minister of J&K in 1948, Sheikh Abdullah played a key role in negotiating J&K's special status. He argued for maximum autonomy to protect the region's unique identity.
  2. Gopalaswami Ayyangar's Contribution: A close aide of Nehru and a former Dewan of J&K, Ayyangar was tasked with drafting Article 370. He advocated for its inclusion as a temporary provision, considering the unsettled political situation.
  3. Constituent Assembly Debate: The provision was discussed extensively in the Indian Constituent Assembly. Some leaders, including Dr. B.R. Ambedkar, were skeptical about granting special status to J&K, but Nehru and Ayyangar emphasized its necessity due to the ongoing conflict in the region.
- Article 370 is a constitutional provision that gave Jammu and Kashmir its special status.
  - The provision was incorporated in Part XXI of the Constitution: Temporary, Transitional and Special Provisions.
    - As evident from the title of the Part, it was supposed to be a temporary provision and its applicability was projected to last till the formulation and adoption of the State's constitution.

It restricted the Parliament's legislative powers with respect to the state of J&K.

Pandit Nehru, on the floor of Lok Sabha on 27th November 1963, said that Article 370 has been eroded and the process of gradual erosion is going on. A year later, the then Home Minister Gulzari Lal Nanda, again on the floor of Lok Sabha on 4 December 1964, said, Article 370 is a tunnel to take the Constitution of India to Jammu and Kashmir. He further said that in the end, only the shell will remain there and it will be bereft of its contents, and it will hardly make any difference whether it is kept or not.

These two statements by two tall leaders of the country speak volumes about the dilution of Article 370 of the Constitution of India just merely after one decade of its enactment. The process had right away started in the year 1950, with the issuance of the Constitutional Application Order 1950, and thereafter, a number of parlances took place between the Centre and the State leadership, which evolved into an agreement known as the Delhi Agreement of 1952, wherein a number of subjects apart from those in the Instrument of Accession were agreed to be made applicable to the State of J&K. Some of them are as under:

- Appointment of the head of State.
- Persons having domicile in the State of J&K shall be Citizens of India.
- Fundamental Rights
- Jurisdiction of Supreme Court
- National Flag
- Financial Integration
- Emergency Powers

### **Implications of Revoking Article 370**

Article 370 was added to India's Constitution in 1949. It allows Jammu and Kashmir to have its own constitution, a separate flag and independence over all matters except foreign affairs, defence and communications. This autonomy has been greatly eroded in practice over recent decades.



During recent national elections, which it won decisively, the Bharatiya Janata Party (BJP), led by prime minister Narendra Modi, promised to revoke Article 370. Except for one clause to which the Government does not object, this happened by presidential order on 5 August.

A Bill has also been rapidly approved by both Houses of Parliament splitting the state of Jammu and Kashmir into two federal (also known as Union) territories. One will be called Jammu and Kashmir, which will have a state legislature. The other is Ladakh, which will be ruled directly from New Delhi.

The revocation of Article 370 extends to a key provision added under it, known as Article 35A. This gives special privileges to permanent residents, including state government jobs and the exclusive right to own property in Jammu and Kashmir. It is intended to protect the state's distinct demographic character as the only Muslim-majority state in India. Others, including the BJP, view it as discriminatory against non-Muslims and harming development. It was introduced in its current form in 1954 but a similar law was in place prior to Indian independence in 1947.

Thousands of additional soldiers were sent to Jammu and Kashmir prior to the 5 August announcement. A curfew is still in force. At least two senior Kashmir opposition politicians and former Chief Ministers, Omar Abdullah and Mehbooba Mufti, have been detained and there is a communication 'lockdown'. It is hard to find out what is happening on the ground.

#### **Is Revocation Legal Under Indian Law?**

Many acknowledge that Jammu and Kashmir's political autonomy has been greatly eroded in practice since Article 370 was introduced. But is the act of revocation legal under Indian law? There are many differing views.

Constitutional expert Subhash Kashyap, has said the order was "constitutionally sound" and that "no legal and constitutional fault can be found in it."

But some lawyers assert that constitutional change of this kind requires a two-thirds majority in both Houses of the Union Parliament. Others suggest that it requires the approval of a body – the Jammu and Kashmir Constituent Assembly – which no longer exists, having been abolished in 1957 after the state constitution was agreed.

In addition, the Supreme Court has previously declared that, contrary to those who believe it was only supposed to be a temporary measure, Article 370 has become a permanent provision of the Indian Constitution. This has led some to question whether it can ever be legitimately revoked.

The Supreme Court will very likely be asked to rule on the constitutionality of the BJP-led government's latest actions. But this could take some time. The Court is already considering a constitutional challenge to Article 35A.

Many critics of revocation regard it as breaching the contractual basis upon which the Maharaja of Kashmir decided to join India in 1947. Some lawyers think that this means there could be an international law dimension too.

#### **Presidential Orders**

Under Article 370 of the Constitution of India, the President had the power of issuing orders for the application of provisions of the Constitution of India with modifications, exceptions and amendments in the provisions. And this power has been upheld in several cases by the Supreme Court, e.g., in P. L. Lakhanpal vs the State of J&K.



As already said, for the application of other provisions of the Constitution of India to the State of J&K, the only mode available was the Constitutional Application Order. And the same was to be done with the consultation and concurrence of the State Government. The Presidential Orders, broadly speaking, deal with the following subject matters:

- Enhancing the jurisdiction of the Parliament to enact laws in the State of J&K out of the Union List.
- Laws relating to an increase or decrease in the area of the State.
- Making provisions for the return of the permanent residents of the State who migrated to the territories included in Pakistan under permit for settlement.
- Providing for constitutional protection to the laws relating to permanent residents of the state, their special rights and privileges, employment under Government, acquisition of immovable property, settlement in the State, scholarship.
- Earmarking the number of seats in the House of the people, excluding the area under the occupation of Pakistan.
- Provision for delimitation of Parliament Constituencies.
- Transfer of judges from the High Court of J&K or to the said Court.
- Exclusion of the State List.
- Provision as regards the decision affecting the disposition of the State of J&K.
- Acquisition and requisition of immovable property on behalf of and at the expense of the Union.
- Provision relating to the use of the official language of the Union and in the proceedings before the Supreme Court.
- Provisions for the proclamation of emergency.
- Provisions for non-application of the amendments carried out by the Parliament of India in the Constitution of India.
- Provision for Governor and the Election Commission.

In the year 1954, the Constitutional Application Order 1950 was renamed as the Constitutional Application Order 1954 and its issuance was the first infringement on the constitutional autonomy of the State of J&K. It culminated with the issuance of the Constitution (Application to J&K) Order, 2019. Article 370 itself was used to make it weak after remaining on the Constitution book for 70 years.

#### **Provisions of Article 370**

- J&K had its own Constitution and autonomy in all matters except defense, foreign affairs, finance, and communications.
- Indian laws would not apply automatically to J&K and required the state government's concurrence.
- Article 370 could only be modified with the recommendation of J&K's Constituent Assembly, making it difficult to alter.
- The Parliament needs the approval of the Government of Jammu and Kashmir in order to apply laws in Jammu and Kashmir. There are some exceptions such as Defence, finance, communication and foreign affairs.

- According to Article 370 no person from outside Jammu and Kashmir can purchase a property in Jammu and Kashmir. The central Government even has no power to proclaim a financial emergency in Jammu and Kashmir.
- Jammu and Kashmir are bound as a state under Indian Union by Article 370(1)(c). Article 1 exercises with the help of Article 370. If Article 370 is repealed, then Jammu and Kashmir will be termed an independent state until and unless new laws are made.

### **Role in Indian Independence**

The inclusion of Article 370 was influenced by the political landscape during India's independence. The princely state of Jammu and Kashmir had the option to join either India or Pakistan. The Maharaja chose to accede to India under certain conditions, leading to the incorporation of Article 370. This article was seen as a way to honor the terms of the accession.

### **Initial Implementation**

Initially, Article 370 was implemented to provide a temporary framework for Jammu and Kashmir's integration into India. Over time, it became a point of contention and debate. The special status granted by Article 370 meant that Indian laws did not automatically apply to Jammu and Kashmir. Instead, the state's legislature had to approve them. This unique arrangement was meant to ensure the state's autonomy while being part of India.

The historical context of Article 370 highlights its significance in the political and social fabric of Jammu and Kashmir. Understanding its origins helps in comprehending the complexities involved in its implementation and subsequent debates.

### **Facts on Article 370**

Article 370 – Temporary provisions with respect to the State of Jammu and Kashmir

(1) Notwithstanding anything in this Constitution,

(a) The provisions of Article 238 shall not apply in relation to the State of Jammu and Kashmir;

(b) The power of Parliament to make laws for the said State shall be limited to

1. Those matters in the Union List and the Concurrent List which, in consultation with the Government of the State, are declared by the President to correspond to matters specified in the Instrument of Accession governing the accession of the State to the Dominion of India as the matters with respect to which the Dominion Legislature may make laws for that State; and
  2. Such other matters in the said Lists as, with the concurrence of the Government of the State, the President may by order specify
- Explanation For the purposes of this article, the Government of the State means the person for the time being recognized by the President as the Maharaja of Jammu and Kashmir acting on the advice of the Council of Ministers for the time being in office under the Maharajas Proclamation dated the fifth day of March 1948 ;

(c) The provisions of Article 1 and of this article shall apply in relation to that State;

(d) such of the other provisions of this Constitution shall apply in relation to that State subject to such exceptions and modifications as the President may by order specify: Provided that no such order which relates to the matters specified in the Instrument of Accession of the State referred to in paragraph 1 of sub clause (b) shall be issued except in consultation with the Government of the State: Provided further that no such order which relates to matters other than those referred to in the last preceding proviso shall be issued except with the concurrence of that Government.

(2) If the concurrence of the Government of the State referred to in paragraph 2 of sub clause (b) of clause (1) or in the second proviso to sub clause (d) of that clause be given before the Constituent Assembly for the purpose of framing the Constitution of the State is convened, it shall be placed before such Assembly for such decision as it may take thereon.

(3) Notwithstanding anything in the foregoing provisions of this article, the President may, by public notification, declare that this article shall cease to be operative or shall be operative only with such exceptions and modifications and from such date as he may specify: Provided that the recommendation of the Constituent Assembly of the State referred to in clause (2) shall be necessary before the President issues such a notification.

#### **Application of 370**

- However, the State's constituent assembly dissolved itself on 25 January 1957 without recommending either abrogation or amendment of Article 370, leaving the status of the provision on a cliffhanger.
- The provision was later held to have acquired permanent status by way of rulings of the Supreme Court of India and the High Court of Jammu and Kashmir.
- This implied that to apply a central law to the state on subjects included in the Instrument of Accession, mere "consultation" with the state government is required.
- However, to apply a central legislation to matters other than defense, foreign affairs and communications," concurrence" of the state government was mandatory.

#### **Jammu and Kashmir Constitution**

- Article 3-> Relationship of the State with the Union of India:- The State of Jammu and Kashmir is and shall be an integral part of the Union of India.
- In the Preamble to the Constitution, not only is there no claim to sovereignty, but there is a categorical acknowledgement about the object of the J&K Constitution being "to further define the existing relationship of the state with the Union of India as its integral part thereof."

#### **Constitution (Application to Jammu and Kashmir) Order, 2019**

1. (1) This Order may be called the Constitution (Application to Jammu and Kashmir) Order, 2019.  
(2) It shall come into force at once, and shall thereupon supersede the Constitution (Application to Jammu and Kashmir) Order, 1954 as amended from time to time.
2. All the provisions of the Constitution, as amended from time to time, shall apply in relation to the State of Jammu and Kashmir and the exceptions and modifications subject to which they shall so apply shall be as follows:-

To article 367, there shall be added the following clause, namely: -

“(4) For the purposes of this Constitution as it applies in relation to the State of Jammu and Kashmir-

(a) References to this Constitution or to the provisions thereof shall be construed as references to the Constitution or the provisions thereof as applied in relation to the said State;

(b) references to the person for the time being recognized by the President on the recommendation of the Legislative Assembly of the State as the Sadr-i-Riyasat of Jammu and Kashmir, acting on the



advice of the Council of Ministers of the State for the time being in office, shall be construed as references to the Governor of Jammu and Kashmir;

(c) references to the Government of the said State shall be construed as including references to the Governor of Jammu and Kashmir acting on the advice of his Council of Ministers; and

(d) in the proviso to clause (3) of Article 370 of this Constitution, the expression “Constituent Assembly of the State referred to in clause (2)” shall read “Legislative Assembly of the State”.

### **Temporary, Transitional, and Special Provisions**

Article 370 of the Indian Constitution was designed to offer special status to Jammu and Kashmir. This article allowed the state to have its own constitution and autonomy over internal matters, except defense, communications, and foreign affairs. This special status was meant to be temporary, but it lasted for decades.

### **Amendment Procedures**

Amending Article 370 required the approval of the Jammu and Kashmir Constituent Assembly. Once this assembly dissolved in 1957, any changes to the article became nearly impossible. This unique amendment procedure made Article 370 different from other parts of the Indian Constitution.

### **Judicial Interpretations**

Over the years, the Supreme Court of India has interpreted Article 370 in various ways. Some rulings reinforced the article’s temporary nature, while others emphasized its permanence. These judicial interpretations have played a crucial role in shaping the legal landscape of Jammu and Kashmir.

The provisions of the Constitution of India with modifications, exceptions, and amendments in the provisions have always been a point of contention and debate.

### **Political and Social Implications**

#### **Impact on Jammu & Kashmir’s Autonomy**

Article 370 granted special autonomy to Jammu & Kashmir, allowing it to have its own constitution and decision-making powers. This autonomy was a significant aspect of the state’s identity. The removal of Article 370 in 2019 changed this dynamic, integrating Jammu & Kashmir more directly into India’s legal and political framework. This shift has led to debates about the balance between national unity and regional autonomy.

#### **Public Opinion and Political Movements**

Public opinion on Article 370 has been deeply divided. Some viewed it as essential for protecting the unique identity of Jammu & Kashmir, while others saw it as an obstacle to integration with the rest of India. The revocation sparked various political movements, both in support of and against the decision. These movements have highlighted the complex nature of regional and national politics in India.

#### **Role of Regional and National Parties**

Regional parties in Jammu & Kashmir have historically supported Article 370, viewing it as a safeguard for the state’s special status. National parties, on the other hand, have had mixed views, with some advocating for its removal to promote national unity. The differing stances of these parties have played a crucial role in shaping the political landscape of the region. The debate over Article 370 has also had a ripple effect on the geo-political relations in the subcontinent.



## Conclusion

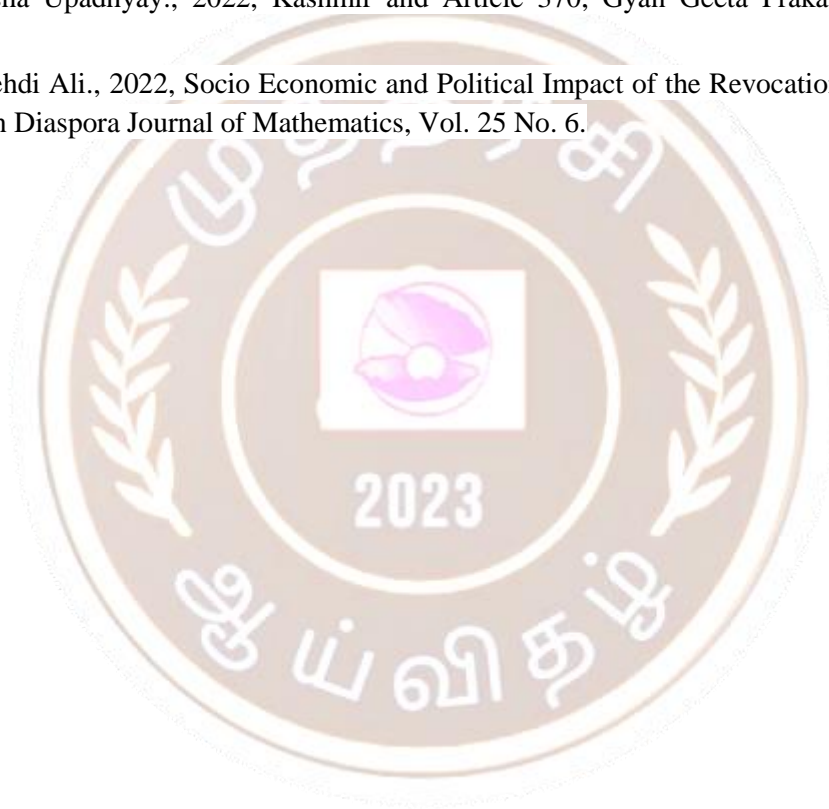
Article 370 has played a significant role in shaping the history and politics of Jammu & Kashmir. It granted the region a special status, allowing it to have its own constitution and autonomy in many areas. Over the years, this provision has been a subject of much debate and controversy. The recent changes to Article 370 have sparked discussions about the future of Jammu & Kashmir and its relationship with the rest of India. Understanding the historical context and impact of Article 370 is crucial for comprehending the complexities of this region. As we move forward, it is important to consider the perspectives of all stakeholders to ensure a peaceful and prosperous future for Jammu & Kashmir.

On 11 December 2023, a Constitution Bench of the Supreme Court unanimously upheld the power of the President of India to abrogate Article 370 of the Indian Constitution. This abrogation in August 2019 led to the bifurcation of the erstwhile state of Jammu & Kashmir into two Union Territories of J&K and Leh and also denuded the state of its special privileges. The top court said that Article 370 was only a temporary provision to facilitate the accession of the erstwhile princely state to the Union of India during a time fraught with internal strife and external aggression. Jammu and Kashmir's unique status was intended to expire, but only with the support of its citizens. Their lives and feelings were directly impacted by the Center's sudden disenfranchisement. The relocation will therefore undoubtedly have a big effect on Jammu and Kashmir's politics, culture, and demographics. The Jammu and Kashmir people should be contacted by the government to assure them of improved governance and security.

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## **07. ADOPTION AND USAGE OF TECHNOLOGY-DRIVEN BANKING SERVICES IN COMMERCIAL BANKS: A STUDY IN VIRUDHUNAGAR DISTRICT**

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### **Introduction**

After demonetization, the tradition of digital banking has gained more weightage and the Indian banks are very busy in delivering e-banking and internet banking services even to customers of rural and remote India. Hence in this transformation stage from conventional banking to contemporary banking, there is a strong need to understand the level of satisfaction of bank customers about technological up gradations in banks. Their demographic profile variables including age, sex, education and monthly income may influence the levels of satisfaction towards modern banking services. The researcher has taken efforts to present the attitude of customers towards e-banking services in Virudhunagar district.

### **Review of Literature**

“High Tech E- banking” facilities to the customers to access their accounting transactions very easily and within short span of time. They concluded that what the corporate customers expect from their bankers are reliability, assurance, empathy, responsiveness and pro-activity as they are the back bone of any relationship (Mahalakshmi,V., and Kanchana, P.Na., 2015). Today is re-defined and re-engineered with the use of Information Technology and it is sure that the future of banking will offer more sophisticated services to the customers with the continuous product and process innovations. (Satinder Singh, and Ajaydeep Singh Brar., 2016).

### **Objectives of the Study**

The main objective of the present study is outlined below

- To analyse the level of the adoption towards tech-based banking services.

### **Hypotheses**

Hypothesis is a tentative proposition formulated for empirical testing. The study is explorative in nature. In order to achieve the objectives of the study, the researcher has framed the following hypotheses:

- H<sub>0</sub>1: There is no significant difference among types of tech-based banking services preferred by the respondents
- H<sub>0</sub>2: There is no significant difference among the respondents regarding period of using tech-based banking services.

### **Methodology**

The survey has been undertaken to analyze the customer satisfaction towards tech-based services. The study is based on both primary and secondary data. Commercial banks can be classified into public, private sector banks and foreign banks. There are one hundred and thirty-four public sector banks, seventy-one private sector banks and there are no foreign banks in Virudhunagar district and totally two hundred and five bank branches are operating within the limit of Virudhunagar district. Virudhunagar district consist of three revenue divisions namely Aruppukottai, Sivakasi and Sattur. The Virudhunagar district consists of nine taluks namely Aruppukottai, Virudhunagar, Tiruchuli, Kariapatti, Sivakasi, Srivilliputtur, Sattur, Rajapalayam and Vembakottai. On the basis of

this sample size calculation, the researcher has taken 100 banks as samples. Then by using proportionate sampling, has selected sixty five public sector banks ( $134/205 \times 100$ ) and thirty five private sector banks ( $71/205 \times 100$ ). Totally one hundred banks are selected in the study area. Then, Convenience sampling technique has been adopted for selecting a sample of 500 customers that is 5 customers from each bank branch selected.

The data collected are classified and analyzed keeping in view the objective of the study. For the purpose of analysis, the statistical tools such as Percentage, Two way Analysis of Variance, Weighted Ranking Technique, t-test, One Way ANOVA have been used.

## **Results and Discussion**

### **I. Demographic profile of the respondents**

The demographic profile of the respondents was obtained by using seven parameters namely gender, age, marital status, employment wise classification, occupation, monthly income and education qualification. The same is presented in the Table 1

**Table 1: Demographic Profile of the Respondents**

<b>Factor</b>	<b>Particulars</b>	<b>Number of Respondents</b>	<b>Percentage</b>
Gender	Male	285	57
	Female	215	43
	<b>Total</b>	<b>500</b>	<b>100.0</b>
Age (in years)	Below 30	243	48.6
	30-40	143	28.6
	40-50	83	16.6
	50 and above	31	6.2
	<b>Total</b>	<b>500</b>	<b>100.0</b>
Marital Status	Married	337	67.4
	Unmarried	163	32.6
	<b>Total</b>	<b>500</b>	<b>100</b>
Employment Wise Classification	Employed	392	78.4
	Unemployed	108	21.6
	<b>Total</b>	<b>500</b>	<b>100.0</b>
Occupation of Employed Respondents	Businessmen	134	34.2
	Private Employee	69	17.6
	Government Employee	126	32.1
	Professionals	47	12.0
	Agriculturist	16	4.1
	<b>Total</b>	<b>392</b>	<b>100.0</b>
Monthly Income (in ₹.)	Less than 5,000	39	9.9
	5,000-10,000	53	13.5
	10,000-15,000	77	19.6
	Above 15,000	223	57.0
	<b>Total</b>	<b>392</b>	<b>100.0</b>
Educational Qualification	Primary Level	17	3.4
	High School	6	1.2
	Higher Secondary	15	3.0
	Under Graduate	165	33.0
	Post Graduate	218	43.6
	Professionals	79	15.8
	<b>Total</b>	<b>500</b>	<b>100.0</b>

**Source: Primary Data**



Table 1 reveals that a majority of 57 per cent of the respondents are male; a majority of 75 per cent of the respondents age group are 30 years below; a majority of 67.4 per cent of the respondents are married; 78.4 per cent of the respondents are employed; 34.2 per cent of the respondents are businessman; 57 per cent of the respondents fall under the income scale of above ₹ 15,000; 43.6 per cent of the respondents are post graduates.

## **II. LEVEL OF ADOPTION OF TECH-BASED BANKING SERVICES**

### **1. Frequency of Using Tech-Based Services**

Today carrying huge money is old fashioned and usage wherever carrying plastic money (cards) is stylish, modern and safe. Now-a-days bank customers prefer to use tech-based banking services rather than going to the bank. The usage of banking services by the customers can be listed under ATM/Debit cards, credit cards, telephone banking, mobile banking, internet banking and ECS/RTGS/NEFT. Table 2 gives cross tabulation of types of tech-based banking services and period of using tech-based banking services.

**Table 2: Types of Tech-Based Banking Services and Frequency of Using Tech-Based Banking Services Cross Tabulation**

<b>Services/ Years</b>	<b>Not using e-services</b>	<b>Less than 1 year</b>	<b>1 year to 3 years</b>	<b>3 years to 5 years</b>	<b>5 years and above</b>	<b>Total</b>
ATM / Debit cards	0	183 (36.6)	29 (5.8)	95 (19.0)	193 (38.6)	<b>500 (100)</b>
Credit Cards	85 (17.0)	368 (73.6)	11 (2.2)	2 (0.4)	34 (6.8)	<b>500 (100)</b>
Telephone Banking	409 (81.8)	73 (14.6)	16 (3.2)	1 (0.2)	1 (0.2)	<b>500 (100)</b>
Mobile Banking	135 (27)	332 (66.4)	9 (1.8)	21 (4.2)	3 (0.6)	<b>500 (100)</b>
Internet Banking	60 (12.0)	194 (38.8)	209 (41.8)	13 (2.6)	24 (4.8)	<b>500 (100)</b>
ECS/RTGS/NEFT	103 (20.6)	296 (59.2)	72 (14.4)	5 (1.0)	24 (4.8)	<b>500 (100)</b>

Source: Primary data (Figures in parentheses are percentages)

Two way Analysis of Variance (ANOVA) has been used to analyse the relationship between types of tech-based banking services preferred by the respondents and period of using tech-based banking services. The null hypotheses framed are as follows:

H<sub>01</sub>: There is no significant difference among types of tech-based banking services preferred by the respondents

H<sub>02</sub>: There is no significant difference among the respondents regarding period of using tech-based banking services.

**Table 3: Types of Tech- Based Banking Services and Frequency of Using Tech-Based Banking Services -ANOVA Test Results**

<b>Source of Variation</b>	<b>SS</b>	<b>df</b>	<b>MS</b>	<b>F</b>	<b>P-value</b>	<b>F crit</b>
Rows	0	5	0	0	1	2.71089
Columns	214636	4	53659	5.328	0.0044	2.866081
Error	201418	20	10070.9			
Total	416054	29				

Source: Computed data

Regarding the types of tech-based banking services, the calculated value of 'F' is 0 which is not significant as its p value is greater than 0.05 ( $1 > 0.05$ ). Hence, the null hypothesis is accepted. Thus, it is proved that there is no significant difference among types of tech-based banking services preferred by the respondents.

Regarding the period of using tech-based banking services, the calculated value of 'F' is 5.328 which is significant as its p value is less than 0.05 ( $0.0044 < 0.05$ ). Hence, the null hypothesis is rejected. Thus, it is proved that there is a significant difference among the respondents regarding the period of using tech-based banking services.

## **2. Factors Influencing to Use Technology Based Banking Services**

For successful implementation of e-banking program, it is imperative on the part of bankers to understand why customers prefer an offering and they devise the marketing strategies accordingly. Weighted ranking technique has been used to analyse the factors influencing the customers to use technology based banking services. The results of the weighted ranking technique are displayed in Table 4.

**Table 4: Factors Influencing to Use Technology based Banking Services-Result of Weighted Ranking Technique**

<b>Factors</b>	<b>Weighted Mean Score</b>	<b>Ranks</b>
Convenience (Any time banking)	10.03	V
Protection against fraud	8.33	VI
Greater control over finances	6.70	XI
Accessibility	11.95	II
Curiosity	7.21	IX
Paying bill online/ Online Shopping	10.62	III
Real time information	7.26	VIII
User friendliness	12.87	I
Ticket Booking/ Transfer money	6.87	X
Mobility	8.09	VII
Security and privacy through encryption	10.06	IV

Source: Computed data

It is clear from the table 4 that user friendliness got the first rank with mean score of 12.87; accessibility secured second rank with mean score of 11.95 and greater control over finance occupied last rank with the least score of 6.70.

### **Suggestions**

- Customers should themselves make some efforts to get knowledge and updates about tech based banking services and make them technically competent.
- Different mobile applications for different services would be uncomfortable while using. Therefore, single application for all the services might be designed.

### **Conclusion**

Money plays an important role in the day - to - day life. The implementation of tech-based banking service improves customer relation and facilitates the bank to extent the services to the

remote areas. Technology deployment should be accompanied by process changes to derive enduring benefits which would enable the banks to manage their banking business in the best possible manner.

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## **08. CUSTOMER SATISFACTION TOWARDS RAPIDO APP IN SIVAKASI**

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### **Abstract**

India's urban mobility has been completely transformed by the explosive rise of ride-hailing services, with Rapido becoming a major force in the two-wheeler transportation market. This study investigates customer satisfaction with the Rapido app specifically in Sivakasi, a town known for its bustling commercial activity and growing demand for efficient transportation. A structured survey was conducted among 53 randomly selected Rapido users in Sivakasi to assess satisfaction levels across key dimensions including ease of booking, driver behavior, app usability, pricing, and overall ride experience. Findings reveal that the most influential factors contributing to customer satisfaction are the simplicity of the booking process, courteous driver conduct, and the intuitive design of the app interface. Respondents also appreciated the affordability and time-saving nature of Rapido rides, especially in navigating Sivakasi's congested routes. However, occasional concerns regarding ride availability during peak hours were noted.

This study highlights the importance of maintaining high service standards and enhancing app features to meet the evolving expectations of users in tier-2 cities like Sivakasi. The insights gained can help Rapido refine its offerings and strengthen its presence in similar urban markets.

**Keywords:** Rapido, Customer Satisfaction, Transportation

### **Introduction**

Rapido, a bike taxi service established in 2015, has earned a strong reputation for its speed, affordability, and convenience. It has rapidly become a preferred mode of transport for individuals seeking a reliable and efficient way to navigate the bustling streets of Indian cities.

Customer feedback plays a vital role in Rapido's continuous improvement. Through regular satisfaction surveys, the company gathers insights into what users appreciate and where enhancements are needed. This valuable input informs app updates and shapes driver training and support programs.

A key contributor to customer satisfaction is the overall ride quality. Rapido ensures that its drivers are thoroughly vetted and trained to deliver safe and comfortable journeys. Additionally, the bikes are routinely serviced and maintained to remain in optimal condition.

Rapido also stands out for its competitive pricing. With a variety of ride options available, customers can select services that suit their preferences and budget. The app-based payment system further streamlines the experience, making transactions quick and hassle-free.

Customer satisfaction remains at the heart of Rapido's mission. Its dedication to providing high-quality service, intuitive technology, and dependable rides has solidified its position as a trusted leader in the bike taxi industry across India.

### **Objectives of the Study**

- To analyze the adoption and usage patterns of Rapido services within Sivakasi.
- To assess customer satisfaction levels regarding the quality and reliability of Rapido's offerings.
- To identify the challenges and issues experienced by users while availing Rapido services.



### **Statement of the Problem**

Rapido, India's popular bike taxi service, has earned recognition for its speed, affordability, and convenience. However, despite its commitment to delivering high-quality service, certain aspects of customer satisfaction may still require attention. Some users report issues such as delayed rides, ineffective communication, or unsatisfactory support experiences.

One area of concern is ride quality. Although Rapido ensures its drivers are thoroughly screened and trained, occasional incidents involving reckless driving or poorly maintained bikes can negatively impact the customer experience and erode trust in the service.

Customer support is another potential challenge. While Rapido offers a dedicated help team to address queries and resolve complaints, some customers encounter long response times or inadequate assistance, leading to frustration and a diminished perception of the brand.

In summary, while Rapido continues to be a reliable and efficient transportation option, there are opportunities to further enhance customer satisfaction. By proactively identifying and resolving these issues, Rapido can strengthen its service quality and reinforce its leadership in the bike taxi sector.

### **Scope of the study**

The scope of the study on customer satisfaction with Rapido app includes a comprehensive examination of the factors that influence customer satisfaction with the service. The study aims to identify the key drivers of customer satisfaction and to explore areas for improvement in order to enhance the customer experience. The study will include a review of existing literature on customer satisfaction and on-demand transportation services, as well as an analysis of Rapido's own customer satisfaction data. This will involve a review of customer feedback surveys, ratings and reviews, and other relevant metrics.

### **Research Methodology**

#### **Research area**

The research area describes the buying behavior of Consumer Satisfaction Towards Rapido App.

#### **Source of data**

The researcher used both Primary and Secondary data. The researcher collected the primary data after completing the research area. Primary data was collected through a questionnaire. It was collected from 50 respondents. Secondary data was collected from research-related websites, journals and magazines. It was collected through a library to facilitate a proper understanding of the conceptual framework of the study.

#### **Sample**

A total of 50 questionnaires were gathered for the survey using a convenience sampling technique.

#### **Data Analysis**

The collected data is refined, consolidated, and analyzed using suitable statistical methods, with the results presented as percentages and showcased in brochures.

#### **Tools used in the analysis**

- Percentage analysis

- Chi-square analysis

### **Limitation of the Study**

- The maximum number of samples selected is 53. Therefore, the results cannot be generalized.
- Respondents may be biased. The data collected may not be predictable.
- Customer preferences and opinions are expected to change from time to time

### **Review of Literature**

Sathiyarayanan and Dhanapal (2021) examined the determinants of customer satisfaction in mobile applications, with a particular focus on the Rapido bike taxi app. Their findings highlighted app performance, perceived value, trust, and ease of use as key contributors to customer satisfaction.

Kumari and Shetty (2021) evaluated customer satisfaction within online ride-hailing platforms, specifically analyzing the Rapido bike taxi service. They identified ease of booking, safety, reliability, and customer support as significant influencing factors.

Vijayakumar and Arumugam (2019) conducted an empirical investigation into customer satisfaction related to Rapido bike taxi services. Their study emphasized the importance of the app's user interface, service quality, and customer support in shaping user satisfaction.

Jaya and Sharmila (2020) explored customer perceptions of the Rapido bike taxi service, revealing that punctuality, pricing, reliability, and customer support were crucial elements affecting satisfaction levels.

Vidhyalakshmi and Ramesh (2019) focused on customer satisfaction in online cab booking services, centering their research on the Rapido bike taxi app. They concluded that pricing, the booking process, and overall user experience were significant predictors of customer satisfaction.

### **Overview About Rapido**

Rapido is a widely used bike taxi service operating across numerous cities in India. Launched in 2015, the platform enables users to book bike rides swiftly and effortlessly, making it a preferred option for short-distance travel - especially during peak traffic hours. Its rapid growth can be attributed to its affordability and convenience, often offering fares lower than those of traditional taxi services.

The app is equipped with user-friendly features such as real-time ride tracking, cashless payment systems, and robust safety protocols including GPS monitoring and mandatory helmet usage. Rapido's emphasis on customer satisfaction and safety has played a key role in its success. The company enforces strict safety standards, including rider background checks, compulsory helmets for both riders and passengers, and GPS-enabled ride tracking. It also offers training programs to ensure riders are well-versed in traffic regulations and safety practices.

Overall, Rapido has emerged as a trusted and efficient mode of transportation for Indian commuters, thanks to its budget-friendly pricing, ease of use, and commitment to safety and service quality.

### **Data Analysis and Interpretation**

This paper presents an analysis and interpretation of consumer satisfaction with the Rapido app. A sample of 50 respondents was selected for the study. Their opinions and relevant insights were gathered through a structured questionnaire that included both personal and experiential factors. The collected data were systematically classified, tabulated, and examined using appropriate statistical tools to align with the research objectives.

**Table 1: Demographic Profile of the sample respondent**

Demographic Variables		Frequency	Percentage
Age	Below 25 years	23	46
	26-35 years	16	32
	36-45 years	6	12
	46 and above	5	10
	Total	50	100
Gender	Male	24	48
	Female	26	52
	Total	50	100
Educational Qualification	UG	20	40
	PG	18	36
	Professional	12	24
	Total	50	100
Monthly Income	Less than 10000	8	16
	10000-20000	19	38
	20000-30000	15	30
	Above 30000	8	16
	Total	50	100
Marital Status	Married	29	58
	Unmarried	21	42
	Total	50	100

Based on Table 1, the demographic profile of the respondents is summarized as follows:

- **Age Distribution:** 46% of respondents are below 25 years of age, 32% fall within the 26–35 age group, 12% are aged between 36–45 years, and 10% are above 46 years.
- **Gender:** 48% of the participants are male, while 52% are female.
- **Educational Qualification:** 40% have completed undergraduate studies, 36% hold postgraduate degrees, and 24% possess professional qualifications.
- **Monthly Income:** 16% earn less than Rs.10,000, 38% have an income between Rs.10,000–Rs.20,000, 30% fall within the Rs.20,000–Rs.30,000 range, and 16% earn above Rs.40,000.
- **Marital Status:** 58% of respondents are married, whereas 42% are unmarried.

### Chi-Square Analysis

Ho: There is no significant relationship between Age and usage of Rapido App.

H1: There is a significant relationship between Age and usage of Rapido App.

**Table 2: Chi-Square Analysis**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	32.268 <sup>a</sup>	30	.355
Likelihood Ratio	32.894	30	.327
N of Valid Cases	50		

a. 40 cells (90.9%) have count less than 5. The minimum expected count is .08.



From the above Table 2 it is found that hypothesis is significant in two cases.

It is concluded that the relationship between age and usage of Rapido App is significant.

### Findings

- ✓ Majority 46% of people are in the age group of 26-35 years.
- ✓ Majority 52% of people are Female.
- ✓ Majority 40% of people are UG(Under Graduates).
- ✓ Majority 38% of people have monthly income in the range of Rs.10000-Rs.20000
- ✓ Majority 58% of people are married.

### Suggestions

- ✓ **Ensure 24/7 Availability** Rapido should operate round-the-clock to meet customer demands at any hour, ensuring consistent accessibility.
- ✓ **Strengthen Safety Measures** Continuous upgrades to safety protocols and features are essential to guarantee a secure and comfortable ride for all users.
- ✓ **Enhance Captain Training** Providing comprehensive training to captains—focusing on communication skills and customer etiquette—will elevate service quality and rider satisfaction.
- ✓ **Promote Billing Transparency** Clear and fair billing practices should be prioritized to build trust and eliminate confusion regarding ride charges.
- ✓ **Boost Customer Support** A responsive and efficient customer service system is crucial for resolving complaints and addressing user concerns promptly.
- ✓ **Launch Loyalty Programs** Introducing rewards for frequent users—such as discounts, cashback, or exclusive offers—can foster customer retention and appreciation.
- ✓ **Broaden Geographic Reach** Expanding operations to additional cities and regions will allow more customers to benefit from Rapido's services and increase market presence.
- ✓ **Partner with Corporate Organizations** Rapido can establish partnerships with companies to provide exclusive ride discounts for their employees, enhancing brand exposure and boosting customer satisfaction.
- ✓ **Leverage Customer Feedback** By actively gathering and analyzing customer feedback, Rapido can refine its services and tailor offerings to better meet user expectations.

### Conclusion

Current research and literature indicate that consumer satisfaction with the Rapido app is generally high. Users consistently praise its convenience, affordability, and reliability, which collectively enhance the overall ride experience.

One of the most valued aspects is the convenience the app provides. It enables users to book rides swiftly and effortlessly, minimizing wait times and helping them avoid traffic congestion. The inclusion of real-time ride tracking further improves user confidence and satisfaction.

Affordability also plays a crucial role in shaping positive perceptions. Rapido offers competitive pricing along with attractive discounts, making it a preferred choice for budget-conscious commuters seeking a cost-effective transportation solution.



In addition, the app's reliability and safety features significantly contribute to user satisfaction. Rapido ensures dependable service and incorporates essential safety measures such as live tracking and emergency support, which foster trust and peace of mind among riders.

In summary, the Rapido app has earned favorable feedback from its users. Its commitment to delivering a safe, affordable, and user-friendly experience has helped it meet customer expectations and maintain a growing and loyal user base.

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## **09. ASIVAKA RELIGIN IN TAMIL NADU : MARKALI KOSALAR BIO – DATA IN HISTORICAL HINTS**

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### **Synopsis**

‘Ajeevika’ (pali) means those who follow a disciplined life. It also means the living principles of laity and religious people. ‘Asivagam’ refers to a flawlers place or a place where you get the best remedy. The Tamil Asivagam religion is a five fold tradition. It was found throughout ancient India. Remnants of Asivagam religion are found in many places in the distict of Trichy, Madurai and Tirunelveli in Tamil Nadu. The principles of Asivakam were formulated and compiled by religious scholars to suit the needs of the time and the environment. The founder of Asivagam is MarkaliKosalar who created the philosophy of ‘Natural law’, ‘theory of uzh’ (Tamil). A separate book on the Asivaga religion is not available. Anspicious page references canbe found through many page references. Many scholars have argued that primary evidence, including field studies and archaeological excavation data from keeladi, Adhichanallur, Arikamedu, Porunai, Vembakkottai confirms Asivaga religious identity. It can be seen that Jainism, Buddhism and Asivagam were the anti – Vedic religious which were opposed to the Vedic religion, sacrifice and rejection of the Sanskrit language. They had the principle of denial of God as their opposing ideology. TherefourAsivakaSithars were hanged. The versatile gifts of the Asivars, religious symbols, relics of the Asivagas, the Asivagam information reference list, a Histirical analysis of the principles given by the philosophers to the above study and the reference books are as follows.

**Key words:** Uzh, fate, agriyavatham, atomic theory, coincidence.

**தமிழ்நாட்டில் ஆசீவக(ம்) சமயம் : மற்கலி கோசாலர் சுய விபர(ம்)**

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**ஆய்வுச் சுருக்கம்**

‘அஜீவிசா’ (பாலி) என்றால் உயர்ந்த நல்லொழுக்கமிக்க வாழ்க்கை முறையைக் கைக்கொண்டவர்கள் என்று பொருள். இல்லறம், துறவறம் என்ற வாழும் நெறிமுறையை உரைப்பதாகும். ‘ஆசீவகம்’ (தமிழ்) ‘ஆசு - ஈவு - அகம்’ என்பதற்கு பிழையற்ற அல்லது செம்மையான தீர்வு தரக்கூடிய இடம் என்று பொருள். தமிழில், ஆசீவகம் காரணப் பெயராக துறவிகளின் வாழ்விடத்தைக் குறிக்கும் சொல்லாக வந்திருக்கிறது. தமிழரின் ஆசீவகம் ‘ஐந்திரம்’ மரபுடையது. பண்டைய இந்தியா முழுமையும் ஆசீவகம் காணப்பட்டது. தமிழகத்தில் திருச்சிராப்பள்ளி, மதுரை, திருநெல்வேலி மாவட்டங்களில் ஆசீவகச் சமயத்தின் எச்சங்கள் பல இடங்களில் காணப்படுகிறது. ஆசீவக சமயம் காலத் தேவைக்கும் துழலுக்கும் பொருந்தும்படியாக கொள்கைகள் சமயப் பேரறிவாளர்களால் வகுத்து தொகுக்கப்பட்டன. மற்கலி கோசாலர் - ‘இயற்கை விதி’ ‘ஊழியல் கோட்பாடு’, ஆசீவகத்துடன் இணைக்கப்பட்டது. ஆசீவக சமயம் குறித்த தனி ஒரு நூலாக கிடைக்கவில்லை. சுப பக்கச் சான்றுகள் (கருத்து), பர பக்கச் சான்றுகள் (எதிர் கருத்து) வழியாக ஆசீவக கருத்துக்களை அறிய முடிகிறது. கீழடி, ஆதிச்சநல்லூர், அரிக்கமேடு, பொருநை, வெம்பங்கோட்டை கள ஆய்வுகள் மற்றும் தொல்லியல் அகழாய்வு தரவுகள் முதன்மைச் சான்றுகள் ஆசீவக சமய அடையாளத்தை உறுதி செய்கின்றன என பல அறிஞர்களின் ஆய்வுக் கூற்றாகும். வைதீக வேத மதம் எதிர்ப்பு, வேள்விப் பலி எதிர்ப்பு, சமஸ்கிருத மொழி மறுப்பு போன்றவற்றைக் கொண்ட அவைதீக சமயங்களாக சமணம், புத்தம், ஆசீவகம். கபாலிகர் (ஆகமம்) கடவுள் மறுப்பு கொள்கையை தங்கள் எதிர் கருத்தாகக் கொண்டிருந்தனர் என்று அறிய முடிகிறது. ஆகவே, ஆசீவகச் சித்தர்கள் கழுமரத்தில் ஏற்றப்பட்டனர். ஆசீவகர்களின் பல்துறைக் கொடைகள், சமய அடையாள சின்னங்கள், ஆசீவக அடையாள எச்சங்கள், ஆசீவகம் - மாற்கலி கேசலர் தகவல் குறிப்புப் பட்டியல், பற்றி வரலாற்றுப் பகுப்பாய்வு செய்கின்றது. மேற்கண்ட ஆய்வின் அடிக்குறிப்புக்கள், சான்று நூல்கள் கீழே கொடுக்கப்பட்டுள்ளன.

**திறவுச் சொற்கள்:** ஊழ், விதி, அகிரியா வாதம், அணுக் கொள்கை, தற்செயல் கோட்பாடு.

**முன்னுரை**

தமிழில், ஆசு - ஈவு - அகம் என்பதற்கு பிழையற்ற அல்லது செம்மையான தீர்வு தரக்கூடிய இடம் என்று பொருள். ஆசீவகத் துறவிகளின் வாழ்விடத்தைக் குறிக்கும் சொல்லாக காரணப் பெயராக வந்திருக்கிறது. மனிதனின் பக்தி இயக்கத்திற்கு மாற்றாக ஞான (அறிவு) இயக்கத்திற்கு வழிவகை செய்தன. இயல்புக்கோட்பாடு அல்லது அணுவியம், தற்செயல் அல்லது வினை மறுப்பு, ஊழியல் அல்லது இயற்கை விதி, ஊழ்கம் அல்லது குண்டலி பயிற்சி (உத்தி - ஓகம்) அனைத்தும் ஐந்திர மரபினை உறவுப்படுத்தும் அறிவியலாகும். ஆசீவகத்தை உருவாக்கியவர் மாற்கலி கோசலர் ஆவர். இந்த ஆய்வானது ஆசீவக சமயம் தத்துவ அறிஞர் குறித்த சுய தகவல் வரலாற்றுக் குறிப்புப் பட்டியல், மெய்யியல் கொள்கைகள் பற்றி விளக்கமாக தத்துவ விசாரணை, பகுப்பாய்வு செய்கிறது.



**ஆசீவகம் :** மாற்கலி கேசலர் தகவல் குறிப்பு பட்டியல்

**சமயத் தலைவர் பெயர் :** மக்கலி கோசலர் (ஆசீவக சமயத் தோற்றுவாளர்)<sup>1</sup>

**தந்தை பெயர் :** மங்கலி<sup>2</sup>

**தாய் :** (தெரியவில்லை)

**பிறந்த இடம் :** சரவண<sup>3</sup> (நாணல்களின் புதர்), (கோசலம்) கோசாலை (மாட்டு கொட்டகை) குயவு - கோவு<sup>4</sup>

**பிறப்பு :** கி.மு. ஆறாம் நூற்றாண்டு, அறிவெளி காலம்<sup>5</sup> (கி.மு. 542)

**இயற்பெயர், காரணப் பெயர் :** கலியன் (கலிவாகு)<sup>6</sup>

**அறப் பெயர் :** சாத்தன்<sup>7</sup> (சாக்கையன்), ஐயனார்<sup>8</sup> (தரும சாத்தா)

**வாழ்க்கை முறை :** நாடோடிகள், பிறரிடம் பிச்சை எடுத்து இரந்துண்டு வாழ்தல்.<sup>9</sup> பிற்காலத்தில் ஆசீவகத் துறவிகள் உழைத்துண்டு வாழ்ந்தனர்.<sup>10</sup>

**சம காலத்தவர் :** வர்த்தமான மகாவீரர் (24 வது தீர்த்தங்கரர்) மற்றும் பக்குடுக்கை நன்கணியார்.<sup>11</sup>

**சமணர் பிரிவு :** மகா வீரரை முதன்முதலாக நாளந்தாவில் மக்கலி சந்தித்தார். தனது 32 ஆம் வயதில் சந்தித்தார். ஆறு ஆண்டுகள் நட்பு நீடித்தது<sup>12</sup> கொள்கை, கோட்பாடுகள் வேற்றுமை காரணமாக இருவரும் பிரிந்தனர். 'திகம்பரர்கள்' என்ற பிரிவில் திசையை ஆடையாக அணிபவர்கள் என்ற பொருளில் நிர்வாணத் துறவிகளாக ஆசீவகர்கள் பிரிந்து, வட இந்தியாவிலிருந்து தென் இந்தியாவிற்கு வந்தனர். அவர்கள் 'திசையாசிரியர்கள்' 'அறிவர்கள்' 'சித்தர்கள்' 'அமணர்கள்' 'சிரமணர்' 'சாரணர்' (மூத்த துறவி) 'வாலறிவர்' 'தேரசியர்' என்று பல பெயர்களில் அழைக்கப்பட்டனர்.<sup>13</sup>

**ஆசீவகச் சமயம் பரவல் :** பிந்து சாரன், மகா அசோகன், அவரது மகன் தசரதன் ஆட்சி காலத்தில் இந்தியாவிலும் பந்துகாபயன் ஆட்சி காலத்தில் இலங்கையிலும் பரவியது. தமிழகத்தில் திருச்சிராப்பள்ளி, மதுரை, திருநெல்வேலி மாவட்டங்கள்<sup>14</sup>

**ஆசீவகம் :** (காரணப் பெயர் : துறவிகளின் வாழ்விடம்) ஆசு - ஈவு - அகம். இதன் பொருள் பிழையற்ற அல்லது செம்மையான தீர்வு தரக்கூடிய இடம்<sup>15</sup> அறம் என்பது மாறக்கூடியது. இல்லறம், துறவறம் வாழும் நெறிமுறையை உரைப்பதாகும். 'அஜீவிகா' (பாலி) என்றால் உயர்ந்த நல்லொழுக்கமிக்க வாழ்க்கை முறையைக் கொண்டவர்கள் என்று பொருள்<sup>16</sup>

**நூல் :** ஒன்பது வாங்கதிர் (நவகதிர்), மற்கலி நூல்<sup>17</sup>

**தலைமையகம் :** (சிராவஸ்தி), திருவெள்ளறை, திருச்சிராப்பள்ளி, (தமிழ் நாடு)<sup>18</sup>

**மாணவி :** ஆலகாலா (குயவர் குலப் பெண்)<sup>19</sup> மற்றும் ஆறு சீடர்கள்<sup>20</sup>

**ஊர் :** சவாத்தி<sup>21</sup> (இறுதி காலம்)

**நிறுவனம் :** பாழிகள் (ஆசீவக அறிவர் பள்ளிகள்), ஊழியல் சங்கம், இயக்கர் - இயக்கியர்<sup>22</sup>

**வாழ்வின் நோக்கம் :** வீடுபேறு நிலை அதாவது முக்தி அடைதல், செம்போதக நெறி அடைதல். (நீர் வண்ணம் அடைதல், கழிவெண் பிறப்பு அடைதல்) முழு மனிதத் தன்மை அடைதல்<sup>23</sup>

**இறப்பு :** கி.மு. 500 கழி வெண்மை நிலை அடைதல்<sup>24</sup> தமது 42 ஆம் வயது கேவல ஞானம் அடைதல். (மகாவீரர் கி.மு. 494 இறந்தார். ஆறு ஆண்டுகளுக்கு பின்பு ஜீனர் ஆனார்).

**வட மரபு :** நவ நாதச் சித்தர்கள்<sup>25</sup>

**தென் மரபு :** பதினெண் சித்தர்கள் (தமிழ் மரபு)<sup>26</sup>



**அழிவு காலம் :** தமிழ் நாட்டில், ஆசீவகர்கள் 14 ஆம் நூற்றாண்டு பிற்பகுதி வரையில் வாழ்ந்தனர். வணிக செட்டியார்கள் ஆசீவகத்திலிருந்து சைவ சமயத்திற்கு மாறியதால் ஆசீவகத்திற்கு ஆதரவு இல்லாமையே அழிவிற்குக் கொண்டுச் சென்றது. கி.பி. 15 ஆம் நூற்றாண்டில்தான் பண்டிய நாட்டின் வட்டெழுத்து முறை சேர (இன்றைய கேரளா) நாட்டிற்குச் சென்றது. சமற்கிருதத்திற்கு வரி வடிவம் பிற்காலத்தில் உருவாக்கப்பட்டது. ஆசீவகம் தன் இறுதி காலத்தில், ஆசீவகத்தின் ஒரு குழுவினர் வள்ளுவர்களின் தலைமையில் ஸ்ரீ இராமனுஜர் (துவைதம்) காலத்தில் வைணவத்தின் தென்கலையாக திருமண இட்டு இணைந்தனர்<sup>27</sup> உயிர் கருணை, கொல்லாமை, பிறருக்கு இன்னா செய்யாமை என்னும் உயரிய நெறியைப் பின்பற்றியும் தாமாக முன்வந்து துன்பமேற்பு நிலையை அன்பின் உச்சம் என்ற நிலையில் உயிர் தியாகம் செய்ததே ஆசீவகத்தின் அழிவிற்குக் காரணம் எனலாம்.

**சுப பக்கச் சான்றுகள் (கருத்து) :** தமிழ் நூல்கள் அன்றி வட நூல்களில் அர்த்த சாஸ்திரம் (கி.மு. 300), புத்தகோஷா, சமணபலசுத்தா, (தொன்மையான அழிந்து போன இந்தியவின் வடமொழியான பாலி, பிராகிருதம், போஜ்புரி, மைத்திலி, மகதி, சிந்தி) கொடுமணல், கீழடி, ஆதிச்சநல்லூர், அரிக்கமேடு, பொருநை, வெம்பங்கோட்டை தள ஆய்வுகள் முத்திரைகள் மற்றும் தொல்லியல் அகழாய்வுகள் வழியில் கிடைத்த கருப்பு, சிவப்பு பானை தொழில் நூட்பவியல், முதுமக்கள் தாழிகள், பயன்பாட்டு அறிவியல் பொருட்கள் கிடைத்துள்ளன.

தருமானந்த கோசாம்பி, ஏ.எல். பாசாம், கோர்ன்லே, குணா, நெடுஞ்செழியன், ஆதிசங்கரன், தேவ பேரின்பன், விஜயலட்சுமி, தேவிபிரசாத் சட்டோபாத்தியாயா போன்ற அறிஞர்களின் ஆய்வுகள் வழிகாட்டியாக அமைந்துள்ளது.

**பர பக்கச் சான்றுகள் (எதிர் கருத்து) :** வைதீக வேத மதம் எதிர்ப்பு, வேள்விப் பலி எதிர்ப்பு, சமஸ்கிருத மறுப்பு. சமணம், புத்தம், ஆசீவகம். கபாலிகர் (ஆகமம்), ஊழ், வினை ஆற்றலின் தன்மையும் கடவுள் மறுப்பும் கருத்தாகக் கொண்டனர். பாலி, பாகத மொழி, தமிழி மொழி வளர்த்தனர். திருக்குறள் 'ஊழ்' அதிகாரம், அறநெறிகளான கொல்லாமை, அவாமறுத்தல், புலால் உண்ணாமை, நிலையாமை, துறவு, இன்னாசெய்யாமையைப் பின்பற்றினர். 'பதினெண் சித்தர்களின் பெரிய ஞானக்கோவை' போன்ற நூல்களை ஆய்வு நூல்களாக எடுத்துக்கொள்ளலாம். கருத்தியல், பொருளியல், உழைப்புச் சுரண்டலுக்கு எதிராகக் குரல் கொடுத்தனர்.

**பல்துறைக் கொடைகள்:** மெய்யியல் தத்துவம், தருக்கவியல், உத்தி, (ஊழ்கம் - அம்மணம்) ஓகம், (தவ நெறி), சித்த மருத்துவம், வேதியியல், நாட்டியம், மௌன விரதம், அறிவியல், உலகாயாதம் (சார்வாகம்), அணுவியல், வண்ணக் கோட்பாடு, ஊழியல் விதி, ஐந்திர மரபு, பள்ளி - பாழி, தேக வாதம், ஐம்பூத வாதம் (உலகு - உடல் உறவு, அண்டம் - பிண்டம்), வானியல், பிறப்பியம், சோதிடம் (விளக்கு) கலியுகம், ஊழியல் சங்கம் (சபை), பஞ்சாங்கம், இசை, கருப்பு, சிவப்பு பானை - தாழி, மனிதத்துவம், எழுத்துரு மொழிக் குறியீடுகள், முத்திரைகள்<sup>28</sup>

**ஆசீவக அடையாள சின்னங்கள் :** சுழல் குறி (ஸ்வஸ்திக்), யானை, குதிரை, திருநிலை, தாலிக் கொடி, கால் காசு, சக்கரத்தாயி, திரு விளக்கு (கஜ இலக்குமி), மாதங்கி, கந்தழி, கொடி நிலை, சுருள் வளையம் (ஊழ் வட்டம் - 60 ஆண்டு), விழுவன் குச்சி (12 அங்குலம்), புரவி எடுப்பு (எச்சங்கள்), ஏழு கன்னியர்கள்<sup>29</sup> முது மக்கள் தாழிகளில் தவம் செய்து இறத்தல், மண் பானை சாடியான பெரும் பானையிலிட்டு புதைப்பர். அமர்ந்த நிலையில் புதைப்பர்<sup>30</sup>

**ஐந்திர மரபு வளர்த்த குலங்கள் :** வள்ளுவர்கள், புலையர்கள், கணியர்கள், வண்ணார்கள், நாபிதர்கள், மருத்துவர்கள், குயவர்கள், வணிகச் செட்டியார்கள், வேளார்கள், புதிரை வண்ணார்கள்<sup>31</sup>

**மெய்யியல் தத்துவம் :** மற்கலி கோசாலரிள், 'இயற்கை விதி', 'ஊழியல் கோட்பாடு' இதில் மனித முயற்சிக்கு இடமில்லை. தற்செயல் கோட்பாடுதான் அணுவியத்திற்கும் ஊழியலுக்கும் அடிப்படையாக உள்ளது. தற்செயல்தான் ஊழக மாறும். மனித வாழ்க்கையில் 'முன்னது இனித்தால் பின்னது கசக்கும்' என்ற பழமொழி தமிழில் உண்டு. மனித வாழ்வில் தவிர்க்க இயலாதவை இருமைக் கோட்பாடான இன்பம், துன்பம், பிறப்பு, இறப்பு, ஊதியம், இழப்பாகும்<sup>32</sup>

#### **முடிவுரை**

தமிழ் பண்பாட்டின் தோற்றம் இயற்கை விதியிலிருந்து தோன்றியது. வள்ளுவ மரபு வளர்த்தெடுத்த சமயமே ஆசீவகம். ஆசீவகம் தொல் தமிழர் சமயம் ஆகும். ஆசீவகத்தைப் பற்றி ஒரு முழுமையான நூல் கிடைக்கப் பெறவில்லை. வட இந்தியாவில்தான் ஆசீவகம் தோன்றியது என்ற கருத்திற்கு மாற்றாக பண்டையகால தமிழகத்தில் ஆசீவகச் சமயம் தோன்றுவதற்கு முன்பே ஆசீவகத்தின் கருத்துருக்கள் தமிழகத்தில் நடைமுறையில் தோற்றம்பெற்று ஒரு வாழ்க்கை முறையாக கடைபிடிக்கப்பட்டு இருக்கின்றன என்று சான்றுகள் வழியாகப் புலப்படுகிறது. ஆசீவகர்கள் முழுமையான சுயக்கட்டுப்பாடான சுதந்திர வாழ்க்கை நெறி முறையைப் பின்பற்றினர் என்பதை அறியமுடிகிறது. ஆசீவகம் கடவுள் வழிபாட்டை முன்வைத்த மரபு இல்லை. மனிதர்கள் தம்முடைய முந்நிலையைக் கடந்து மேல்நிலைக்கு செல்ல வழி வகுத்தவை. ஆசீவகம் அவைதீக சமய வர்ண - ஆசிரமக் கொள்கைக்கு எதிர் கருத்தாக இருந்தனர் என்பதை அறியமுடிகிறது. ஆசீவகம் இந்தியாவிலும் தமிழகத்திலும் அறிவுசார் புரட்சியை ஏற்படுத்தியது. ஆசீவகம் மனிதத்துவத்தை அறிவியல் அடிப்படையில் கற்பிக்கிறது. உலக மனித குலம் அனைவரும் நலமுடன் வாழவேண்டும் என்பதே ஆசீவகத் தத்துவமாகும்.

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## **10. FRAGMENTED SELVES: NEGOTIATING IDENTITY AND ADAPTATION IN KIRAN DESAI'S DIASPORIC NARRATIVE**

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### **Abstract**

Diasporic literature offers one of the most nuanced reflections on displacement, belonging, and the complex negotiations of identity. Kiran Desai's *The Inheritance of Loss* captures these tensions with remarkable depth, portraying characters whose lives are shaped by migration, colonial history, and the demands of globalization. This paper investigates how Desai's diasporic narrative dramatizes identity fragmentation and cultural adaptation through the dual frameworks of Homi Bhabha's theory of cultural hybridity and John Berry's acculturation model. While Bhabha conceptualizes the "third space" as a site of negotiation where new hybrid identities are formed, Berry identifies four strategies of cultural adaptation—assimilation, integration, separation, and marginalization. Reading Desai's characters, particularly Biju, Sai, and Jemubhai, through these frameworks illuminates how diasporic subjects grapple with alienation, mimicry, nostalgia, and resistance. At the same time, the novel humanizes these theoretical constructs by anchoring them in lived experiences of longing, exploitation, and fractured belonging. Ultimately, the study highlights Desai's contribution to diaspora studies: the recognition that diasporic identity is never settled but always evolving in response to shifting cultural, political, and emotional terrains.

**Keywords:** Diaspora, hybridity, cultural displacement, identity crisis, assimilation, belonging, alienation

### **Introduction**

Diaspora has become a defining feature of contemporary literature, capturing the anxieties and possibilities of lives lived across borders. Indian English writers like Salman Rushdie, Jhumpa Lahiri, Amitav Ghosh, and Bharati Mukherjee have illuminated how migration produces not only geographical displacement but also deep psychological and cultural negotiation. As Avtar Brah observes, diaspora is not merely about scattering but about the formation of "diaspora space," where the native and migrant, past and present, intersect in often fraught encounters (Brah 16).

Kiran Desai's *The Inheritance of Loss*, which won the Man Booker Prize in 2006, is one of the most incisive portrayals of such encounters. Moving between Kalimpong in the Himalayas and the immigrant kitchens of New York, Desai presents a mosaic of characters fractured by history and globalization. Biju, an undocumented immigrant, struggles with humiliation in the United States; Sai, an Anglicized teenager, wrestles with her hybrid identity; Jemubhai Patel, the retired judge, embodies colonial mimicry and self-hatred; and Gyan, Sai's tutor, is drawn into insurgency politics that expose fractures within the homeland itself.

These figures dramatize what Stuart Hall describes as "fragmented identities"—selves that are never unified but always "in process" (Hall 222). This paper explores how Desai represents these fragmented selves through two complementary lenses: Homi Bhabha's notion of hybridity and Berry's model of acculturation. While Bhabha emphasizes the "third space" of cultural negotiation, Berry classifies adaptation into assimilation, integration, separation, and marginalization. Taken together, these frameworks reveal how Desai's characters embody strategies of survival, yet none achieve stable belonging.

The purpose of this study is twofold. First, it situates *The Inheritance of Loss* within diasporic criticism while addressing gaps that often overlook the psychological dimension of adaptation. Second, it argues that Desai's novel humanizes theory by showing how global structures of inequality manifest in everyday experiences of loss, humiliation, and fractured belonging.



### **Literature Review:**

Scholars of diaspora have long emphasized that identity is never fixed but constantly negotiated. Robin Cohen classifies diasporas into types—victim, labour, cultural, imperial highlighting different histories of displacement (Cohen 6–8). Avtar Brah introduces “diaspora space,” a zone where natives and migrants coexist in dynamic but tense relations (Brah 16). Stuart Hall insists that cultural identity is “not an essence but a positioning” (Hall 225). These perspectives shift the discourse from nostalgia for homeland to the ongoing process of hybridity and negotiation.

Within Indian English literature, writers like Rushdie, Mukherjee, and Lahiri have examined these negotiations differently: Rushdie celebrates hybridity, Mukherjee stresses assimilation, while Lahiri portrays quiet negotiations of second-generation immigrants. Desai distinguishes herself by foregrounding globalization’s inequities and the emotional costs of migration.

Criticism on *The Inheritance of Loss* falls into three main strands. First, studies of globalization read the novel as a critique of global capitalism. Elleke Boehmer and Graham Huggan situate Desai in the “postcolonial cosmopolitan” tradition, while Priyamvada Gopal shows how Biju’s narrative dismantles myths of upward mobility (112). John Thieme similarly highlights how globalization privileges elites while exposing undocumented labourers to exploitation (93).

Second, studies of postcolonial identity interpret Jemubhai as an emblem of colonial mimicry. Tabish Khair notes that his disdain for Indian culture illustrates the psychological scars of colonial education (74). Sai, in contrast, inhabits Bhabha’s “third space,” embodying the contradictions of hybridity. Critics often compare Rushdie’s celebratory hybridity with Desai’s more ambivalent portrayal (Bose 51).

Third, scholarship on migration emphasizes Biju as a figure of precarious labour. Vijay Mishra identifies him as part of the “global underclass,” constantly shifting jobs yet never achieving stability. His return to India, rather than marking fulfilment, underscores the theme of loss (Mishra 202).

While these studies illuminate the novel’s thematic concerns, they often privilege either cultural theory (Bhabha, Said, Appadurai) or global critique. Few bring in psychological frameworks like John Berry’s acculturation model, which explains immigrant strategies of adaptation. This paper addresses this gap by combining postcolonial theory with cultural psychology, reading Desai’s characters as embodiments of both cultural negotiation and psychological struggle.

### **Theoretical Framework**

Homi Bhabha’s concept of hybridity, articulated in *The Location of Culture*, views identity as emerging in an ambivalent “third space,” where cultural meanings are negotiated rather than inherited. Hybridity destabilizes fixed categories but also produces confusion and instability. In Desai’s novel, Sai inhabits this space, while Jemubhai’s mimicry illustrates its destructive potential.

John Berry’s acculturation model categorizes adaptation strategies into assimilation, integration, separation, and marginalization (Berry 15). Biju embodies separation and marginalization, Jemubhai represents assimilation, and Sai gestures toward integration but remains unsettled. Berry’s framework underscores that adaptation has real psychological consequences, from alienation to self-hatred.

Stuart Hall’s view of identity as “always in process” (222) and Edward Said’s reflections on exile as “an unhealable rift” (173) deepen this framework. Together, these theories allow us to see Desai’s characters as not just cultural symbols but as human figures negotiating fractured lives.

### **Analysis and Discussion**

Kiran Desai’s *The Inheritance of Loss* is not simply a collection of individual stories but a tapestry of fragmented selves negotiating belonging in a fractured world. From the undocumented struggles of Biju in New York to the hybrid upbringing of Sai in Kalimpong, and from Jemubhai Patel’s assimilationist failures to Gyan’s politicized disillusionment, the novel dramatizes the instability of diasporic identity as a collective human condition. By weaving together these disparate

trajectories, Desai exposes how globalization, colonial legacies, and cultural displacement combine to produce fractured subjectivities that remain unresolved, always in process.

At the heart of Desai's narrative lies the tension between home and away. For Biju, America promises upward mobility but delivers exploitation and alienation. His experience aligns with John Berry's categories of separation and marginalization: he resists assimilation into American life, clings to his Indian identity, yet is excluded from both communities. His narrative is littered with humiliation—working in kitchens, hiding from immigration raids, and constantly feeling the weight of illegitimacy. This is not merely a personal failure but a symptom of what Edward Said calls the “unhealable rift” of exile, where the immigrant exists in perpetual estrangement (Said 173).

Yet Biju's plight cannot be understood in isolation. Back in Kalimpong, Sai, his narrative counterpart, embodies a different facet of diasporic identity. Raised in English schools and steeped in Western habits, Sai inhabits Homi Bhabha's “third space” of hybridity, where identity is negotiated between cultural poles. Her sense of belonging is conflicted: she can move fluently through the language and mannerisms of the West, yet she remains tethered to her Indian environment. This produces both a sense of superiority and estrangement, as she oscillates between admiration for Western modernity and unease with its incompatibility in her Indian context. The narrative positions her alongside Biju not as opposites but as complementary figures—both caught in the dissonance of being “in-between,” one abroad and one at home.

The novel further complicates this continuum through Jemubhai Patel, Sai's grandfather, who represents the historical root of diasporic alienation. Having studied in England, Jemubhai returns to India marked by mimicry and self-loathing. In his attempt at assimilation, he adopts the colonizer's mannerisms, language, and prejudices, but this brings no acceptance. As Bhabha notes, mimicry produces “almost the same, but not quite” (Bhabha 86). Jemubhai's identity becomes hollow, his relationship with both England and India broken. His isolation in Kalimpong is not merely physical but psychological, epitomizing the destructive potential of assimilation without belonging.

What unites Biju, Sai, and Jemubhai is not their cultural strategies alone but their shared fragmentation of self. Each one enacts a different adaptation path—marginalization, hybridity, assimilation—yet all suffer alienation. This is Desai's crucial intervention in diaspora studies: no strategy guarantees coherence. Migration, whether geographic (Biju) or cultural (Sai, Jemubhai), creates fractures that resist resolution. Stuart Hall's insight that identity is “never complete, always in process” (Hall 222) becomes the novel's central motif.

Adding another layer to this fractured mosaic is Gyan, Sai's tutor and lover, who turns towards the Gorkhaland insurgency. His disillusionment shows that alienation is not confined to those who cross borders; it also marks those marginalized within their own homeland. By embedding his story within the broader diasporic narrative, Desai underscores that the search for belonging is equally fraught at home as it is abroad. Gyan's political radicalization mirrors Biju's immigrant frustration and Jemubhai's colonial scars—different expressions of the same fractured quest for recognition.

Taken as a whole, *The Inheritance of Loss* resists easy categorizations of success or failure in diaspora. Instead, it presents diaspora as a continuous negotiation, a process shaped by structural inequalities, colonial legacies, and human vulnerabilities. Biju's return to India, stripped of savings and illusions, contrasts with Sai's hesitant openness to hybridity and Jemubhai's ossified bitterness. Yet all remain fragmented. None achieves wholeness, for Desai's novel insists that diasporic life is less about resolution and more about enduring dissonance.

The narrative structure itself enacts this fragmentation. By shifting between New York and Kalimpong, between immigrant kitchens and colonial mansions, Desai mirrors the oscillations of diasporic consciousness. The discontinuities in setting, voice, and time parallel the discontinuities of identity. Just as Bhabha's third space destabilizes fixed positions, Desai's prose destabilizes linear storytelling, offering instead a collage of fractured lives that together capture the essence of diaspora.

What emerges, then, is a set of findings that position Desai's work distinctively within diasporic literature. Unlike Rushdie's celebration of hybridity or Lahiri's quieter negotiation of

immigrant life, Desai presents a darker, more conflicted vision. Hybridity is not triumphant but ambivalent. Assimilation is not liberating but corrosive. Separation does not preserve roots but fosters alienation. By integrating Berry's psychological model with Bhabha's cultural theory, Desai demonstrates that diasporic identity is not only a cultural construct but also a psychological struggle.

Ultimately, The Inheritance of Loss humanizes the abstractions of diaspora theory. Behind terms like hybridity, assimilation, and exile lie the raw experiences of humiliation, nostalgia, disillusionment, and fragile hope. Biju's hunger, Sai's confusion, Jemubhai's bitterness, and Gyan's anger are not simply narrative devices but human realities that echo across immigrant kitchens, postcolonial classrooms, and insurgent movements. The novel's contribution lies in reminding us that diasporic identity is never singular, never stable, and never complete—it is a fragmented inheritance, marked by both loss and adaptation.

### Conclusion

Kiran Desai's The Inheritance of Loss stands as one of the most incisive explorations of diasporic identity in contemporary Indian English literature. Unlike celebratory narratives that foreground hybridity as empowerment, Desai insists on the fractures, ambiguities, and alienations that migration and colonial legacies impose on individuals. Her characters—Biju, Sai, Jemubhai, and Gyan—do not represent isolated case studies but form an interconnected mosaic of fragmented selves negotiating belonging in different contexts. Whether through Biju's failed immigrant journey, Sai's conflicted hybridity, Jemubhai's corrosive assimilation, or Gyan's disillusioned nationalism, the novel demonstrates that diasporic life is always marked by tension, contradiction, and unresolved longing.

The findings of this study reveal that Desai's narrative complicates both cultural and psychological understandings of identity. Using Homi Bhabha's concept of the "third space," we see how hybridity is not necessarily liberating but often destabilizing, producing confusion and self-estrangement. Applying John Berry's acculturation model, we observe that the characters exemplify different adaptation strategies—assimilation, integration, separation, and marginalization—but none lead to coherent or stable selves. Stuart Hall's idea that identity is "never complete, always in process" and Edward Said's reflections on exile further reinforce the sense that Desai's characters embody not closure but perpetual negotiation.

This dual application of postcolonial theory and acculturation psychology underscores a significant insight: diasporic identity cannot be reduced either to cultural celebration or psychological adjustment. It is both, and more—it is lived experience, shaped by global inequalities, colonial histories, and human vulnerability. Desai's novel insists that diaspora is not merely a theoretical construct but a lived struggle involving humiliation, nostalgia, self-erasure, political anger, and, at times, fragile resilience.

By portraying diasporic life as fragmented and unresolved, Desai positions herself against more optimistic visions of cosmopolitan belonging. Her contribution lies in humanizing abstract concepts—showing how the hybrid space of culture, the strategies of adaptation, and the condition of exile play out in the everyday lives of individuals. In doing so, The Inheritance of Loss reminds us that the search for belonging in a globalized world is always fraught, always contingent, and always incomplete.

For diaspora studies, this reading offers an important conclusion: diasporic identity is not a single trajectory of assimilation or integration, but a spectrum of fractured negotiations that remain ongoing. For literary criticism, it suggests that psychological models like Berry's can enrich postcolonial readings by grounding them in human emotion and experience. And for readers, Desai's work offers an empathetic lens into the lives of those who live between worlds, carrying the inheritance of both loss and adaptation.



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## **11. ARTIFICIAL INTELLIGENCE IN CYBER SECURITY- A REVIEW**

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### **Introduction to AI in Cybersecurity**

The rapid growth of digital technologies has led to an equally rapid rise in cyber threats, ranging from malware and phishing to sophisticated state-sponsored attacks. Traditional security systems, which rely on predefined rules and manual intervention, often struggle to detect and respond to these evolving threats in real time.

Artificial Intelligence (AI) has emerged as a transformative tool in cybersecurity. By leveraging techniques such as machine learning, deep learning, and natural language processing, AI can analyze vast amounts of data, identify hidden patterns, and detect anomalies that may indicate potential cyberattacks. Unlike conventional systems, AI-driven security solutions can learn from new threats, adapt to changing attack vectors, and even predict malicious activity before it occurs.

AI in cybersecurity not only enhances threat detection and prevention but also supports faster incident response, reduces false positives, and strengthens overall resilience against cybercrime. As cyberattacks continue to grow in complexity and scale, the integration of AI technologies into security frameworks is becoming increasingly essential for organizations, governments, and individuals alike.

### **Evolution of cyber threats and security challenges**

Cyber threats have evolved significantly over the past few decades, moving from simple viruses and worms to highly advanced global attacks. In the early years (1980s–2000s), most threats were limited to basic viruses, Trojans, and worms, often created for curiosity or small disruptions. During the 2000s–2010s, cyberattacks became more financially motivated, with phishing, spyware, and large-scale worms targeting businesses and individuals to steal sensitive data. In the modern era (2010s–present), cybercrime has become highly organized, leading to the rise of ransomware, Advanced Persistent Threats (APTs), Distributed Denial-of-Service (DDoS) attacks, and even state-sponsored cyber warfare. Today, with the growth of cloud computing, the Internet of Things (IoT), and artificial intelligence, attackers use more sophisticated and automated methods, including AI-powered attacks and supply chain compromises, making cybersecurity one of the biggest challenges of the digital age.

### **AI Techniques in Cybersecurity**

Artificial Intelligence (AI) uses smart algorithms that can learn from data, detect patterns, and make decisions. In cybersecurity, AI helps in analyzing huge amounts of data, identifying unusual activities, and stopping threats faster than humans or traditional tools.

### **Main AI Techniques Used**

#### **1. Machine Learning (ML):**

- Learns from past cyberattacks and network behavior.
- Detects suspicious activities (like unusual logins or traffic).
- Helps classify files as safe or malicious.

#### **2. Deep Learning (DL):**

- Works well with large and complex data such as images, logs, or network traffic.
- Detects zero-day attacks (new, unknown threats).
- Useful for malware analysis and spam/phishing detection.

3. **Natural Language Processing (NLP):**

- Understands and analyzes text.
- Detects phishing emails, fake websites, and social engineering attempts.
- Helps in scanning security reports and threat intelligence feeds.

4. **Reinforcement Learning (RL):**

- Learns by trial and error to improve security systems.
- Adapts intrusion detection systems based on changing attack patterns.
- Can be used in automated defense strategies.

**Applications of AI in cybersecurity:**

Artificial Intelligence plays a vital role in strengthening cybersecurity by enabling faster and smarter threat detection. It is widely used in **intrusion detection and prevention systems (IDPS)** to identify suspicious activities in networks and block unauthorized access. AI also helps in **phishing and spam detection** by analyzing emails and URLs to filter out fraudulent content. In the financial sector, **fraud detection systems** rely on AI to monitor transactions in real time and flag abnormal patterns. Similarly, AI-driven tools enhance **malware and ransomware detection** by analyzing behavior instead of depending only on known signatures. For device-level safety, **endpoint protection** solutions powered by AI secure computers, mobiles, and IoT devices. AI is also applied in **user and entity behavior analytics (UEBA)** to monitor user activity and detect insider threats. With the rise of cloud adoption, AI-based **cloud security systems** help in identifying misconfigurations and potential breaches. Additionally, **automated threat intelligence** gathers global data to predict attacks, while **security orchestration and automated response (SOAR)** ensures quick responses to incidents. Finally, AI powers **biometric security** like facial recognition, voice authentication, and fingerprint scanning, providing an extra layer of identity protection.

**Role of AI in Cybersecurity**

Artificial Intelligence plays a crucial role in modern cybersecurity by making security systems smarter, faster, and more adaptive. AI helps in **detecting threats in real time** by analyzing large volumes of network traffic and identifying unusual patterns. It also provides **predictive security**, where machine learning models can forecast potential cyberattacks such as zero-day exploits or ransomware. AI enhances **threat detection accuracy** and reduces false alarms compared to traditional rule-based systems. In addition, AI is widely used in **phishing detection, malware analysis, fraud prevention, and intrusion detection systems**. It also supports **automated incident response**, enabling quicker action against attacks without waiting for manual intervention. By continuously learning from new data, AI adapts to evolving attack strategies, making it a powerful defense tool. Overall, AI strengthens cybersecurity by providing intelligent monitoring, proactive defense, and faster response, ensuring stronger protection for organizations and individuals.

**Benefits of AI in Cybersecurity**

1. **Real-time Threat Detection** – Identifies attacks as they happen.
2. **Predictive Security** – Detects unknown and future threats by analyzing patterns.
3. **Automation** – Reduces manual work and minimizes human error.
4. **Faster Incident Response** – Quickly reacts to cyberattacks like malware or phishing.
5. **Data Handling** – Analyzes massive amounts of data from networks and devices.
6. **Improved Accuracy** – Reduces false alarms and increases detection reliability.
7. **Continuous Learning** – Adapts to new types of cyber threats automatically.
8. **Cost Efficiency** – Saves resources by preventing major security breaches.

### Limitations of AI in Cybersecurity

1. **High Cost** – Developing and maintaining AI systems is expensive.
2. **Data Dependency** – Requires large and quality datasets for accurate results.
3. **False Positives/Negatives** – AI may wrongly flag safe activity as a threat or miss actual attacks.
4. **Complexity** – AI systems are difficult to build, manage, and update.
5. **Adversarial Attacks** – Hackers can trick or manipulate AI models to bypass security.
6. **Resource Intensive** – Needs high computing power and storage.
7. **Lack of Transparency** – AI decisions are often a “black box,” making it hard to explain results.
8. **Over-Reliance Risk** – Too much dependence on AI may reduce human vigilance.

### Future Trends in AI-Driven Security

1. **Autonomous Security Systems** – AI will enable fully automated systems that can independently detect, analyze, and respond to cyber threats in real time.
2. **Predictive Cyber Defense** – Advanced AI models will forecast attacks before they happen, especially zero-day vulnerabilities.
3. **AI + Quantum Computing** – The combination will deliver ultra-fast threat detection and stronger encryption methods.
4. **IoT & Cloud Protection** – AI will play a bigger role in securing billions of IoT devices and large-scale cloud environments.
5. **Deepfake & Social Engineering Detection** – New AI tools will be designed to identify fake videos, synthetic voices, and AI-generated phishing.
6. **Explainable AI (XAI)** – Security systems will become more transparent, making AI decisions easier for humans to understand and trust.
7. **Adaptive & Self-Learning Security** – AI will continuously learn from new attack techniques and automatically update defenses.
8. **Human-AI Collaboration** – Instead of replacing experts, AI will work alongside humans to combine speed, intelligence, and strategic thinking.

### Conclusion

Artificial Intelligence has become a powerful tool in the fight against cyber threats. By enabling real-time detection, predictive analysis, and automated response, AI strengthens the security of networks, devices, and data. It provides faster and more accurate protection compared to traditional methods. However, AI also comes with challenges such as high costs, dependency on large datasets, and the risk of being exploited by attackers. Therefore, the future of cybersecurity depends on a balanced approach—where AI is combined with human expertise to build smarter, stronger, and more reliable defense systems.

## 12. FINANCIAL LITERACY EMPOWERS WOMEN

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### Abstract

In this Digital world, financial literacy is mandatory to overcome any pitfalls. After Covid Pandemic situation, Indian economy has changed dramatically and due to increased market complexity and exposure to advanced technology, individuals' financial responsibility has increased. Earnings in Lakhs and lavish spending, impulse buying, increased digital scam has been a burden to the Indian Government. To overcome these difficulties and to enhance economic development, Government, RBI, SEBI and other financial institution's key focus is to financially literate the people of India. Role of Women in contributing towards the economy has increased hence the digital literacy and financial literacy of women is noteworthy. Only limited number of females are aware of financial management. Financial literacy means the capacity to understand and use various financial skills. Budgeting, savings and investments are referred to as financial literacy. It helps people in making solid financial choices by ensuring long-term financial security and well-being.

Financial Literacy is a key indicator of a growing economy. Secondary data and research studies reveals that the women's financial literacy is very poor. Secondary data was collected from websites, journals, newspapers, and various regulatory bodies. This paper probes in to the Government initiatives, RBI and SEBI efforts and other financial institution efforts to impart financial education through campaigns, workshops seminars so as to guide people to manage money more effectively, overcome any pitfalls and to achieve financial well-being.

**Keywords;** Financial literacy, financial inclusion, empowerment

### Introduction

Today's youth learn more than ever before and are becoming financial consumers earlier in their lives. It is essential for them to make financial decisions that can have lasting consequences, if not well managed it will lead to failures. Women are competing with men in all spheres. The modern woman has begun to unlock her true potential and is dominating in business, politics, sports, entertainment, literature, space science and technology. Globally, financial literacy becomes essential to enable each and every one to save the hard earned money so as to navigate any challenges and hardships. Lack of Financial literacy leads life in dramatic ways. Health is wealth, but in the current scenario, financial wealth is essential to maintain good health.

After Covid Pandemic situation, mobile plays a dominant role in the lives of all class of people. Today earning money is a simple task but managing this earned money and building money makes money concept is possible only because of financial knowledge. Moreover, in the year of 2025, many digital tools proliferate and financial products grow more complex, understanding basic financial concepts are no longer optional, it is mandatory.

### Financial literacy

Financial literacy means the capacity to understand and use various financial skills. Budgeting and saving is referred to as financial literacy. It helps people in making solid financial choices by ensuring long-term financial security and well-being. The following are the key financial skills:

Budgeting means understanding how to create and manage income and expenses and it is essential for financial stability.

Investing refers to the knowledge of investment options and strategies that help to build wealth and achieve long-term financial goals. Every one save to meet huge expenses such as higher education, house, marriage and car and so on.



Retirement Planning: Planning for retirement is critical to ensure financial security in the long term.

Debt Management: Understanding how to manage debt and build a good credit score is vital for financial health.

### **Financial Literacy among Women**

Women make up a sizable share of Indian homemakers, so it's a must for them to have essential financial knowledge. Modern women contribute a lot for the economic development of the nation but their standard of living needs to be enhanced by injecting financial knowledge in their minds. This knowledge is essential for them to run the household and provide for all of the dependents' financial needs.

Financial inclusion means irrespective of one's financial status, geographical location, or social status one has access to essential financial services like savings accounts, insurance, credit, and other payment systems. In recent times, financial inclusion is a key driver of economic growth and alleviation of poverty across the globe. An individual needs to be financially literate to make full use of financial services. Financial inclusion of women in India is lagging. It is imperative to equip women with financial literacy so that they can accumulate financial reserves. This is an important safeguard against unforeseen and unfortunate circumstances.

An African proverb says, "If you educate a man you educate an individual. But If you educate a woman, you educate a nation". Financial literacy among working women is crucial for achieving economic independence, confidence, and security. It enables them to make informed decisions about their finances, investments, and retirement planning. Financial inclusions empower women as effective management of finance paves path for reducing dependence on others. Women explore entrepreneurial ventures and contribute for economic development and a financial literate women build a sustainable future.

### **Review of Literature**

According to the Organization for Economic Co-operation and Development (OECD) Report 2023, only 35% of men and 30% of women are financially literate across the globe. In India, a study by the Securities and Exchange Board of India (SEBI) reveals that only 27% of men and 20% of women are financially literate.

Chetna Singh & Raj Kumar (2017) in their study revealed that it is very crucial to financially literate the women to fuel the engine of growth by providing opportunities to women to contribute to economic growth. While women in developed countries proved to be better financial planners relatively, it is the women of emerging economies who have to become literate when it comes to money management issues. Though various initiatives were taken by different organisations to boost the financial literacy but still there is a need of more awareness programs which may include workshops, seminars, and financial management courses at different levels to get more financial knowledge regarding the banking services and their benefits one can attend.

Somiha Chatterjee (2021) expressed in her study that the goal of making financial services available through digital platforms is to reduce poverty and contribute to a generally more inclusive financial playing field. However, women's limited access to these digital technologies in India poses the danger of pushing them towards the wrong side of a persistent digital divide.

According to the Humanity Welfare Council, around 62% of Indian women do not own bank accounts or have limited access to banking services. Considering gender pay gaps, the lower income makes them vulnerable to economic shocks such as long debts and lower opportunities. More than half the population lack social coverage due to lack of public investment in a social safety net.

Digitalisation is one of the most influential mega global trends of today and government worldwide are making strides at increasing financial inclusion by boosting access to digital bank accounts and other digital financial services. The adoption of digital payments across the world was boosted by COVID-19 and digital payments, in turn, have widened financial inclusion. However, without this financial literacy these opportunities might lead to defaults, debts and financial hardships.

### **Challenges Faced by Women**

- Women are paid lower than men, affecting their ability to save and invest for the future.
- Practically many women lack confidence in managing finances as they lack financial education.
- Decision making by women is denied in most of the families and community.
- Women mobility in India is highly limited.
- Indian women have to balance both family and business. They give emphasis to family ties and relationship. The burden of these overlapping duties can limit their time and energy to focus on financial management.
- Women priorities savings but they are not ready to venture in to risky investments.
- Societal Norms restricts women to prove their personalities in an innovative , daring, competitive jobs.
- Women prefer to invest in physical gold. They are ready to learn the money making opportunities in stock market.
- Most of the women are not aware of the mutual fund.
- Women prefer quick money so they fall prey to unregistered chit funds.
- In most families there is no financial transparency and financial decisions are denied for women.
- A lower credit score can limit their ability to secure loans or obtain favourable interest rates.

### **Financial Literacy - Women's Prosperity**

As women increasingly take on diverse roles in society and the workforce, financial education has become more crucial than ever. Mastering financial literacy enables a woman to achieve financial independence and stability. It opens doors to opportunities and ensures a secure financial future. By enhancing financial education, women can confidently navigate their financial journeys and make informed decisions that benefit themselves and their families. Financial literacy becomes essential for securing a stable and comfortable future.

Various government schemes focus on supporting women to overcome societal challenges. Self-help groups, and development programmes, such as FLCC (Financial Literacy and Credit Counselling Centres), National Center for Financial Education (NCFE), etc., continue to develop and disseminate financial literacy resources through relevant projects and campaigns. In addition, initiatives such as Pradhan Mantri Jan-Dhan, and 'BetiBachao, BetiPadhao' have added to the effectiveness of welfare programmes focused on women empowerment. Apart from this the government has introduced many schemes that can help women today. Schemes such as Orient MahilaVikasYojna, Stree Shakti, Udyogini, and more exist to uplift women financially.

National Centre for Financial Education (NCFE) is a Company (Not for Profit), registered under section 8 of the Companies Act 2013, promoted by Reserve bank of India (RBI), Securities and Exchange Board of India (SEBI), Insurance Regulatory and Development Authority of India (IRDAI), and Pension Fund Regulatory and Development Authority (PFRDA) to promote Financial Education across India for all sections of the population. Its vision is to undertake initiatives to make the country financially aware and empowered. In view of the said vision, NCFE carries out a significant amount of financial education campaign to help people manage money more effectively to achieve financial well - being by accessing appropriate financial products and services through regulated entities with fair and transparent machinery for consumer protection and grievance redressal.

National Centre for Financial Education has introduced FACT (Financial Awareness and Consumer Training), a program specifically designed to provide financial education to young graduates and postgraduates. This program covers topics relevant to this demographic, aiming to positively impact their financial well-being. By equipping the youth with the knowledge and skills

necessary for informed financial decision-making, FACT contributes to building a financially savvy and responsible generation.

Financial Literacy Week 2025 was observed during February 24 – 28, 2025 and the theme is 'Financial Literacy - Women's Prosperity' with emphasis on 'Financial Planning', 'Saving and Risk Management' and 'Availing Credit for Growth'.

Financial Inclusion and Education are two important elements in the Reserve Bank of India's developmental role. Towards this, it has created critical volume of literature and has uploaded on its website in 13 languages for banks and other stakeholders to download and use. The aim of this initiative is to create awareness about financial products and services, good financial practices, going digital and consumer protection. Business Correspondents (BCs) are retail agents that provide doorstep bankingservices in rural areas.

Smile Foundation's Swabhiman program strives to bridge the gender gap in financial literacy, promote economic empowerment, and contribute to the overall well-being of rural women and their communities.

"Education is more valuable than Money, in the long run", emphasis Robert Kiyosaki Author of Rich Dad Poor Dad. Education empowers women wherein they must learn effective budgeting as it is essential for gaining control over expenses, maximizing savings and working towards achieving important financial goals. Women must be educated to understand loan terms, interest rates and repayment schedules. Knowledge of debt management must be imparted. Women must be well informed of the power of compounding. Employers can arrange meetings to educate their Women employees about the Provident fund, pension schemes, Life and health insurance schemes that focus on their wellbeing. Women must be trained to analyze and understand various investment options such as gold, stocks, bonds, real estate, and mutual funds as it is crucial for building a diverse and resilient investment portfolio. Don't follow the crowd for quick money. Financial advisor's advice to opt for systematic investment plan (SIP) and the amount is calculated based on one's age and the period money is required. Financial advisors and Government agencies can conduct seminars to educate women to have a diversified portfolio based on her financial goals. Financial institutions must troubleshoot issues faced by women in digital adoption. Demonstrating and understanding of how inflation affects purchasing power must be made clear and the effect of impulse buying and online shopping must be well defined and the steps to avoid them must be clearly explained through workshops and seminars. Women are more likely to take career breaks. These breaks can result in income loss and reduced retirement savings. They must be trained to predict and tackle this situation through their strong diversified portfolio.

Financial literacy can educate women in building a good credit score. A good credit score not only reflects responsible financial behaviour but also opens doors to improved financial opportunities. Financial literacy campaign can focus on making aware of women about Tax benefit-ELSS - tax saving mutual funds. In this digital era, training can be given on E – LMS & Financial Literacy Mobile App of NCFE. To improve their economic wellbeing Women must come forward to attend webinars, signing up for online courses, reading financial books, and following trusted financial websites. Above all family must include women in financial planning and there must be transparency moreover the family members must be well informed about the loans, borrowings and investments.

## **Conclusion**

Women frequently juggle in multiple roles wherein effective planning paves path for them to overcome the obstacles. Financial planning promotes wellbeing. Financial inclusion and financial literacy are no longer personal advantage, it's a societal necessity. Financial literacy and digital literacy are mandatory for women. Further women must master in Budgeting, investment planning and risk diversification which are the key ingredients of financial literacy. Inflation knowledge, SIP and interest compounding must be imparted to empower women. Tech savvy women must be an expert in handling finance and train others also grew as a financially savvy and responsible



generation.Digital Financial Literacy Programs must propel women to play a meaningful role in India's economic success.

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### 13. ARTIFICIAL INTELLIGENCE IN EDUCATION: IMPLICATIONS FOR TEACHER ROLES AND PEDAGOGICAL TRANSFORMATION

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#### Abstract

The rapid integration of Artificial Intelligence (AI) into educational contexts is reshaping teaching and learning practices worldwide, raising critical questions about the evolving role of teachers and the nature of pedagogy in the 21st century. This study examines the ways in which AI-driven tools—such as automated assessment systems, adaptive learning platforms, and large language models—are transforming teachers' responsibilities, professional identity, and instructional strategies. While AI offers opportunities for personalized learning, administrative efficiency, and data-driven insights, its adoption also introduces challenges related to teacher autonomy, pedagogical authority, and professional adaptation. Focusing on the theme of **pedagogical transformation**, this paper investigates how teachers navigate the tension between technological augmentation and the preservation of human-centered teaching practices.

#### 1.Introduction

Education is undergoing a period of unprecedented change, driven in large part by rapid technological advancements and, more recently, the integration of Artificial Intelligence (AI). Among these developments, the concept of **pedagogical transformation** has emerged as a critical area of scholarly inquiry. Pedagogical transformation refers to the fundamental reconfiguration of teaching and learning practices, moving beyond surface-level technological adoption toward deep structural changes in instructional design, classroom interaction, and the professional identity of teachers. It emphasizes not only the introduction of new tools but also the rethinking of underlying pedagogical paradigms to meet the evolving needs of learners in the 21st century.

Artificial Intelligence (AI) has become one of the most significant disruptors in this transformation. AI-driven tools such as adaptive learning systems, automated assessment mechanisms, and language models like GPT-4 are increasingly integrated into classrooms and learning management systems. Their capacity to personalize instruction, automate routine tasks, and provide real-time feedback has intensified debates about the role of teachers and the future of pedagogy. While these innovations promise efficiency and individualized learning experiences, they also raise fundamental questions concerning the **identity, autonomy, and authority of educators**. These models, developed through training on extensive and diverse datasets, possess the capacity to comprehend and generate human-like text, thereby serving as valuable instruments for both educators and learners. As educational institutions increasingly pursue innovative pedagogical strategies to enhance learning outcomes, AI language models present considerable potential in the domains of personalized instruction, the development of academic content, and the optimization of administrative processes.

#### 1.1 Applications of AI Language Models in Education

##### 1.1.1 Personalized Learning

AI language models can tailor educational content to individual student needs. By analyzing student responses and learning patterns, these models can recommend resources, generate practice questions, and provide instant feedback. This personalization helps address diverse learning styles and paces, making education more inclusive.

### **1.1.2 Automated Assessment and Feedback**

Grading essays and open-ended responses is time-consuming for educators. AI language models can evaluate written work, provide constructive feedback, and even detect plagiarism. This automation not only saves time but also ensures consistency in assessment.

### **1.1.3 Language Learning Support**

For students learning new languages, AI models can serve as conversational partners, correct grammar, and suggest vocabulary improvements. They can simulate real-life dialogues, making language acquisition more engaging and effective.

### **1.1.4 Content Creation and Curation**

Educators can use AI language models to generate lesson plans, quizzes, summaries, and study guides. These tools can also curate relevant resources from vast online repositories, ensuring that students have access to up-to-date information.

### **1.1.5 Accessibility Enhancements**

AI language models can transcribe lectures, translate materials, and simplify complex texts, making education more accessible to students with disabilities or those who speak different languages.

## **2. Review of Literature**

The rapid integration of Artificial Intelligence (AI) into educational contexts has become a defining trend of the past decade, particularly with the rise of large language models (LLMs) such as GPT-3 and GPT-4. These systems, trained on vast datasets, demonstrate advanced capabilities in natural language understanding and generation, making them powerful tools for instructional delivery, personalized learning, and administrative efficiency (Holmes et al., 2022). Scholars note that AI's role in education is increasingly shifting from being a supplementary tool to becoming a catalyst for pedagogical change, reshaping traditional conceptions of teaching and learning (Luckin et al., 2022).

## **3. Statement of the Problem**

The statement focus on Teacher Roles and Pedagogical Transformation, while AI-powered tools promise efficiency in automating grading, feedback, and administrative tasks, their increasing use has prompted concern regarding the evolving role of educators. Few studies critically investigate how the adoption of AI reshapes teachers' professional practices, autonomy, and pedagogical responsibilities. The absence of systematic research on this issue creates uncertainty about whether AI acts as a supportive aid or risks undermining the professional identity and agency of educators, thereby influencing overall teaching quality and instructional design.

## **4. Scope of this Study**

1. Investigate how AI influences the day-to-day instructional practices of teachers.
2. Explore changes in teachers' professional identity, autonomy, and learner-teacher relationships under AI-mediated conditions.
3. Identify opportunities and challenges teachers face when adapting their roles to a technology-augmented pedagogical environment.

The study aims to provide insights into the ways AI mediates power dynamics, teaching strategies, and the future of the teaching profession in an AI-enhanced educational system.

## **5. Research Objectives**

The primary objective of this study is to investigate how Artificial Intelligence (AI) integration is reshaping the roles, practices, and professional identity of teachers in formal educational settings.

The specific objectives are to:

1. Examine the extent to which AI-powered tools influence teachers' instructional design, classroom management, and student assessment practices.

2. Explore how the adoption of AI impacts teachers' professional identity, autonomy, and authority in the teaching–learning process.
3. Identify the challenges and opportunities teachers encounter when adapting their pedagogy to AI-supported environments.

## 6. Conceptual Framework

The adoption of Artificial Intelligence (AI) in education influences teachers' professional roles, instructional practices, and identity. This, in turn, drives a broader pedagogical transformation that affects learning outcomes and institutional strategies.

### 6.1 Framework Components

1. **AI Integration in Education (Independent Variable)**
  - AI-powered tools (e.g., automated grading, adaptive learning systems, large language models, chatbots, predictive analytics)
  - Level and type of AI adoption across institutions
2. **Teacher Roles and Practices (Intervening Variables)**
  - **Instructional Design:** Curriculum planning, lesson adaptation, content personalization.
  - **Classroom Management:** interaction, automated support tools, Feedback.
  - **Assessment:** Automated evaluation, formative feedback, reduced teacher workload
3. **Teacher Professional Identity & Agency**
  - Autonomy and authority in decision-making
  - Perceptions of being augmented vs. replaced
  - Shifts in teacher–student dynamics
4. **Pedagogical Transformation (Dependent Variable)**
  - Redesign of teaching methods (traditional → blended → AI-augmented practices)
  - Adoption of learner-centered approaches through AI support
  - Evolution of teacher as “facilitator” or “mentor” rather than sole knowledge provider

## 4. Benefits of AI Language Models in Education

### 4.1 Enhanced Engagement

AI-driven interactive tools significantly boost student engagement in the learning process. Platforms such as chatbots, virtual tutors, and adaptive learning systems promote active involvement and stimulate curiosity. Chatbots, for example, can function as virtual assistants, offer customer support on websites, assist with order tracking in online shopping, and provide account information in banking. By responding to inquiries and delivering timely assistance, these AI tools enhance both support and the overall user experience.

### 4.2 Scalability

AI language models enable educational institutions to serve large numbers of students without compromising quality. Automated support and assessment free up educators to focus on higher-level teaching tasks.

For Example, an online university uses an AI-powered platform to deliver personalized feedback on written assignments to thousands of students enrolled in its courses. Instead of relying solely on human graders, the AI system can quickly analyze and assess essays, providing each student with detailed comments and suggestions for improvement. This allows the university to efficiently



support a large and growing student body without sacrificing the quality of feedback or overwhelming its teaching staff.

#### **4.3 Data-Driven Insights**

By analyzing student interactions, AI models can identify learning gaps, predict performance, and suggest interventions. That is, AI models examine how students engage with learning materials to uncover areas where they may be struggling, anticipate future academic outcomes, and recommend targeted support strategies. Leveraging this data empowers educators to make informed decisions that enhance teaching and learning effectiveness.

### **5. Challenges and Limitations**

#### **5.1 Accuracy and Reliability**

While AI language models are powerful, they are not infallible. They may generate incorrect or misleading information, especially in specialized subjects. Over-reliance on AI-generated content can lead to the propagation of errors.

#### **5.2 Bias and Fairness**

AI models can inherit biases present in their training data, potentially leading to unfair or discriminatory outcomes. Ensuring fairness and inclusivity requires ongoing monitoring and refinement of these models.

#### **5.3 Privacy and Security**

The use of AI in education raises concerns about data privacy. Student interactions with AI systems generate sensitive data that must be protected from unauthorized access and misuse.

#### **5.4 Teacher and Student Roles**

The integration of AI may shift traditional roles in the classroom. Teachers may need to adapt to new technologies, and students must develop critical thinking skills to evaluate AI-generated content.

### **6. Ethical Considerations**

#### **6.1 Transparency**

It is essential to ensure that students and educators understand how AI language models work and the limitations they possess. Transparent communication builds trust and promotes responsible use.

#### **6.2 Accountability**

Clear guidelines are needed to determine who is responsible for errors or biases in AI-generated content. Educational institutions must establish protocols for addressing issues that arise.

#### **6.3 Equity**

Access to AI-powered educational tools should be equitable. Efforts must be made to bridge the digital divide and ensure that all students benefit from technological advancements.

### **7. Scope of the Study**

The future of AI language models in education is promising. Ongoing research aims to improve model accuracy, reduce biases, and enhance interpretability. Collaboration between educators, technologists, and policymakers will be crucial in shaping ethical and effective AI integration.

Emerging trends include the development of multilingual models, integration with virtual and augmented reality, and the use of AI for lifelong learning and professional development. As AI language models become more sophisticated, their potential to transform education will continue to grow.



## 8. Conclusion

AI language models are reshaping the educational landscape by enabling personalized learning, automating assessments, and enhancing accessibility. While they offer significant benefits, challenges related to accuracy, bias, privacy, and ethics must be addressed. By fostering collaboration and prioritizing transparency and equity, the education sector can harness the full potential of AI language models to create more effective and inclusive learning environments.

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## **14. BEHAVIORAL ECONOMICS IN ONLINE SHOPPING: THE PSYCHOLOGY OF DISCOUNTS AND FLASH SALES**

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### **1.1 Introduction**

The rapid growth of e-commerce industry among the people has paved the way for online purchasing. Online shopping is the activity or action of buying products or services over the Internet. It means using the internet, finding a seller's website, choosing an item and setting up delivery. The buyer can pay for the goods or services online with a credit or debit card or in person when the product is delivered. The term does not only include online purchases but also searching the product through online. Online shopping has been around for about twenty-five years. But its popularity has greatly increased. Today, we can buy almost anything in online. Numerous discounts and flash sales were available while entering online shopping. So, the people engaged impulsive and unplanned purchase. In fact, retail experts say that online shopping will soon overtake traditional shopping in monetary terms. This paper is an attempt to examine the Behavioral Economics in Online Shopping: The Psychology of Discounts and Flash Sales.

### **1.2 Buying attitude towards online shoppers**

The world is rapidly becoming a Global Village due to Internet. The internet changed the landscape of the retail industry and the rules of the game in retailing are fast changing. Our Indian society has also affected by the western culture in each and every aspect. Both in urban areas and in regular cities, life is getting faster. Some other factors like time constraints, travel congestion, late work hours, the convenience of card money and most importantly, the availability of the internet at anyone's doorstep. Traffic jams, late working hours, versatility of plastic money and above all the approach of internet at the door step. Online retailers have improved their service and are providing more and more convenience to the customers. From advance payment options they moved on to payment on delivery. From fixed delivery timings they have moved on to convenient delivery timings at the choice of the customer.

The people used online shopping for purchase anything like groceries, gadgets and gifts to clothes, vehicles and cruises. The online shop are available at 24/7, more convenient to buy any products and also compare the products on the basis of product reviews from customers, access vendor returns policies and find warranty information. They are unable to see, touch, feel, smell, or experience the things they wish to buy, consumers find it challenging to evaluate them and make decisions about what to buy when they shop online. In addition, some products, like clothing and shoes, must be tried before being purchased; but, while shopping online, it is impossible to inspect, feel and evaluate the quality of the products before making a purchase, which makes buyers reluctant to buy. The primary thing that concerns consumers when making purchases online is product quality. Additionally, online purchasing has a higher rate of counterfeit and copied goods. The most frequent reason why customers steer clear of online purchases is a lack of trust in the online seller.

### **1.3 Statement of the problem**

Online shopping is increasingly replacing traditional purchasing methods among consumers. One popular marketing tactic used by e-commerce platforms to boost sales is flash sales. These limited-time offers encourage impulsive, unplanned, and urgent purchases. While flash sales can significantly increase short-term sales, they also raise concerns regarding consumer awareness, pre-

purchase satisfaction, and ethical business practices. Many online shoppers feel pressured by limited-time deals, countdown timers, and instant discounts, which often lead to impulsive purchases without proper evaluation or genuine need. Despite the growing popularity of flash sales, there is limited understanding of how these tactics influence and affect consumers' long-term purchasing habits. Given this context, it is important to explore the factors that drive impulse buying during flash sales and how these influences shape consumer behavior over time.

#### **1.4 Objectives of the Study**

- To know the profile of the online shoppers
- To identify psychological drivers like urgency, scarcity and FOMO (Fear Of Missing Out) in impulse buying.
- To analysis of psychological drivers towards discounts and flash sales in online shopping and the gender of the respondents

#### **1.5 Research Methodology**

The present study is conducted in Sivakasi city using 300 respondents. The study is based on primary data and to collect a questionnaire was constructed covering all details in the objective for the study. The data is collected employing convenient sampling method. Percentage analysis, Garrett Ranking Method and T-test are used to analyses the data.

#### **1.6 Data Analysis and Interpretation**

The profile of online buyers, Frequency of online purchasing, attitude towards discounts and flash sales related data are collected and analyzed.

##### **1.6.1 Profile of online buyers**

Profile of online buyers are needed in order to analysis the buying attitude of online shopping. The information about profile of online shoppers like Gender, Age, Profession and monthly income of the respondents are displayed in Table.1.

**Table 1**  
**Profile of online buyers**

<b>Profile</b>	<b>Category</b>	<b>No.of Respondents</b>	<b>Percentage (%)</b>
Gender	Male	120	40.00
	Female	180	60.00
	<b>Total</b>	<b>300</b>	<b>100.00</b>
Age	Below 20	45	15.00
	20-40	75	25.00
	40-60	120	40.00
	Above 60	60	20.00
	<b>Total</b>	<b>300</b>	<b>100.00</b>
Profession	Business	45	15.00
	Employees	75	25.00
	House Wife	120	40.00
	Students	60	20.00
	<b>Total</b>	<b>300</b>	<b>100.00</b>
Monthly Income	Below Rs.10,000	25	8.33
	Rs.10,000-Rs.20,000	20	6.67
	Rs.20,000 – Rs.30,000	75	25.00
	Above Rs.30,000	180	60.00
	<b>Total</b>	<b>300</b>	<b>100.00</b>

**Source: Primary Data**

From the above analysis, it is inferred that out of 300 respondent's majority of 60.00 per cent of the respondents are female, 40.00 per cent of the respondents are in the age between 40–60 years, 40.00 per cent of the respondents are House wife, and 60.00 per cent of the respondents are earned above Rs.30,000 as monthly income.

### 1.6.2 Frequency of online purchasing

Consumers are shopping online more frequently. The frequency with which consumers shop online is accelerating. Table 2 shows the frequency of online purchasing.

**Table 2**  
**Frequency of online purchasing**

Frequency	No.of Respondents	Percentage
Regularly	115	38.33
Occasionally	110	36.67
Rarely	75	25.00
<b>Total</b>	<b>300</b>	<b>100.00</b>

**Source: Primary Data**

From the above analysis, it is inferred that out of 300 respondents 38.33 per cent of the respondents are regularly using online app while purchasing the product, 36.67 per cent of the respondents are used the online app occasionally and the remaining 25.00 per cent of the respondents are rarely used. From the analysis it is noted that most of the respondents are using online app for regularly.

### 1.6.3 Psychological Drivers towards Discounts and Flash Sales in Online Shopping

Shopping online is much better than going into stalls and shops to buy goods and ask for services to be rendered because it saves a lot of time. The psychological drivers towards discount and flash sales in online shopping shows in Table 3.

**Table 3**  
**Psychological Drivers Towards Discounts and Flash Sales in Online Shopping**

Psychological Drivers	1	2	3	4	5	6	7	8	9	10	11	Total
Discount and Flash sales can provide an opportunity to purchase higher-priced items at low price	96	40	11	38	10	20	25	11	12	13	24	300
<b>Discount and Flash Sales creates Excitement and Urgency.</b>	88	65	13	22	30	12	15	9	10	24	12	300
Discount and Flash Sales makes quick decisions to avoid missing out on a deal.	75	59	32	20	38	12	16	15	9	10	14	300
Discount and Flash Sales chose a brand they hadn't previously considered	65	68	29	18	25	15	12	16	20	24	8	300
Discount and Flash sales can lead to impulsive purchases	75	76	36	13	11	20	18	15	8	12	16	300
Discount and Flash sales and discounts make me Buying unplanned items	58	38	34	22	16	18	16	45	28	15	10	300



Discount and Flash sales create regret and dissatisfaction.	75	64	28	8	4	6	10	15	12	30	48	300
Discount and Flash sales can lead to over spending	68	72	52	7	5	26	22	18	15	10	5	300
Discount and Flash Sales creates the <u>excitement and pleasure</u> of shopping.	55	49	33	22	25	18	12	26	16	30	14	300
Discount and Flash sales perceived <u>urgency</u> and <u>time pressure</u>	54	66	38	18	14	12	15	22	20	25	16	300
Discount and Flash sales provides excitement of securing a discount and saving money	78	46	32	14	20	30	23	22	12	8	15	300

**Source: Primary Data**

Based on the above details the following part of the analysis is made.

**Garret scores**

The Garret ranks are calculated by using appropriate Garret ranking formula. Then based on the Garret ranks, the Garret table value is ascertained. The Garret table values and scores of each rank are multiplied to record scores. Finally, by adding each row, the total Garret score is obtained. The ranking result is presented in the following Table 4.

**Table 4**  
**Ranking Results**

S.No	Psychological Drivers	Total Score	Rank	Average Score
1.	Discount and Flash sales can provide an opportunity to purchase higher-priced items at low price	18507	IV	52.95
2.	<b>Discount and Flash Sales creates Excitement and Urgency</b>	18999	III	53.64
3.	Discount and Flash Sales makes quick decisions to avoid missing out on a deal.	16341	XI	42.64
4.	Discount and Flash Sales chose a brand they hadn't previously considered	18327	V	51.43
5.	Discount and Flash sales can lead to impulsive purchases	19019	I	56.17
6.	Discount and Flash sales and discounts make me Buying unplanned items	17205	IX	47.64
7.	Discount and Flash sales create regret and dissatisfaction.	17066	X	45.53
8.	Discount and Flash sales can lead to over spending	19086	II	55.34
9.	Discount and Flash Sales creates the <u>excitement and pleasure</u> of shopping.	17275	VIII	47.14
10.	Discount and Flash sales perceived <u>urgency</u> and <u>time pressure</u>	17441	VII	48.51
11.	Discount and Flash sales provides excitement of securing a discount and saving money	18290	VI	50.00

**Source: Computed Data**

The above table shows the Garret scores and the average scores for each respondent. The average scores are ranked according to their values. The first rank is given to “Discount and Flash sales can lead to impulsive purchases”, second rank goes to “Discount and Flash sales can lead to over spending”, third rank is for the “**Discount and Flash Sales creates Excitement and Urgency**”, fourth rank is taken by “Discount and Flash sales can provide an opportunity to purchase higher-priced items at low price”, fifth rank goes to “Discount and Flash Sales chose a brand they hadn’t previously considered”, sixth rank goes to “Discount and Flash sales provides excitement of securing a discount and saving money”, the seventh rank is given to “Discount and Flash sales perceived urgency and time pressure”, eighth rank goes to “Discount and Flash Sales creates the excitement and pleasure of shopping.”, ninth rank is for the “Discount and Flash sales and discounts make me Buying unplanned items”, tenth rank is taken by “Discount and Flash sales create regret and dissatisfaction.” and eleventh rank goes to “Discount and Flash Sales makes quick decisions to avoid missing out on a deal.”. It is inferred that the majority (56.17) of the college students are facing challenges of using technology in education.

#### 1.6.4 Analysis of Psychological Drivers towards Discounts and Flash Sales in Online Shopping and the gender of the respondents

The investigator has classified the online shoppers based on their gender into two categories namely male and female and made analysis to know whether these two categories of the online shoppers are varied in their psychological drivers towards discounts and flash sales in online shopping of the respondents. The following null hypothesis is framed for this analysis.

##### Hypothesis

**The online shoppers do not differ in their psychological drivers towards discounts and flash sales in online shopping when they are classified on the basis of the gender.** To test this null hypothesis independent sample ‘t’ test is applied and the results are shown in the following Table 5.

**Table 5**

#### Gender and Psychological Drivers Towards Discounts and Flash Sales in Online Shopping – Group statistics

Psychological Drivers	Gender of Respondents	N	Mean	Std. Deviation	Std. Error Mean
Discount and Flash sales can provide an opportunity to purchase higher-priced items at low price	Male	120	3.5917	1.21956	.11133
	Female	180	3.8556	1.04171	.07764
<b>Discount and Flash Sales creates Excitement and Urgency.</b>	Male	120	3.5833	1.21326	.11075
	Female	180	3.8333	1.05967	.07898
Discount and Flash Sales makes quick decisions to avoid missing out on a deal.	Male	120	3.5667	1.20037	.10958
	Female	180	3.8500	1.03824	.07739
Discount and Flash Sales chose a brand they hadn’t previously considered	Male	120	3.5750	1.20686	.11017
	Female	180	3.8333	1.05967	.07898
Discount and Flash sales can lead to impulsive purchases	Male	120	3.2417	1.22300	.11164
	Female	180	3.7556	1.08119	.08059
Discount and Flash sales and discounts make me Buying unplanned items	Male	120	3.2500	1.23159	.11243
	Female	180	3.7278	1.11781	.08332
Discount and Flash sales create regret and dissatisfaction.	Male	120	3.2333	1.22806	.11211
	Female	180	3.8556	1.02004	.07603
Discount and Flash sales can lead to over spending	Male	120	3.2417	1.22985	.11227
	Female	180	3.8444	1.04010	.07752
Discount and Flash Sales creates	Male	120	3.4000	1.22577	.11190

the excitement and pleasure of shopping.	Female	180	3.8556	1.04171	.07764
Discount and Flash sales perceived urgency and time pressure	Male	120	3.4000	1.22577	.11190
	Female	180	3.8722	1.01953	.07599
Discount and Flash sales provides excitement of securing a discount and saving money	Male	120	3.2500	1.23159	.11243
	Female	180	3.8722	1.01953	.07599

**Source: Primary Data**

From the above table it is found that there is a difference between the mean and standard deviation values of the **Psychological Drivers Towards Discounts and Flash Sales in Online Shopping** when they are classified based on their gender. The result of Levene's Test for Equality of Variances obtained for this analysis is exhibited in the following Table 6.

**Table 6**

**Gender and Psychological Drivers Towards Discounts and Flash Sales in Online Shopping  
Outcome of Independent sample 't' test**

Psychological Drivers		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Diff.	Std. Error Diff.
Discount and Flash sales can provide an opportunity to purchase higher-priced items at low price	*	10.072	.002	-2.006	298	.046	-.26389	.13154
	**			-1.944	227.186	.053	-.26389	.13573
<b>Discount and Flash Sales creates Excitement and Urgency.</b>	*	8.061	.005	-1.888	298	.060	-.25000	.13241
	**			-1.838	231.083	.067	-.25000	.13603
Discount and Flash Sales makes quick decisions to avoid missing out on a deal.	*	8.883	.003	-2.174	298	.030	-.28333	.13032
	**			-2.112	229.369	.036	-.28333	.13415
Discount and Flash Sales chose a brand they hadn't previously considered	*	7.630	.006	-1.956	298	.051	-.25833	.13208
	**			-1.906	232.014	.058	-.25833	.13556
Discount and Flash sales can lead to impulsive purchases	*	6.312	.013	-3.825	298	.000	-.51389	.13434
	**			-3.732	233.219	.000	-.51389	.13769
Discount and Flash sales and discounts make me Buying unplanned items	*	4.591	.033	-3.481	298	.001	-.47778	.13725
	**			-3.414	237.896	.001	-.47778	.13993
Discount and Flash sales create regret and dissatisfaction.	*	15.357	.000	-4.766	298	.000	-.62222	.13056
	**			-4.594	222.367	.000	-.62222	.13546
Discount and Flash sales can lead to over spending	*	14.051	.000	-4.568	298	.000	-.60278	.13196
	**			-4.418	225.461	.000	-.60278	.13644
Discount and Flash Sales creates the excitement and pleasure of shopping.	*	12.946	.000	-3.455	298	.001	-.45556	.13186
	**			-3.345	226.303	.001	-.45556	.13620
Discount and Flash sales	*	15.312	.000	-3.621	298	.000	-.47222	.13040



perceived urgency and time pressure	**			-3.491	222.600	.001	-.47222	.13526
Discount and Flash sales provides excitement of securing a discount and saving money	*	15.745	.000	-4.760	298	.000	-.62222	.13071
	**			-4.585	221.794	.000	-.62222	.13570

**Source: Computed Data**

Note: \* - Equal Variances Assumed

\*\* - Equal Variances Not Assumed

The above result of Levene's test for equality of variances indicates that the online shoppers do not differ in their view about the eleven statements namely Discount and Flash sales can provide an opportunity to purchase higher-priced items at low price, **Discount and Flash Sales creates Excitement and Urgency**, Discount and Flash Sales makes quick decisions to avoid missing out on a deal, Discount and Flash Sales chose a brand they hadn't previously considered, Discount and Flash sales can lead to impulsive purchases, Discount and Flash sales and discounts make me Buying unplanned items, Discount and Flash sales create regret and dissatisfaction, Discount and Flash sales can lead to over spending, Discount and Flash Sales creates the excitement and pleasure of shopping, Discount and Flash sales perceived urgency and time pressure and Discount and Flash sales provides excitement of securing a discount and saving money .That is the probability value for these eleven aspects is more than the acceptance level of 0.05. Hence the null hypothesis framed for this analysis is not rejected and it is concluded that there is no significant association between gender of the online shoppers and their psychological drivers towards discounts and flash sales in online shopping. It is inferred that the online shoppers selected for the study do not varied in their view Discount and Flash sales can provide an opportunity to purchase higher-priced items at low price, **Discount and Flash Sales creates Excitement and Urgency**, Discount and Flash Sales makes quick decisions to avoid missing out on a deal, Discount and Flash Sales chose a brand they hadn't previously considered, Discount and Flash sales can lead to impulsive purchases, Discount and Flash sales and discounts make me Buying unplanned items, Discount and Flash sales create regret and dissatisfaction, Discount and Flash sales can lead to over spending, Discount and Flash Sales creates the excitement and pleasure of shopping, Discount and Flash sales perceived urgency and time pressure and Discount and Flash sales provides excitement of securing a discount and saving money.

**1.7 Suggestions**

The results of this study also provide information to the Government in order to play a role in regulating and enforcing the law in all online shopping events to ensure the safety of online shoppers. Government and communities need to pay attention to the online shopping model and their promotional strategies. The Government should take regulatory measures to safeguard the online shoppers from unfair discount and flash sales. So that the online shoppers can enjoy more advanced online shopping facilities.

**1.8 Conclusion**

The main strategies used by online shoppers, such as instilling a sense of urgency and scarcity, which engenders a fear of losing out, cause them to make snap decisions. The internet shoppers selected a brand that they had not before thought about. By changing reference points, customers are led to believe that bargains are worth more than the true value of the product. Discount and flash sales can result in overspending and impulsive shopping leads to the purchase of unforeseen things. These strategies, which are bolstered by user experience design and a positive economic gain, raise arousal and enjoyment.



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## 15. ETHNOBOTANICAL AND PHYTOCHEMICAL STUDY OF MEDICINAL PLANTS FOUND IN AND AROUND MALLIPUTHUR

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### Abstract:

Medicinal plants have bioactive compounds which are used for curing of various humandiseases and also play an important role in healing. The medicinal plants have antifungal, antibacterial and anti-inflammation activities. In this study we have to take survey of 75 medicinal plants and their phytochemical constituents in an around Malliputhur. Most of the plants have alkaloids, terpenoids, various aminoacids, flavonoids, tanins and saponns. Among the 75 medicinal plants we have to take only three important medicinal plants naming Piper betle L. (Vetrillai), Abutilon indicum L. (Thuti), Morindatinctoria Roxb. (Manjanathi) are used for the variety of plant growth. Phytochemicals have two categories i.e., primary and secondary constituents. Primary constituents have chlorophyll, proteins sugar and amino acids. Secondary constituentscontain terpenoids and alkaloids. Preliminary screening of phytochemicals in different solvent (hexane, ethanol and chloroform) of plantextracts i.e., Piper betle, Abutilon indicum, Morindatinctoria wererecarriedoutbyemployingstandardmethods for conducting Qualitative phytochemical analysis for studying the presence of activecompounds likesteroids, reducing sugar, sugar, alkaloids, phenolic compounds, flavonoids,tannins, saponins and amino acids. The test plant extracts, few phytochemiel constituents wererepresentinallthesolvents.

**Keywords:** Piper betle L. (Vetrillai), Abutilon indicum L. (Thuti), MorindatinctoriaRoxb. (Manjanathi), Ethnobotanical survey and phytochemical analysis.

### Introduction:

Plants play on vital role in the development of new drugs or antibiotics. Plants have many antimicrobial and phytochemical constituents. Most of the plant has these characters and it is used to cure many diseases. Phytochemicals are the natural compound occurs in plants, vegetables and fruits that work with nutrients and fibers to act against diseases or more specifically to act against diseases. Plants are directly exposed to air, water and soil so it is affected directly by these components .In India medicinal plants play a vital role for the purification of water and soil. It also plays an important role in the preparation of many ayurvedic medicines and it is used to cure many chronic diseases like cancer, diabetics, hemorrhage etc., (Naseemullahet al., 2014).

According to World Health Organization (WHO) medicinal plants would be the bestsource to obtain variety of drugs. About 80% of individuals In developed countries about 80% of persons usetraditionalmedicines, which hascompounds derived from medicinal plants.

Medicinal plants contain some organic compounds which provide definite physiological action on the human body and these bioactive substances include tannins, alkaloids, carbohydrates, terpenoids, steroids and flavonoids (Hassan and Kmarudin et.al., 2017).These compounds are synthesized by primary or rather secondary metabolism of living organisms. Secondary metabolites are chemically and taxonomically extremely diverse compounds with obscure function. They are widely used in the human therapy, veterinary, agriculture, scientific research and countless other areas.

**Description of the plant:**

**1. Betel (Piper betle L.)**

Class	:	Magnoliopsida
Subclass	:	Magnolidae
Order	:	Piperales
Family	:	Piperaceae
Genus	:	Piper L.
Species	:	Piper betle L



In India and Sri Lanka, the bundle of betel leaves is traditionally offered as a mark of respect and favourable beginnings. Occasions include greeting elders at weeding ceremonies, celebrating the New year and offering payment to Ayurvedic Physicians and astrologers.

Wahidaet. al., 2012 discussed about the preservation of piper species by vaccum drying methods and concluded that increasing drying temperature combined with increasing vaccum pressure accelerated the vaccum drying process.

Kaleemet. al., 2005 suggested that Piper betle used effectively in the treatment of diabetes. These results concluded that oxidative stress played a key role in diabetes and treatment with Piper betle leaf extract are useful in controlling glucose and lipid levels of diabetic in both animal and human beings. Hewageeganaet al., 2011 and Chandra et. al., 2011 also used the same plant to cure diabetes.

**2. Country Mallow (Abutilon indicumL.):**

Class	:	Magnoliopsida
Subclass	:	Rosanae
Order	:	Malvales
Family	:	Malvaceae
Genus	:	Abutilon
Species	:	indicumL.





*Abutilon indicum* (Indian abutilon, Indian mallow) is a small shrub in the comes under the family Malvaceae. The native place of this plant is tropic and subtropical regions and sometimes cultivated as an ornamental. It is located in Karnataka and Tamilnadu. This plant is mainly used as a medicinal plant and is considered invasive on certain tropical islands. Its roots and leaves are used for curing fever.

*Abutilon indicum* is an erect woody plant found commonly in tropical Regions (Archana Sharma, et.al., 2013). The seeds are used as a purgative in piles and in the treatment of cough (Nadakami, 1995). The seeds are also used to cure gonorrhea (Saini et. al., 2015) and ti is also used to linctus. Seed of *Abutilon indicum* contain an important sugar molecule called raffinose (Badamiet. al., 1975).

### 3. Indian Mulberry (*MorindatictoriaRoxb.*):

Class	:	Magnoliopsida
Subclass	:	Asteridae
Order	:	Gentianales
Family	:	Rubiaceae
Genus	:	<i>MorindaRoxb.</i>
Species	:	<i>Morindatictoria</i>



Indian Mulberry is an evergreen shrub or small tree growing upto 5-10m tall. The leaves are 15-25 cm long, oblong to lanceolate and the flowers are tubular white, aromatic, about 2 cm long. The fruit is a green syncarp, 2-2.5 cm Diameter.

In case of disturbing the plants increase in the rate of infections with antibiotic resistant microorganisms and due to side effects (Rekhabishtet.al., 2009) of some antibiotics there is an improving the quality of medicinal plants natural alternate to synthetic drugs (Seyyedednejad and Motamedi, 2010). Most of the higher plants store enormous organic substances in quantities it may be significant to be economically useful as pharmaceuticals. Species of higher plants were less much surveyed for antimicrobial activity (Mohanaet. al., 2008).

### Phytochemical Analysis:

Photochemical are the chemicals produces by various parts of the plants. These bioactive constituents of plants are steroids, terpenoids, carotenoids, flavonoids, alkaloids, tannins and glycosides. These compounds have variousactivities such as antimicrobial and antibacterial some have been reported to exhibit hemolytic and foaming activity reported by Feroz et al., (1993). Plants materials are on increasing interest for their applications in pharmaceutical, nutritional and cosmetic application. Plants are rich in active compounds orsecondary metabolites such as alkaloids, steroids, tannins, glycosides, volatile oils, fixed oils, resins, phenols and flavonoids

Extraction processes of these metabolites are related to the difference in solubility of the compounds present in a mixture of solvent. The beneficial action of those phyto constituents typically comes from the merging or synergic work of these secondary products (Tonthubthimthong et al.,



2001). There are several extractions techniques for metabolites presenta vegetal. These techniques can be called conventional (long been used) and new (developedmore recently). Conventional techniques are the ones using organic fluid (hexane, acetone, methanol, ethanol etc.) or water and are carried out generally at atmospheric pressure while newtechniques using pressure and elevated temperatures (Luque de Castro et al., 1998). Methods used for extraction are necessary for the differentiation of active components of plant tissues from the originated components by using appropriated solvents. During this process, the solventsmove into the solid plant material and solubilize the compounds with similar polarity (Amita and Shalini, 2014). Thus theneed inchoosing the relevant extraction method is evident becausewhen different methods are practiced on same plant material with the same solvent, extraction efficiency shows significant variations. In addition, the relevant extraction methods most areconstant, for a future good reproducibility. More, appropriate solvent is of essential importance along with application. This is related to fact that polar solvents will extract out polar actifscompoundsandnon-polar oneswill beextracted outbynon-polarsolvents (Ankit et al., 2012).

For the extraction procedures, solvents such as water, ethanol, chloroform, ethylacetate, methanol, etc. are commonly used and occasionally, for better extraction efficiency, mixtures ofsolventscan beused.

The vetrillai leaf contains water (85-90%), protein (3-3.5%), carbohydrates (0.5-6.2%), minerals (2.3-3.3%), fat (0.4-1%), fiber (2.3%), essential oil (0.08-0.2%), tannin (0.1-1.3%), alkaloid. The phytochemical investigation on leaves revealed the presence of alkaloids, carbohydrate, amino acids, tannins and steroidal components (Sugumaran, Poornimaa et al., 2011). Several methods are usedto extract the necessary active components of plant tissues from the originated components by using appropriated solvents. During this process, the solventsmove into the material and solubilize the compounds with similar polarity (Amita and Shaliniet al.,2014).Thus theneed inchoosing the relevant extraction method is evident becausewhen different methods are practiced on same plant material with the same solvent, extractionefficiency show significant variations. In addition, the relevant extraction methods most areconstant, for a future good reproducibility. More, appropriate solvent is of essential importancealong with application. This is related to fact that polar solvents will extract out polar actifs compounds andnon-polar oneswill beextracted outbynon-polarsolvents (Ankitet al., 2012). For the extraction procedures, solvents suchas water, ethanol, chloroform, ethyl acetate, methanol, etc. are commonly used and occasionally, for better extraction efficiency, mixtures of solvents can beused.(Manimekaliaet.al., 2018).

## **Materials and methods:**

### **Sample Collection and Identification**

ThePiper betle L. (Vetrillai), Abutilon indicum L.(Thuti), Morindatinctoria Roxb. (Manjanathi) are used asa testplants. It was collected from in an around Malliputhur.The collected plant samples weremaintainedin theBotany Lab, The Standard Fireworks Rajaratinam College for women, Sivakasi in Tamilnadu. The collected fresh samples were stored for further analysis.

### **Preparation of Extracts**

The fresh samples were grinded with the help of mortar and pestle. Ten grams ofvarious plant materials was taken, then it was grinded well and the extract was filteredthrough muslin cloth. The extract was makeup with 50ml of different solvents (low polarto highpolar) like a shexane, ethanol, and chloroform. After the preparation was over, the extracts were stored in refrigerator for further analysis.

### **Preliminaryphy to chemical screening**

Different plant extracts of Vetrillai (Piper betle), Thuti (Abutilon indicum), Manjanathi (Morindatinctoria) were used to screen the following photo chemical namely steroids, reducing sugar, sugar, alkaloids, phenoliccompounds, flavanoids, tannins, saponins and amino acids by standard procedures (Harborne,1985)

### **Steroids**

One ml of all plant extracts was treated with minimum quantity (0.1ml) of chloroform, 3 to 4 drops of acetic anhydride and one drop of concentrated sulphuric acid. Purple color of the test content was changed into blue green indicates the presence of steroids.

### **Reducing sugar**

One ml of all plant extracts was treated with 2ml of Fehling's reagent and 3ml of distilled water. The test content was boiled for 1-2 minutes and the development of red or orange color indicated the presence of reducing sugar.

### **Sugar**

One ml of all solvent plant extracts was treated with 0.1ml of anthrone and 2-3 drops of concentrated sulphuric acid and then heated for 1-2 minutes. Change of color from green to purple showed the presence of sugar.

### **Alkaloids**

The test extracts were treated with 2N hydrochloric acid, the aqueous layer was formed. It was decanted and to which one or two drops of Mayer's reagent was added. The test content was changed into white turbidity or precipitates, which indicated the presence of alkaloids.

### **Phenolic compounds**

One ml of all solvent extracts was treated with a drop of neutral ferric chloride. Change of intense color in the test content shows positive result for phenolic compounds.

### **Flavonoids**

A bit of magnesium and then one or two drops of concentrated hydrochloric acid were added to the plant extracts and heated. The development of red or orange color indicated the presence of flavonoids.

### **Tannins**

One ml of all solvent plant extracts were mixed with 1ml of water and 0.1% lead acetate. Formation of white color precipitate indicates the presence of tannins.

### **Saponins**

One ml of all solvent extracts was treated with water and shaken well. The test solution was changed into foamy leather, if the test sample contains saponins.

### **Amino acids**

The plant extracts were heated with ninhydrin in the presence of 1-2ml of alcohol. The violet color formed and confirmed the presence of amino acids.

### **Result and Discussion:**

#### **Identification of test plant materials:**

The medicinal plants are Piper betle L. (Betle leaf), Morinda tictoria Roxb. (Indian Mulberry) Abutilon indicum L. (Country Mallow) leaves are collected and grinded then it was transferred to the laboratory of Botany, The Standard Fireworks Rajaratnam College for Women, Sivakasi.

The collected plant materials were taken and grinded using mortar and pestle and added to the solvents like hexane, ethanol and chloroform (low polar to high polar). After the preparation was over, the extracts were stored in refrigerator for further analysis.

These plant extracts are using the analysis of antimicrobial activity, phytochemical constituents, TLC (invitro) and analysis of soil samples were analysed and recorded.

#### **Ethano Botanical Survey**

Plants have been used as traditional medicine for several thousand years. The exploration of ethnomedicinal survey was carried out by the researchers in Malliputhur. There are 75 species belonging to 75 families were recorded. The species are arranged in sequential order (Table- 1). In my

survey the family Fabaceae ranks at the top having 7 ethnomedicinal plants species, followed by Cucurbitaceae and Lamiaceae (6sp), Solanaceae (5sp), Amaranthaceae, Rutaceae and Euphorbiaceae (3sp), Meliaceae, Malvaceae, Arecaceae, Poaceae, Apocyanaceae, Liliaceae, Amaryllidaceae, Arecaceae, Apocyanaceae, Lythraceae, Moraceae, Oleaceae, Rubiaceae (2sps). The remaining 19 families had only one species (Table-1). The present study provides information about some beneficial uses of 75 plant species. The plants are either used individually or in mixture with some other plants or plant parts. Some plant species are claimed to be quite effective remedies for cutaneous affection of head, snakebite, diarrhea, Febrifuge, malaria, cough and cold, leukemia, breast cancer and stomach troubles etc. Since the uses are based on empirical knowledge, the scientific study of all these herbal drugs is highly desirable to establish their efficacy for safe use. Every one of members of the people in the area, use medicinal plants. Some medicinal plants like *Ocimumtenuiflorum* L. leaf parts also used to cough and cold, abscess by different communities of the area. Similar ethnobotanical studies have been reported in some other parts of India (John De Britto et al., 2010; Mohan et al., 2008, Ketewa and Arora, 1997; Reddy et al., 1997; Jain, 2004; Singh, 2004; Muthukumarasamy et al., 2003a, b; 2004a, b), as well as in other parts of the world (Jovelet al., 1996; Bonet et al., 1999; Grierson and Afolayan. 1999; Shinwari and Khan, 2000). Various parts of the plant are used in curing different ailments. During the research project it was noted that the medicinal plant wealth of Malliputhur, Virudhunagar District. Some medicinally important plant species are fast dwindling, mainly due to human interference. So, the area needs proper protection for the conservation and survival bio-resources. Further research works should be formulized on base line of indigenous studies because there are still some diseases like “Cancer” and “AIDS”, for which there are no identified cures. So ethno directed studies can help in these research works (Ahmad and Ali, 1998).

### **Phytochemical Analysis**

Preliminary screening of photochemical indifferent plant extracts (hexane, ethanol, and chloroform). The plant extracts were analyzed qualitatively and tabulated in the Table 2.1-2.3 and plate 1.1.

In Piper betle the steroid, reducing sugar and sugar was absent in the all the solvents. Alkaloids were present in hexane alone. Phenol was present in all the solvents like hexane, ethanol and chloroform. Flavonoids were present only in hexane solvent. Tannins were present in all the solvents (hexane, ethanol and chloroform). Saponins and amino acids were absent in all the solvents. The above result was correlated with the phytochemical analysis, Identification and Quantification of antibacterial active compounds in Betel leaves, Piper betle used methanolic extracts gave by Syahidah et al., 2017.

In *Abutilon indicum* the steroid, reducing sugar and sugar was absent in the all the solvents. Alkaloids were present in hexane and ethanol. Phenol was present in all the solvents like hexane, ethanol, and chloroform. Flavonoids was absent in all the solvents. Tannins were present in all the solvents (hexane, ethanol, and chloroform). Saponins and amino acids were absent in all the solvents. Similar observation was noted in Antimicrobial activity of *Abutilon indicum* – A medicinal plant worked by Shital and Megha 2021 using methanol and water extracts.

In *Morinda tinctoria* the steroid was present in ethanol, chloroform. Reducing sugar was absent in all the solvents. Sugar was present in ethanol. Alkaloids and phenol was present in all the solvents (hexane, ethanol, and chloroform). Flavonoids was present in hexane, ethanol. Tannins was present in all the solvents. Saponins were present in ethanol and chloroform. Amino acids was absent in all the solvents. The report was correlated with Antimicrobial activity and phytochemical analysis of *Morinda tinctoria* (leaf extracts) reported by, Deepti et al., 2012 using different organic solvents.



**Table 2.1: Preliminary phyto chemical screening of piper betle l.(leaf) – using different solvent**

S.No	Phytoconstituents	Extracts		
		Hexane	Ethanol	Chloroform
1.	Steroids	-	-	-
2.	ReducingSugar	-	-	-
3.	Sugar	-	-	-
4.	Alkaloids	++	-	-
5.	Phenol	+	++	++
6.	Flavonoids	+	-	-
7.	Tannins	++	++	+
8.	Saponins	-	-	-
9.	Aminoacid	-	-	-

**Note:** ++indicate: more quantity, +indicate: moderatequantity, -indicatemeager quantity or absent

**Table 2.2 – Preliminary Phyto Chemical Screening of Abutilon Indicum L.(Leaf)–Using different solvent.**

S.No	Phytoconstituents	Extracts		
		Hexane	Ethanol	Chloroform
1.	Steroids	-	-	-
2.	ReducingSugar	-	-	-
3.	Sugar	-	-	-
4.	Alkaloids	++	++	-
5.	Phenol	+	+	+
6.	Flavonoids	-	-	-
7.	Tannins	+	++	+
8.	Saponins	-	-	-
9.	Aminoacid	-	-	-

**Note:** ++indicate: more quantity, +indicate: moderate quantity, -indicate meagre quantity or absent

**Table 2.3- Preliminary Phytochemical Screening of Morinda Tinctoria l.(leaf)–using different solvent.**

S.No	Phytoconstituents	Extracts		
		Hexane	Ethanol	Chloroform
1.	Steroids	-	+	+
2.	ReducingSugar	-	-	-
3.	Sugar	-	+	-
4.	Alkaloids	++	+	+
5.	Phenol	+	+	+
6.	Flavonoids	+	+	-
7.	Tannins	++	+	+
8.	Saponins	-	++	+
9.	Aminoacid	-	-	-

**Note:** ++indicate: more quantity, +indicate: moderate quantity, -indicate meagre quantityor absent

#### **Conclusion:**

From the above discussion we know the importance of medicinal plants and its significance.Each and every person should be responsible for create the disease free environment. Reduce the level of micro organisms in the air, water and soil through in



numerable biological techniques and methodology. Reduce the biowaste things over done with the solid waste management system and produce the new drugs. In future, these medicinal plants were widely used in many pharmaceutical industries and produced the many antibiotics in the form of capsules and syrups.

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## **16. FROM STONE TO SCREEN: TECHNOLOGICAL INNOVATIONS IN ANCIENT INSCRIPTION ANALYSIS**

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### **Abstract**

The study of historical inscriptions provides vital insights into past cultures, languages, and societies. Traditional methods of documenting inscriptions, such as manual copying or rubbings, often faced limitations due to weathering, damage, or inaccessibility. In recent years, digital technologies have transformed inscription studies, offering precise, non-invasive, and collaborative approaches. High-resolution digital imaging and Reflectance Transformation Imaging (RTI) allow researchers to capture fine surface details, revealing faded or hidden texts. 3D scanning and modeling enable the creation of accurate replicas, reconstruction of broken artifacts, and analysis of inscriptions in their spatial context. The integration of Artificial Intelligence (AI) and Machine Learning facilitates automated transcription, script recognition, and pattern detection, significantly improving research efficiency. Additionally, digital databases and collaborative platforms provide standardized, accessible, and well-preserved repositories of inscription data, encouraging global scholarly cooperation. This paper examines how these technologies enhance the analysis, preservation, and accessibility of inscriptions while complementing traditional epigraphic methods. By combining modern tools with cultural and historical knowledge, researchers can ensure the sustainable study of inscriptions, expand analytical possibilities, and foster international collaboration. The paper highlights the transformative potential of digital technologies in epigraphy, emphasizing their role in safeguarding human heritage for future generations.

**Keywords:** Digital Imaging, 3D Modeling, Artificial Intelligence, Machine Learning, Inscriptions, Epigraphy, Collaborative Research, Reflectance Transformation Imaging (RTI)

### **Introduction**

Inscription investigation, a key element of epigraphy, has historically relied on traditional methods, often limiting the scope of our understanding of ancient cultures. However, with the rise of advanced technologies, the field has been revolutionized, enabling researchers to discover new insights and revisit existing interpretations. This presentation explores the transformative role of technology in inscription analysis, focusing on developments in digital imaging, 3D scanning, artificial intelligence, and database systems. These tools allow scholars to enhance the accuracy, efficiency, and depth of epigraphic studies, significantly enriching our knowledge of ancient civilizations.

### **Objectives**

- To describe the use of digital imaging, 3D modeling, and AI in studying inscriptions.
- To explain how online databases and platforms help preserve and share inscription data.
- To discuss the combination of modern technology with traditional epigraphy methods.

### **Digital Technologies in Inscription Studies: Imaging, 3D Modeling, AI, and Collaborative Databases**

The study of historical inscriptions has long been a crucial part of understanding past civilizations, cultures, languages, and social practices. Inscriptions, whether on stone, metal, pottery, or other materials, provide primary evidence for historians, linguists, archaeologists, and epigraphers. Traditional methods of recording and analyzing inscriptions—such as manual rubbings, hand-drawn

copies, and textual transcription were often time-consuming, prone to error, and limited by accessibility. The advent of **digital technologies** has revolutionized the field of epigraphy, allowing researchers to capture, preserve, analyze, and share inscriptions in ways that were previously impossible. Techniques such as **digital imaging, 3D scanning and modeling, artificial intelligence, and collaborative database management** have greatly expanded the depth and scope of inscription studies. This paper elaborates on these methods, exploring their applications, advantages, challenges, and implications for future research.

### **Digital Imaging and Enhancement**

Digital imaging represents one of the most impactful tools in modern epigraphy. By using high-resolution imaging methods, researchers can observe minute details of inscriptions that are often invisible to the naked eye. Among these technologies, **Reflectance Transformation Imaging (RTI)** has emerged as a leading technique. RTI involves capturing multiple images of an object from a fixed camera position while varying the direction of illumination. These images are then computationally combined to create a single, interactive file that allows users to manipulate the lighting virtually. The result is a dynamic visualization of surface textures, indentations, and faint engravings, which can reveal features such as chisel marks, eroded letters, or faded patterns.

For example, the application of RTI to ancient Greek pottery has uncovered inscriptions that were previously obscured due to erosion or pigment loss. Such enhanced imaging not only allows for accurate transcription but also facilitates a better understanding of artistic practices, ceremonial uses, and social contexts surrounding the artifacts. Similarly, RTI has been applied to medieval European manuscripts, South Indian temple inscriptions, and Roman milestones, significantly improving the readability of texts.

Complementing RTI, **image editing and enhancement software**, such as Adobe Photoshop and GIMP, allows researchers to digitally restore inscriptions. Techniques such as contrast adjustment, sharpening, filtering, and color manipulation can bring out faded letters or symbols. For instance, scholars working on stone inscriptions in India have successfully recovered details that were illegible due to centuries of weathering. Digital enhancement also allows for side-by-side comparison of inscriptions from different periods or regions, aiding in stylistic and linguistic analyses.

Moreover, **multispectral and hyperspectral imaging** have opened new frontiers. These methods capture data across different wavelengths, including infrared and ultraviolet, which can reveal hidden inscriptions, underdrawings, or erased texts. Such imaging has proven especially useful for palimpsests—manuscripts where original writings were erased and overwritten. For instance, studies of ancient manuscripts in Middle Eastern archives have revealed previously lost texts, enriching historical and religious scholarship.

### **3D Scanning and Modeling**

While digital imaging focuses on surface visualization, **3D scanning and modeling** techniques provide comprehensive spatial documentation of inscriptions. These technologies allow researchers to capture the three-dimensional geometry of inscribed artifacts with extreme precision. Methods such as **structured light scanning** and **laser-based scanning** generate point clouds that accurately represent the surface topography, allowing detailed measurements of depth, orientation, and engraving patterns.

One of the main benefits of 3D scanning is the ability to virtually reconstruct damaged or fragmented inscriptions. Broken pottery, eroded stones, and incomplete tablets can be digitally restored, enabling scholars to interpret inscriptions in their original context. For example, 3D models of Roman inscriptions have allowed historians to reconstruct partially lost civic decrees, revealing administrative and legal practices of ancient societies. In India, digital reconstruction of temple inscriptions from fragmented stones has helped preserve records of donations, land grants, and ritual practices, which would otherwise have been lost.

3D models also facilitate **comparative analysis**. By overlaying scans of similar inscriptions from different sites, researchers can detect stylistic patterns, trace the movement of scripts or motifs,



and analyze regional variations. This has significant implications for understanding the diffusion of cultural practices, trade networks, and historical interactions between communities.

### **Artificial Intelligence and Machine Learning**

The integration of **Artificial Intelligence (AI) and Machine Learning (ML)** into epigraphy has begun to transform the speed, accuracy, and scope of research. AI tools can automate repetitive tasks such as transcription, translation, and script identification, reducing human error and accelerating analysis.

A key AI application is **custom Optical Character Recognition (OCR) for ancient scripts**. Traditional OCR software is designed for modern printed texts and struggles with irregular ancient characters. However, AI-based OCR models trained on historical datasets can recognize a variety of scripts, including Brahmi, Tamil-Brahmi, Greek, and Latin inscriptions. This technology enables faster digital transcription, creating machine-readable text from images of inscriptions.

Machine learning models also facilitate pattern recognition. By analyzing large corpora of inscriptions, algorithms can identify recurring motifs, stylistic conventions, or linguistic structures. For example, AI has been used to classify inscriptions by region, period, or author based on subtle visual and textual features. Such analysis can uncover connections between distant sites or previously unnoticed historical trends.

AI-driven language detection and translation tools are increasingly applied in epigraphy databases. The **Epigraphic Database** employs algorithms that automatically detect the language and script of inscriptions, suggesting possible translations and linking them to historical references. This enhances efficiency, reduces transcription errors, and allows researchers to focus on interpretation rather than mechanical processing.

In addition, AI can aid **reconstruction of damaged or incomplete inscriptions**. Predictive modeling can suggest likely sequences of missing characters based on linguistic rules, historical context, and pattern analysis. Although human verification remains essential, AI significantly accelerates hypothesis generation.

Machine learning also enables **cross-disciplinary analysis**. By integrating inscription data with archaeological, linguistic, and geographic datasets, AI can reveal patterns such as trade routes, migration trends, or cultural diffusion that would be challenging to discern manually.

### **Database Management and Collaborative Platforms**

The digitization of inscription data is complemented by **online databases and collaborative platforms** that facilitate global research. Traditional epigraphy relied on printed catalogs and personal archives, which were difficult to access and prone to fragmentation. Digital repositories now allow standardized, centralized storage, ensuring long-term preservation and easy retrieval.

For example, the **Epigraphic Database** provides a searchable archive of inscriptions from multiple regions, periods, and languages. Researchers can access high-resolution images, metadata, translations, and references in one platform. Such databases often include advanced search functions, allowing queries based on script type, location, date, or content.

Collaborative platforms, like the **Digital Epigraphy Database Initiative**, enable peer review, annotation, and joint research projects. Scholars from different countries can contribute, verify, and update records in real-time, promoting transparency and academic rigor. Annotation tools allow users to mark features of interest, suggest corrections, or link inscriptions to related archaeological findings. This democratizes research, encouraging participation beyond specialized institutions.

Database management also supports **data standardization**. Consistent metadata structures—covering material, date, location, script, language, and condition—facilitate large-scale comparative studies. When combined with GIS mapping, these databases allow spatial visualization of inscriptions, revealing patterns of settlement, trade, or cultural influence.



### Integration and Future Directions

The convergence of **digital imaging, 3D modeling, AI, and collaborative databases** has created a synergistic framework for modern epigraphy. Digital imaging provides detailed visualization, 3D scanning captures spatial context, AI accelerates transcription and analysis, and databases facilitate preservation and collaboration. Together, these tools allow scholars to study inscriptions comprehensively, integrating text, materiality, and spatial context.

Future directions include:

1. **Virtual and Augmented Reality (VR/AR):** Allowing users to explore inscriptions in immersive environments, reconstructing historical sites with accurate inscriptions.
2. **Enhanced AI Models:** Developing deep learning models capable of recognizing highly eroded or fragmented scripts, predicting missing text, and identifying stylistic influences.
3. **Interdisciplinary Platforms:** Integrating epigraphy with archaeology, linguistics, history, and digital humanities for richer analyses.
4. **Crowdsourcing and Citizen Science:** Engaging the public in transcription, annotation, or verification through gamified platforms.
5. **Sustainability and Preservation:** Combining digital archives with conservation strategies to protect fragile artifacts while making them globally accessible.

The integration of these technologies also promotes inclusivity. Scholars from developing countries, or those without physical access to rare inscriptions, can participate in research. Global collaboration fosters cross-cultural understanding and ensures that knowledge about human heritage is widely disseminated.

### Conclusion

Digital technologies have fundamentally transformed the study of inscriptions. High-resolution imaging, 3D scanning, AI, and collaborative databases have increased accuracy, accessibility, and analytical power. They allow researchers to recover faded texts, reconstruct broken artifacts, and detect patterns invisible to traditional methods. By combining technological innovation with scholarly expertise, epigraphy is now more precise, comprehensive, and globally interconnected. The continued development and integration of these tools promise a future where inscriptions—once limited to the hands of a few specialists—can be studied, shared, and appreciated by researchers and the public worldwide, preserving human heritage for generations to come..

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## **17. ROLE OF SELF-RESPECT MOVEMENT IN THE ABOLITION OF DEVADASI SYSTEM**

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### **Abstract**

The Self-Respect Movement, founded in Tamil Nadu in 1925 by E.V. Ramasamy (Periyar), was a significant social reform initiative focused on establishing dignity for the disadvantaged by challenging caste-based hierarchy, promoting rationalism, advancing women's rights, and fostering an egalitarian society free from Brahminical dominance. The movement utilized periodicals like Kudiarasu to spread its ideology and advocated for self-respect marriages, property rights for women, and inter-caste marriages. The Devadasi system, which involved young women dedicating their lives to temples and often forced into prostitution, was considered a severe social evil and exploitation. Through Kudiarasu and Self Respect Movement Periyar struggled for the welfare of the women and the society.

**Key Words:** Women, Periyar, Kudiarasu

### **INTRODUCTION**

Since Middle Ages, a religious practice of 'devoting' the girl child to serve God existed in the Hindu religion. Such 'devoted' girl children were generally regarded as Devadasis by society. These women who were devoted to God, felt that they possessed divinity in them and considered themselves as wives of God.

But practically, these women were often molested by temple priests and others. It was a historical truth that they were pushed to a scenario where they used their bodies for survival<sup>1</sup>. So, to ameliorate the lives of such women, the self-respect movement started by Periyar E.V. Ramasamy in 1925 played an important role in the abolition of the Devadasi system. This article aims to elucidate the role of the self-respect movement in abolishing the devadasi system based on historical traces.

### **DEVADASI SYSTEM AND PROSTITUTION:**

Generally, several people in the society were interested in pushing girl children into the Devadasi system

- to relieve themselves from any curse and defilement
- to publicize their wealth to the world
- to be blessed with the boy child
- for the welfare of family and boy child
- obsession towards heaven in life after death
- due to the fortune of earning money easily<sup>2</sup>.

Moreover, poverty was also the prime reason for women going into the Devadasi system<sup>3</sup>. Waned devadasi's who don't have girl children bought 'Hindu' girls from other communities and 'devoted' them to God to continue their descendants, tradition and property<sup>4</sup>. Such devoting ritual was called as Pottukattudhal or Pottukattu ritual in Tamil.

A thin line separates prostitution and the devadasi system. Devadasis have undergone prostitution several times for their comfort and livelihood. Kudiarasu magazine mentions that devadasis were cursed to be handmaids and strumpets<sup>5</sup>. The usage of diction differentiated devadasi from prostitutes. The Tamil word 'Vesi' refers to prostitutes, and 'Dasi' refers

to Devadasi. It shall be mentioned that prostitutes work without religious recognition, whereas 'dasi's' safely carry out prostitution under the institution of religion.

People belonging to the self-respect movement referred devadasi system as professional prostitution as they clearly knew that devadasis were pushed to the extent of selling their bodies for survival<sup>6</sup>. Kudiarasu article mentions that through 'Pottukattum' ritual, Devadasi's have chosen to be prostitutes and concubines as their lifestyle.

In festive times, the houses of priests were served as a place for prostitution<sup>7</sup>, and they also shared excess Devadasis with other priests and devotees who came to the temple<sup>8</sup>. Adding to this, priests also had a habit of taking Devadasi's during travels to accompany them. It can be found out that priests even sent Devadasis to those who needed their service<sup>9</sup>. It can be discovered that priests had the custom of choosing things for dasi's, which was brought by devotees for pooja. Same way, Kudiarasu magazine also reveals that temple trustees and their heirs had the privilege of taking important decisions in the lives of beautiful Devadasis<sup>10</sup>.

Periyar states that women are forced into this devadasi system to attract devotees in the temple and for the desire of God<sup>11</sup>. Even those who have a strong adherence to religion and faith in God embraced prostitution in the name of God and religion. Kudiarasu declared that devadasis were the prime source of attraction for devotees who came to the temple, and people visited the temple to satisfy their desire. This practice had a great impact on the lives of ladies from normal families too<sup>12</sup>.

People who come to the temple in the name of the devotion actually have some compliance with Devadasis<sup>13</sup>. They had the custom of inviting Devadasi's to family functions like marriage, puberty, and other celebrations to keep them intact. It was to be mentioned that prostitution based on religion was familiar among people in holy places like Rameswaram, Madurai, Thiruchendhur, Chidambaram, Sri Rangam, Palani, Kaasi and Gaya<sup>14</sup>.

#### **SELF-RESPECT MOVEMENT AND ABOLITION OF DEVADASI SYSTEM AND LEGAL BATTLE:**

Indian government must take immediate steps to stop young women involved in such immoral activities in temples in the name of caste, religion, and rituals, argued Muthulakshmi in Madras legislative council. She said dedicating innocent young women and children and tying them to the temple is a disgrace to Indian women and a great stain to social justice. So, she humbly requested all the women's associations to support the cause to embrace this thought. Though Muthulakshmi has put forth all the fair points to introduce a bill to abolish the Devadasi system, it was said that she struggled a lot to bring out the desired resolution.

#### **FUNDAMENTALISTS WHO WANTED TO PROTECT THE DEVADASI SYSTEM:**

Mixed criticisms arose from the bill introduced regarding the abolition of the Devadasi system. Most of the fundamentalist's arguments in legislative assembly and society were based on the importance of dance in Hindu religious rituals. Renaissance men and fundamentalists argued that the Abolition of Devadasi bill would question the belief and culture of 'Hindus' who consider the Devadasi system as sacred and cultural heritage. In a brahmin conference which held in 1932, Tanjore passed a resolution that child marriage, orthodox practices should prevail, and the abolition of the devadasi act should be repealed, and they even tried their best to accomplish their resolution<sup>15</sup>.

It is understood from the writings of Muthulakshmi that fundamentalists and people those who identify them as upper caste vigorously argued the initiatives of the abolition of the Devadasi system, and they didn't come forward to cope with the social changes because of the devadasi system<sup>16</sup>. If any argument rose regarding Devadasi's, people tend to elude, showing their reluctance by saying that they don't belong to their caste even though women from all the castes are devoted to God as devadasis.

Muthulakshmi wrote a letter seeking support from Gandhiji when few congress leaders were irresponsible and created obstacles to abolish the devadasi. Gandhiji appreciated Muthulakshmi and expressed that her plans were coherent, which would be good for the purity of religion and social



justice. Though Gandhiji appreciated the efforts of Muthulakshmi and applauded her actions in the legislative council, he also advised her not to follow western customs.

Some legislative members belonging to the justice party voted in favour of fundamentalists and opposed the bill, which made people like Muthulakshmi to grieve. Somayarajulu felt abolition of the devadasi bill was introduced in a hurry without any arguments in the assembly. Though Kotti Reddy embraced the bill, he thought that the bill would aim to stop devadasi's dance and concerts.

So, this is how members who belonged to the justice party voted against the abolition of the devadasi bill, which made members of the self-respect movement embarrassed. Even Periyar expressed this behavior of theirs as a 'shameless act'<sup>17</sup>. Even South Indian social reform condemned the legislative members who voted against the bill. Indraniammaiyyar also condemned the obstacle created by legislative members against the abolition of the devadasi bill in the second self-respect conference held in Virudhunagar.

#### **SELF-RESPECTERS AND SELF-RESPECT LIFE OF DEVADASI WOMEN:**



The members of the self-respect movement have clearly understood the part of the colonial government in the abolition of the devadasi system. When the Madharasapattanam government ordered to collect people's opinion on the abolition of the devadasi system, Periyar condemned this activity as the foolishness of the government and also added that no civilized government in any country would allow such practices which degrades the morality of people or self-respect of the people and any country which prefers people's virtues and welfare will not allow such illicit customs in the name of God or religion or society.

At the same time, the members of the self-respect movement tried to create awareness among people in support of the abolition of the devadasi system. Neelavathiammaiyyar wrote an essay, "is it fair to still allow subjugation of women?" to evade the ignorance of people and to create awareness<sup>18</sup>. Periyar, who was concerned to abolish the devadasi system, wrote letters to the chairman of the Madharasapattanam presidency stressing the need to abolish the devadasi system. Periyar embraced the bill introduced by Muthulakshmi by saying that the bill not only focuses on restraining prostitution but also curbs the practice of prostitution itself.

A certain percentage of devadasis supported and appreciated Muthulakshmi's efforts and gave a call to others to abolish this wicked practice as a unified effort. self-respect people explained the significance of the abolition of the devadasi bill and threw some insights into why people should embrace this bill. the plea is made through women's society conferences to the government, Hindu religious and charitable endowments, trustees of the temple that rituals like devoting women to temple or other worship places should be banned. (Revolt. 24.11.1929). Same way, several institutions of people welcomed this bill and passed resolutions in their conference.

Women's conference, which was held in 1930, appreciated and applauded Jayakkar, who raised questions against 'pottikattum ritual' in parliament and Muthulakshmi, who introduced the Devadasi Abolition Bill in the legislative assembly of Madharasapattinam. The chengundhars asked the legislative assembly to work towards the abolition of the devadasi bill. The second self-respect



conference condemned 'devoting' young girls to the temple as many took advantage through their dance and music concerts. South Indian social reformist conference passed a resolution to abolish the devadasi system. self-respect conference which held in Tirunelveli praised Muthulakshmi's effort and condemned Sathyamurthy and other fundamentalists for their ignorant mindset, which is against this bill. A meeting which was held in Thiruvarur on 5<sup>th</sup> March 1930 in approbation of the devadasi bill supported Muthulakshmi's abolition of the devadasi system and also rebuked the wicked practice of devoting young women to temple in the name of religion.

Isai Vellalar youth congregation, which was held in Chidambaram, passed a resolution, the status of an individual should not be determined by the work they do, and youth must be provided with free education and abolition of the devadasi system. Isai Vellalar congregation, which was held in Nagapattinam in 1930, reprimanded the devadasi system and accused this practice is a barbarous activity.

### **Conclusion**

Women who faced discrimination and suppression in their lives from birth to death. They faced sufferings like female foeticide, infanticide, child marriage, widowhood, the devadasi system, immoral trafficking, etc. Through this law, the social practice of children and women who has been made to involve in depravity under the tag of Hindu religion was completely abolished in Madarasapattinam.

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## **18. SUSTAINABLE FUTURES 2047: INTEGRATING TAMIL CULTURE AND GEOGRAPHY WITH SDGS**

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### **Abstract**

This paper explores the integration of Tamil culture and geography in achieving the Sustainable Development Goals (SDGs) with a vision toward Sustainable India 2047. Tamil Nadu, with its rich cultural heritage, unique ecological zones, and diverse landscapes, offers valuable lessons for sustainable living. Traditional Tamil knowledge systems such as Sangam literature's ecological classifications (tinai), indigenous agricultural practices, and water management methods demonstrate harmony between humans and nature. By linking these cultural insights with geographical perspectives, the study identifies strategies to address contemporary challenges such as climate change, urbanization, environmental degradation, and resource depletion. The findings highlight that blending cultural wisdom with modern SDG frameworks can provide innovative, locally rooted, and globally relevant solutions. The paper concludes that a holistic approach combining Tamil heritage and geography is essential for envisioning a resilient and sustainable Tamil Nadu by 2047.

**Keywords:** Tamil Culture, Geography, Sustainable Development Goals, Traditional Knowledge, Sustainable 2047, Sangam Landscapes, Ecology, Tamil Nadu

### **Introduction**

India's centenary of independence in 2047 offers a critical milestone for reimagining sustainable futures. The United Nations' Sustainable Development Goals (SDGs) provide a global roadmap, but achieving them requires contextualized approaches rooted in local culture and geography. Tamil Nadu, with its long history of ecological wisdom and cultural practices, stands as a model for integrating tradition with modern sustainability frameworks.

Tamil culture has long recognized the interdependence between people and nature. The classical Sangam literature identifies five ecological landscapes (tinai)—kurinji (mountains), mullai (forests), marutam (agricultural plains), neital (coastal), and palai (arid zones)—each associated with specific livelihoods, values, and sustainable practices. Modern geography similarly categorizes regions based on physical and cultural characteristics, aligning closely with these ancient frameworks. By drawing connections between Tamil heritage and geographical approaches, this paper examines how such integration can guide Tamil Nadu towards achieving the SDGs and envisioning sustainable futures by 2047.

### **Objectives**

1. To identify the role of geography in addressing Tamil Nadu's contemporary challenges such as urban expansion, agricultural stress, and climate change.
2. To analyze the cultural and geographical dimensions of sustainability in Tamil Nadu.
3. To evaluate the relevance of Tamil traditional ecological knowledge for the SDGs.
4. To propose strategies for integrating Tamil cultural heritage with SDG frameworks to envision Sustainable Tamil Nadu 2047.

## Results and Discussion

### Cultural–Environmental Linkages in Tamil Society

Tamil Nadu has a long history of cultural practices that are deeply interwoven with its environment. Ancient Tamil society, as reflected in Sangam literature, identified five ecological regions (tinai): kurinji (mountains), mullai (forests), marutam (agricultural plains), neital (coastal), and palai (arid zones). Each tinai was not only a physical landscape but also a cultural identity linked with livelihoods, ethical codes, and poetic traditions. This classification demonstrates an early awareness of the geographical diversity of the region and its implications for sustainable living.

Traditional water management systems highlight Tamil Nadu's capacity to adapt to semi-arid climates. Eri (tanks) and ooranis (village ponds) were engineered as community-based water harvesting systems. These not only conserved rainwater but also recharged groundwater, sustained agriculture, and reduced vulnerability to drought. Such practices resonate strongly with SDG 6 (Clean Water and Sanitation) and SDG 13 (Climate Action). Reviving and modernizing these systems could significantly contribute to sustainability in 2047.

Similarly, Tamil culture's emphasis on rice cultivation, coupled with millet-based subsistence farming, offers insights into climate-resilient agriculture. With increasing climate stress, reintroducing millets aligns with SDG 2 (Zero Hunger) and SDG 12 (Responsible Consumption and Production).

### Geographical Diversity and its Implications for Sustainability

Tamil Nadu's geography is marked by its coastal plains, fertile river valleys, Western and Eastern Ghats, and arid interiors. Each region has distinct resources, vulnerabilities, and potentials for sustainable development.

**Western Ghats:** Recognized as a biodiversity hotspot, these highlands are critical for water security, hosting the origins of major rivers. Protecting this ecosystem ensures achievement of SDG 15 (Life on Land) and SDG 6. However, deforestation, monoculture plantations, and encroachments threaten ecological balance.

**Deltaic Regions:** The Cauvery delta is known as the “rice bowl” of Tamil Nadu. Yet, overexploitation of groundwater, sand mining, and industrial pollution undermine its productivity. A sustainable 2047 vision requires integrated river basin management and climate-adaptive agriculture.

**Coastal Zones:** With a long coastline of over 1,000 km, Tamil Nadu is highly vulnerable to cyclones, sea-level rise, and erosion. At the same time, coastal ecosystems such as mangroves, estuaries, and lagoons offer resilience. Promoting blue economy initiatives—like sustainable fisheries and eco-tourism—aligns with SDG 14 (Life Below Water).

**Arid Interiors:** The palai regions face desertification risks. Afforestation, soil conservation, and water-efficient irrigation methods are critical interventions for sustainability. Geographical analysis reveals that Tamil Nadu's future lies in tailoring development strategies to its regional diversity rather than a one-size-fits-all model.

### Tamil Ecological Knowledge and the SDGs

The integration of Tamil ecological wisdom with SDG targets provides a culturally grounded model for sustainability.

**SDG 2 (Zero Hunger):** Tamil Nadu's traditional cropping patterns involved crop rotation, mixed cropping, and millet dominance. These ensured nutritional diversity and soil fertility. Reviving such practices could combat modern malnutrition and monocropping dependency.

**SDG 6 (Clean Water and Sanitation):** Ancient tank irrigation systems ensured equitable water distribution across villages. Modernizing eri systems with GIS-based mapping can help restore water security.

**SDG 11 (Sustainable Cities and Communities):** Traditional Tamil settlements were planned with concentric zoning—temple at the center, surrounded by residential areas, agricultural fields, and water bodies. This model offers lessons for creating compact, walkable, and climate-resilient urban designs.



**SDG 12 (Responsible Consumption and Production):** Tamil society emphasized minimalism and respect for nature, visible in festivals, food traditions, and architecture. This value system is crucial for shifting towards sustainable consumption in 2047.

**SDG 13 (Climate Action):** Tamil Nadu's seasonal calendars, agricultural rituals, and proverbs reflect deep climate literacy. Such cultural memory can enhance community-based climate adaptation.

By mapping Tamil cultural practices onto SDG frameworks, the study illustrates how heritage and modern goals can co-exist.

### **Urbanization, Industrialization, and Contemporary Challenges**

While Tamil Nadu is one of India's most industrialized states, rapid urbanization has created sustainability challenges. Cities such as Chennai, Coimbatore, and Madurai face problems of traffic congestion, waste management, water scarcity, and air pollution.

Geography offers tools such as **GIS-based urban planning, remote sensing for land use mapping, and climate modeling** to create sustainable city strategies. Meanwhile, Tamil cultural values—such as temple-centered water tanks and traditional waste recycling—offer community-based alternatives. For example, Chennai's revival of temple tanks for groundwater recharge illustrates the fusion of cultural heritage and modern environmental management.

Industrial hubs like Tiruppur (textiles) and Sivakasi (fireworks) contribute significantly to the economy but face global criticism for environmental pollution. Moving towards cleaner technologies, waste recycling, and green certifications can align industries with SDG 9 (Industry, Innovation, and Infrastructure) and SDG 8 (Decent Work and Economic Growth).

Thus, sustainable 2047 requires balancing economic growth with environmental safeguards.

### **Climate Change and Resilience Pathways**

Tamil Nadu is highly vulnerable to climate change due to its geographic position. Rising sea levels threaten coastal settlements, while shifting monsoon patterns affect agriculture. Heat waves and cyclones are becoming more frequent, demanding proactive adaptation strategies.

Geographical approaches such as **climate zoning, hazard mapping, and vulnerability assessments** are crucial. At the same time, Tamil cultural traditions—such as community grain storage (kudams), cyclone shelters built near temples, and drought-resistant crops—offer resilience models.

### **Case studies:**

**Chennai Floods 2015:** Exposed the dangers of urban encroachment on wetlands. Integrating geography (wetland mapping) with Tamil ecological values (sacred lakes) can prevent such disasters.

**Gaja Cyclone 2018:** Demonstrated the vulnerability of coastal agriculture. Promoting mangrove restoration could serve as a natural cyclone buffer.

By 2047, climate adaptation in Tamil Nadu must blend **scientific innovations (solar energy, early warning systems)** with **traditional coping mechanisms**.

### **Policy and Community Engagement**

A sustainable 2047 cannot be achieved through government action alone; it requires community ownership. Tamil Nadu has historically had strong local governance through panchayats and temple committees managing common resources. Reviving these institutions can democratize sustainability efforts.

### **Policy directions include:**

- Integrating Tamil ecological knowledge into school curricula to build climate awareness.
- Encouraging community-based water management as a participatory approach.
- Promoting eco-tourism in cultural landscapes (e.g., Western Ghats, temple tanks) to create sustainable livelihoods.

- Strengthening state-level SDG monitoring with region-specific indicators tailored to Tamil Nadu's geography.  
Such policies align with SDG 16 (Peace, Justice, and Strong Institutions) and SDG 17 (Partnerships for the Goals).

#### Pathways to Sustainable Tamil Nadu 2047

Looking ahead to 2047, the vision for Tamil Nadu involves:

1. **Agriculture:** Transitioning to climate-resilient, organic, and millet-based farming.
2. **Water:** Restoring eri and tank systems for equitable water distribution.
3. **Energy:** Expanding solar, wind, and tidal energy, given Tamil Nadu's natural advantages.
4. **Urban Futures:** Designing compact, green, and culturally rooted cities.
5. **Culture and Education:** Embedding Tamil ecological heritage into environmental education.
6. **Technology and Geography:** Using GIS, AI, and remote sensing to monitor land, water, and urban expansion while grounding solutions in local wisdom.

By integrating Tamil culture with geography and aligning both with SDGs, Tamil Nadu can emerge as a global model for sustainable development in 2047.

#### Conclusion

The vision of Sustainable Tamil Nadu 2047 requires a fusion of cultural heritage and geographical knowledge. Tamil society's ecological wisdom, expressed in literature and traditional practices, remains highly relevant to present sustainability challenges. Geography, as a discipline, offers scientific tools to map, analyze, and address these issues within the framework of the SDGs. By integrating both, Tamil Nadu can create a sustainable development model that is locally grounded yet globally significant. The study concludes that cultural ecology and geography together form the foundation for achieving a resilient, inclusive, and sustainable Tamil Nadu by 2047.

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## **19. A STUDY ON OVERVIEW OF RURAL TRANSFORMATION IN SAMINATHAM**

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### **Introduction**

Rural transformation is fundamental in understanding future food security and can be more formally defined as a long-term process of change in fundamental features of the way people in rural areas live and act economically, taking into consideration how they are embedded in societal and global dynamics. It is indicated by the following manner.

- The gap between per capita rural GDP and per capita national GDP.
- The gap between rural HDI and national HDI.
- The gap between the ratio of agricultural GDP / total GDP and the ratio of agricultural employment / total employment.

### **Causes of Rural Transformation**

The push and pull factors are behind the rural to urban migration. The push factors that force people to move out of villages for poverty and lack of basic amenities. Higher education, increased standard of living, more job opportunities and wages are the pull factors that attracted by the people to move from villages to cities.

### **Strategies for Rural Development**

The objectives of rural development revolve around the progress in rural economy and raise the standard of living of the rural people. Education, entrepreneurship, physical infrastructure and social infrastructure are playing the vital role in developing rural regions. The three linked pillars of rural development are social, economic and environmental factors. These three factors are interconnected for supporting the rural communities in order to enhanced sustainability and long-term well-being. The strategies for rural development are mainly focused as hereunder.

1. Alleviation of poverty.
2. Providing better livelihood opportunities for rural population.
3. Improvement of infrastructure facilities.
4. Providing basic amenities such as housing, sanitation etc.
5. Agricultural development and livelihood diversification.
6. Social inclusion and empowerment.
7. Environmental sustainability.
8. Governance and institutional reforms.

### **Factors of Rural Development**

The following are the factors of rural development.

1. Geographical location
2. Size of village
3. Productivity of land
4. Type of land use
5. Active population
6. Popular production areas



7. Proximity to a river
8. Housing comfort
9. Characteristics of drinking water
10. Productive fruit areas
11. Co-operativization
12. Social dimensions

### **Challenges of Rural Development**

There are three major challenges in rural development. They are bringing about economic development, developing facilities to meet social needs and finally bringing about a change of attitude in matters concerning society, culture and ways of thinking.

Tamil Nadu Rural Transformation Project is an emerging concept for promoting rural enterprises, access to finance and employment opportunities in the selected blocks of Tamil Nadu. Besides, our government highlighted that Rural Enterprise Ecosystem Development, seeks to create an enabling environment for promoting and strengthening enterprises and jobs in the target areas through identifying market and value-chain strengthening opportunities, supporting the development of favourable business conditions, and informing pathways to effective and efficient business enterprise development. Our government helps to uplift the skills and job opportunities of people residing in rural area. Moreover, our government aims to sustainable wage and self-employment opportunities promote relevant skills for higher value agriculture and allied activities, and nonfarm activities and enable entrepreneurship through market responsive skills and entrepreneurship development. This project is led by the Department of Rural Development & Panchayat Raj, Government of Tamil Nadu.

It enlightened and induced the researcher to make the study to know the rural transformation of people residing in Saminatham.

### **Profile of Saminatham**

The total geographical area of such village is 1520 hectares. According to Census 2020, the total population of Saminatham 2999 and there are about 645 houses.

### **Sampling Design**

The survey was based on a questionnaire consisting of 115 questions covering the complete details of a family like personal information, savings habit, land details, Electrical and electronic appliances have, loan borrowed details, usage of government schemes, drainage and toilet facility, entrepreneurial skill and infrastructure facilities.

Therefore, the researcher used Raosoft Sample Size Calculator for making the study of population in the rural transformation development. Such calculator advised that the sample size would need to be 341 with a confidence level of 50% significance. Therefore, the researcher makes an attempt to study the sample size of 341 adopted convenience sampling method.

### **FACTORS INFLUENCING RURAL TRANSFORMATION OF SAMINATHAM**

**Table 1: Educational Qualification**

S. No	Educational Qualification	No. of Respondents	Percentage
1.	Illiterate	48	14.08
2.	Up to 10 <sup>th</sup> Standard	110	32.26
3.	Up to 12 <sup>th</sup> Standard	130	38.12
4.	Graduate	53	15.54
Total		341	100.00

The study area consists of eight schools and only one school in Poovanathapuram is having a higher secondary education. 38.12 per cent of the people are having their education status up to 12<sup>th</sup>

standard in school level; 32.26 per cent of them are studied up to 10<sup>th</sup> standard; 15.54 per cent of them are graduates and the rest 14.08 per cent of them are illiterate. They said that only one higher secondary school is having in the nearest. So they have troubled to continue their higher studies. Some of them only moved to Sivakasi and Srivilliputtur for higher studies. Therefore, they need middle and higher school in their area for their betterment in life.

**Table 2: Annual Income**

S. No	Annual Income	No. of Respondents	Percentage
1.	Before ₹ 50000	64	18.77
2.	₹50001 - ₹ 100000	175	51.32
3.	Above ₹ 100000	102	29.91
Total		341	100.00

Nearly Half of the respondents 175 (51.32%) are earning an annual income range between ₹ 50,001 and ₹ 1,00,000; 102(29.91%) of them are earning an annual income as above the range of ₹ 1,00,000 and the rest 64 (18.77%) of them are only earning an annual income below ₹ 50,000. Majority (70%) of them is treated as below the poverty line category and mostly they suffered from poor condition in agricultural trade practices. So, they prefer to move forward to another job like 100 days job opportunity plan, fireworks, painters, printers and so on. These job opportunities are also becoming down. So, their earning capacity is reduced and they gave suggestions to the government for improving their annual income through such jobs, government subsidies and credit schemes pertaining to the field of agriculture and start-ups.

**Table 3: Savings Habit**

S. No	Savings Habit	No. of Respondents	Percentage
1.	Yes	239	70.09
2.	No	102	29.91
Total		341	100.00

Two-third (70%) of the people is having the habit of savings in SBI, IOB, TMB and so on. Only 30% of them are unaware of the savings habit and they did not open any account on banks. So, they need become aware about Pradhan Mantri Jan-Dhan Yojana (P.M.J.D.Y) for their betterment in future like deposits, remittance, credit, insurance, pension in an affordable manner.

**Table 4: Details of Own Land**

S. No	Details of Own Land	No. of Respondents	Percentage
1.	Yes	226	66.28
2.	No	115	33.72
Total		341	100.00

As per our survey, 66.28 per cent of the people are having own land and the rest of them are not having the land.

**Table 5: Details of Own House Property**

S. No	Details of House Property	No. of Respondents	Percentage
1.	Owned	223	65.39
2.	Rented	118	34.61
Total		341	100.00

65.39 per cent of the people are living in their own house and the rest (34.61%) of them are living in rented house.

**Table 6: Number of Facilities Availed**

S. No	Number of Facilities Availed in a house	No. of Respondents	Percentage
1.	Up to 3	85	24.93
2.	4-6	206	60.41
3.	Above 6	50	14.66
Total		341	100.00

Nearly 60% of the people are felt comfortable with the usage of Free Mixi, grinder, Fan, laptop, cycle and motor cycle from the government; 25% of them are using free mixi, grinder and fan; 14.66 % of them are availed more than six facilities offered by our government.

**Table 7: Details of Ration Card**

S. No	Details of Ration Card	No. of Respondents	Percentage
1.	Green	223	65.39
2.	White	88	25.81
3.	Yellow	30	8.80
Total		341	100.00

65.39% of the people are having green colour ration card and they are enjoying purchasing of rice, wheat, dhal and oil in an affordable prices; 25% of them are having white ration card and the rest 8.80% of them only having yellow card.

**Table 8: Details of Interest of the Respondents to become an Entrepreneur**

S. No	To become an Entrepreneur	No. of Respondents	Percentage
1.	Yes	278	81.52
2.	No	63	18.48
Total		341	100.00

Nearly two-third of the people (81.52 per cent) is struggling in running their family due to earning constraints in the poor condition of agriculture and fireworks business. So, they wanted to become an entrepreneur and they are basically having some idea about silk thread, paper quelling, tailoring, art and craft; only 18.48 per cent of them are not having an idea to start-up the business. At present, sericulture, mushroom cultivation and vermicompost are becoming popular and earning high income. So, they need such orientation programme for earning high income with minimum risk and capital in their own places.

**Table 9: Details on Area of Interest to become an Entrepreneur**

S. No	Nature of Work to be undertaken	No. of Respondents	Percentage
1.	Sericulture	96	34.53
2.	Mushroom Cultivation	90	32.37
3.	Vermicompost	62	22.30
4.	Tailoring	20	7.19
5.	Handicrafts	10	3.61
Total		278	100.00

Out of 278 interested respondents, 34.53 per cent of the people are interesting to start sericulture business; 32.37 per cent of them are interesting to do mushroom cultivation business; 22.30 per cent of them are going to start vermicompost business because these activities basically active in relating to the agricultural produce and continuous increase in earning; 7.19 per cent of them are interesting to start tailoring business with their skills and the balance 3.61 per cent of them to do art and handicrafts as unique in nature.



**Table 10: Number of Loan Taken**

S. No	Number of Loan Taken	No. of Respondents	Percentage
1.	Single Loan	289	84.75
2.	More than one loan	52	15.25
Total		341	100.00

As per our survey, all the people are taken the loan from private and public sector banks and individuals. Majority 85 per cent of them are taken only one loan either for housing loan, marriage loan, medical loan, educational loan, vehicle loan, business loan and so on. Only 15 per cent of them borrowed more than one loan in order to meet their contingencies in family and business.

**Table 11: Details of Drainage Facility**

S. No	Drainage Facility	No. of Respondents	Percentage
1.	Yes	261	76.54
2.	No	80	23.46
Total		341	100.00

76.54 per cent of the people are using drainage facility for cleanliness and 23.46 per cent of them are not having the drainage facility. So, they need drainage to become healthy.

**Table 12: Details of Toilet Facility**

S. No	Toilet Facility	No. of Respondents	Percentage
1.	Yes	277	81.23
2.	No	64	18.77
Total		341	100.00

81.23 per cent of the people are having own toilet in their houses and they are using neatly for becoming more healthy and hygienic and the rest 18.77 per cent of them are not having the toilet in their houses. So, they have to become an aware of Swachh Bharat (Sanitation Schemes) especially for Open Defecation free.

**Table 13: Details of Sickness faced**

S. No	Nature of Sickness	No. of Respondents	Percentage
1.	Fever	59	26.46
2.	Headache	25	11.21
3.	Leg pain	12	5.38
5.	Cold, cough	57	25.56
7.	Heart Attack	22	9.87
8.	Blood Pressure	10	4.48
9.	Diabetics	14	6.28
10.	TB & Cancer	24	10.76
Total		223	100.00

As per our survey 223 from the out of 341 people are suffered either from fever or blood pressure, diabetics, cold and so on. Only 35 per cent (118 respondents) of them are felt well. Out of such 59 people, 26.46 per cent of them affected from severe fever; 25.56 per cent of them suffered from cold and cough; 11.21 per cent of them suffered from headache; 10.76 per cent of them affected from TB and cancer; 9.87 per cent of them affected from heart attack, 6.28 per cent of them affected from diabetics; 5.38 per cent of them suffered from leg pain and the rest 4.48 per cent of them suffered from blood pressure. As per such detail, they need diabetics' checkup, cancer checkup, dental and general medical camp in the forthcoming years to create the healthy people.

**Table 14: Details of Tree Plantation Awareness**

S. No	Tree Plantation Facility – Good for Health	No. of Respondents	Percentage
1.	Yes	298	87.39
2.	No	43	12.61
Total		341	100.00

Nearly 90 per cent of the people are having an aware about tree plantation and the rest 10 per cent of them are an unaware about Green India.

**Table 15: Details of Open Defecation Awareness**

S. No	Open Toilet – Injurious to Health	No. of Respondents	Percentage
1.	Yes	277	81.23
2.	No	64	18.77
Total		341	100.00

Nearly 80 per cent of the people are aware about the own defecation and its problems and the rest 20 per cent of them are unaware about open defecation and how it creates the problems regarding the health of the people. So, government has to create clean India and green India awareness by dramas and rallies through NSS Volunteers and Unnat Bharat Abhiyan activities.

#### **Findings of the Study**

- 38.12% of the people are having their education status up to 12<sup>th</sup> standard in school level.
- Nearly Half of the respondents 175 (51.32%) are earning an annual income range between ₹ 50,001 and ₹ 1,00,000;
- Two-third (70%) of the people is having the habit of savings in SBI, IOB and so on.
- 66.28 per cent of the people are having own land.
- 65.39 per cent of the people are living in their own house.
- Nearly 60 per cent of the people are felt comfortable with the usage of Free Mixi, grinder, Fan, laptop, cycle and motor cycle from the government.
- Majority 223 (65.39%) of the people are having green colour ration card.
- Nearly two-third of the people (278) is struggling in running their family due to earning constraints in the poor condition of agriculture and fireworks business. So, they wanted to become an entrepreneur.
- Sericulture, mushroom cultivation and vermicompost businesses are active in relating to the agricultural produce and continuous increase in earning.
- All the people taken the loan from private and public sector banks and individuals.
- Majority 85 per cent of them are taken only one loan either for housing loan, marriage loan, medical loan, educational loan, vehicle loan, business loan and so on.
- 23.46 per cent of the people are not having the drainage facility.
- 18.77 per cent of the people are not having the toilet facility in their houses.
- As per our survey 223 from the out of 341 people are suffered either from fever or blood pressure, diabetics, cold and so on.
- Nearly 87 per cent of the people are having an aware about tree plantation.
- The people of Saminatham village gave water to such saplings by 100 days job opportunity plan.
- 18.77 per cent of the people are unaware about open defecation.

### **Suggestions to the Rural Transformation Development**

- To increase the literacy level in the study area, two or three higher secondary schools and one library should be originated by the government.
- In order to develop the annual income, government subsidies and credit schemes pertaining to the field of agriculture and start-ups as and when required without any delay and discriminations.
- To make an aware about Pradhan Mantri Jan-Dhan Yojana (P.M.J.D.Y) for their betterment in future like deposits, remittance, credit, insurance, pension in an affordable manner.
- To require common assembly hall in their college for celebrating any personal functions.
- To require Primary Health Centre in the eve of any illness on emergency.
- To require ATM Counter.
- To conduct regular medical camp like general, diabetics, dental, breast cancer.
- To improve the drainage facility.
- To require Industrial Estate for getting regular earnings and their economic development.
- To conduct some orientation programme for earning high income with minimum risk and capital in their own places.
- To conduct guest lecture relating to the area of banking and insurance for the welfare of the people especially for farmers.
- To organize any workshop for online fund transfer, online upload the documents and how to avail the government schemes via online with the help of any Private or Public Sector Banks and Insurance Companies.
- To offer any orientation programme or workshop for improving the entrepreneurial skills of the people and survive them in a competitive era.
- To increase the bus facility especially from Sivakasi, Srivilliputtur and Rajapalayam.
- To create an aware of Swachh Bharat (Sanitation Schemes) especially for Open Defecation free and its problems.

### **Conclusion**

From this survey, the researcher received lot of information and they move friendly and they also gave their needs also. Mostly, these needs were the valuable one. People of Saminatham required Higher Secondary School, Primary Health Centre, ATM Counter, Agriculture Development regarding seeds; water subsidy etc. Sericulture, Mushroom Cultivation and Vermicompost programme was organized for helping the farmers and inmates of Saminatham to get aware of self-employment in the growing field of sericulture, mushroom cultivation and vermicompost. Besides, after the session completed people gave the feedback. In this feedback, they said that these two programmes was highly helpful, motivated to become start-ups and also to earn within a house.

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## 20. DIGITAL TWIN TECHNOLOGY: A PARADIGM SHIFT TOWARDS INTELLIGENT SYSTEMS

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### Abstract

Digital Twin Technology (DTT) has emerged as a revolutionary approach that links the physical and digital worlds through real-time, data-driven replicas of physical entities. By integrating the Internet of Things (IoT), Artificial Intelligence (AI), big data, and cloud computing, digital twins provide predictive insights, operational efficiency, and lifecycle management across industries. This paper presents a comprehensive study of digital twin technology, including its conceptual foundation, architecture, applications, benefits, limitations, and future directions. The analysis demonstrates how digital twins are reshaping sectors such as manufacturing, healthcare, energy, and smart infrastructure, while also highlighting challenges in scalability, interoperability, and data governance.

**Keywords;** Digital Twin, Cyber-Physical Systems, IoT, Predictive Analytics, Smart Manufacturing, Industry 4.0, Simulation, Artificial Intelligence

### 1. Introduction

The Fourth Industrial Revolution has accelerated the integration of physical systems with digital technologies. Among the key enablers, Digital Twin Technology (DTT) has gained prominence due to its ability to continuously replicate and monitor real-world systems in a virtual environment. Originally conceptualized by NASA in the early 2000s for monitoring spacecraft, the concept has since expanded into domains such as healthcare, automotive, aerospace, and urban planning.

Digital twins establish a bi-directional communication loop between a physical system and its digital counterpart. This continuous interaction enables real-time monitoring, optimization, and predictive simulations, reducing uncertainties and enhancing decision-making.

### 2. Concept of Digital Twin Technology

A digital twin is defined as a virtual representation of a physical object, system, or process that is continuously updated through data exchange.



#### Core components include:

**Physical Entity:** Machine, infrastructure, or process being mirrored.

**Digital Replica:** A computational model of the entity.

**Connectivity Layer:** IoT sensors, networks, and cloud infrastructure for real-time data flow.

**Analytics Engine:** AI/ML algorithms for simulations and predictive insights.

### 3. Types of Digital Twins

**Component Twin:** Focuses on individual parts.

**Asset Twin:** Represents entire equipment or assets.

**System Twin:** Covers interconnected assets.

**Process Twin:** Models workflows and operations at scale.

#### 4. Applications of Digital Twin Technology

**Manufacturing:** Predictive maintenance, process optimization, and digital prototyping.

**Healthcare:** Patient-specific digital twins for personalized treatment and drug testing.

**Smart Cities:** Simulation of urban traffic, energy demand, and disaster management.

**Aerospace & Automotive:** Engine design, performance testing, and autonomous driving systems.

**Energy:** Grid management, renewable energy optimization, and fault detection.

**Construction:** Lifecycle monitoring via Building Information Modeling (BIM).

#### 5. Benefits

Improved operational efficiency.

Predictive maintenance and downtime reduction.

Enhanced decision-making using simulations.

Sustainable design and cost savings.

Personalized services in healthcare and customer-centric industries.

#### 6. Challenges

**High deployment cost** and integration complexities.

**Cybersecurity risks** due to reliance on IoT and cloud.

**Data accuracy limitations** affecting predictions.

**Interoperability issues** across platforms and standards.

**Scalability constraints** for large-scale systems.

#### 7. Future Directions

Future advancements in digital twins will rely on

**5G and Edge Computing** for faster real-time interactions.

**Blockchain** for secure data exchange.

**Metaverse integration** for immersive simulations.

**Human Digital Twins** in healthcare for preventive diagnostics.

**Sustainability-focused twins** in energy and environment management.

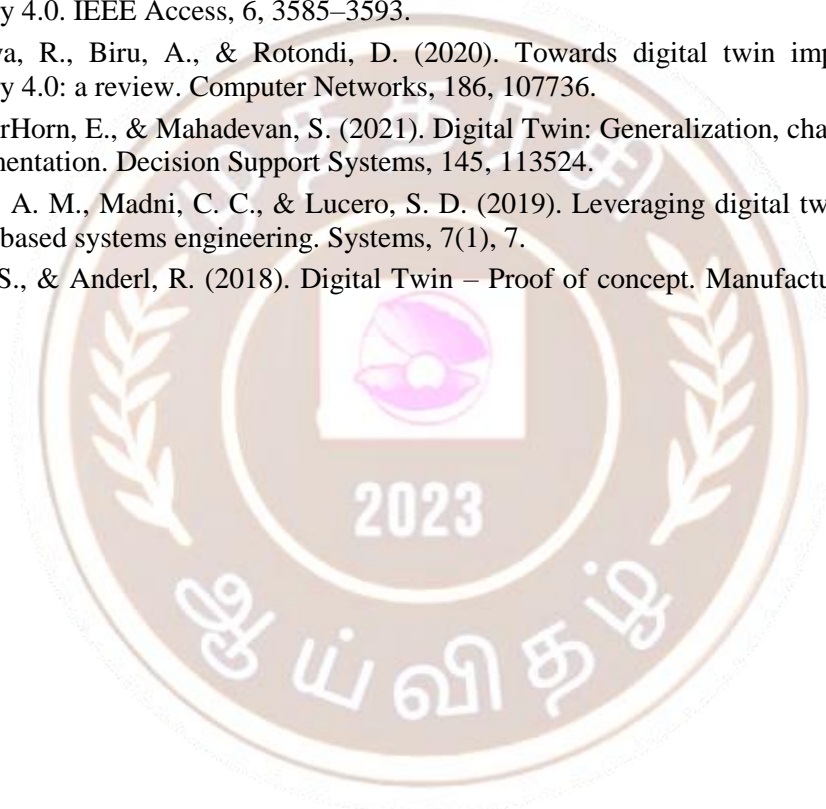
#### 8. Conclusion

Digital Twin Technology has become a cornerstone of Industry 4.0, enabling the convergence of cyber and physical systems. By providing real-time insights, predictive analytics, and operational efficiency, digital twins have transformative potential across industries. However, addressing challenges in cost, data governance, and interoperability remains essential for broader adoption. Future innovations promise to expand its applications, driving intelligent, sustainable, and resilient systems.

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## **21. FINANCIAL PROBLEMS FACED BY THE SINGLE PARENT FAMILIES IN SIVAKASI TALUK**

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### **Abstract**

The role of single parent is challenging one especially when the family is headed by a women. Problem of single mother are linked with the upbringing of children, their future and setting down in life. Single-parent families face unique socio-economic and emotional challenges that significantly affect their well-being. Financial constraints are a major issue, as single parents often struggle with limited income and unstable employment, leading to difficulties in providing for basic needs such as food, housing, education, and healthcare. Addressing these challenges requires targeted government policies, community support, and skill development initiatives to enhance resilience. After that the problems are considerably reduced. The present studies like, to study the financial problems faced by single mothers a sample of 50 single mothers were selected by snowball sampling technique. The results of the study revealed that financial problem was the main stressor for majority of the single mothers.

**Keywords:** Single Mothers, Single Parent, Emotional Problems, Economic Problems and Social Problems.

### **Introduction**

Family is a great institution, and parenting is its pillar. Parents perform multidimensional operations for the well-being, welfare, and development of their children. Parents are responsible for the overall development of their children by promoting their physiological, psychological, cognitive, emotional, moral, social and career development and also bringing them up as per the norms and values of the society. If a child misses any one of his/her parents, it leaves the child with an uncertain future and the family becomes a single-parent family. Especially during the adolescent period, both the parent and the ward are facing numerous problems. In India, a single parent means a father or mother the one who is living alone with their children without his/her partner, because of death, divorce, or separation. Single parent come across with socio-economic disturbances to bring up their children safely. Indeed, nurturing the adolescent is the biggest challenge for the single parent. Unfortunately, the economic opportunities of these child and their families are also forbidden due to several reasons. In a growing, dynamic society, nurturing children as a single parent is a very challenging task too. Hence, this study intends to focus on the dynamics of single-parent households.

The results revealed that divorced women have a higher susceptibility to chronic illness, especially over a period of time compared with married women. A stressful life event has also shown to have affected the psychological health of these women after the divorce. Divorced mothers experienced a greater number of stressful events such as demotions, layoffs, accidents, critical illnesses and problems with their own parents than did married women. Divorced mothers are also trapped in a vicious cycle of financial problems and other stressful life events.

### **Research Methodology**

A sample of fifty mothers was selected through snowball sampling technique. An interview schedule was framed for data collection. Responses were recorded on the basis of interview schedule as well as observation. Data were tabulated and results were given in numbers and percentages.

**Socio-Economic Profile of the Single Mothers****Table 1: Socio-Economic Profile of The Single Mothers**

S. No.	Variables	No. of the Respondents	Percentage (%)
Age (in years)	20-30	1	2
	30-40	16	32
	40-50	28	56
	50-60	4	8
	Above 60	1	2
<b>Total</b>		<b>50</b>	<b>100.0</b>
Education Qualification	Illiterate	19	28
	School	22	18
	Under Graduate	9	22
<b>Total</b>		<b>50</b>	<b>100.0</b>
Occupation	Government Job	2	4
	Private Job	12	24
	Coolie	36	72
<b>Total</b>		<b>50</b>	<b>100.0</b>
Residing Area	Rural	31	62
	Urban	19	38
<b>Total</b>		<b>50</b>	<b>100.0</b>
No. of Children	1	20	40
	2	27	54
	3	3	6
<b>Total</b>		<b>50</b>	<b>100.0</b>
Type of families	Nuclear	41	82
	Joint	9	18
<b>Total</b>		<b>50</b>	<b>100.0</b>
Monthly Income of the Family (in Rs.)	Below Rs. 9000	36	62
	10000	5	10
	15000	4	8
	20000	3	6
	Above Rs. 20000	2	4
<b>Total</b>		<b>50</b>	<b>100.0</b>

**Source: Primary Data**

The majority of respondents belong to the 40–50 years age group (56%), followed by those aged 30 - 40 years (32%), showing that middle-aged women form the largest share of single-parent mothers in the study. In terms of education, a considerable portion is illiterate (38%), while only a few have completed undergraduate studies (18%), indicating low educational attainment. Occupationally, most are engaged as coolies (72%), highlighting their dependence on unskilled labor for livelihood, with very few in government jobs (4%).

Geographically, a larger share resides in rural areas (62%), while 38% live in urban settings. Regarding family size, most mothers have two children (54%), followed by one child (40%). Family structure reveals a dominance of nuclear families (82%), suggesting limited extended family support.

Economically, the picture is concerning: a majority earn below Rs. 9,000 per month (62%), with only a small fraction earning more than Rs. 20,000 (4%). This indicates a high level of economic vulnerability among respondents, primarily due to low education, unskilled work, and single-income dependency.

The respondents are largely middle-aged, rural, illiterate, working as daily wage laborers, with nuclear families and two children, surviving on very low a income which highlights the socio-economic struggles faced by single-parent families.

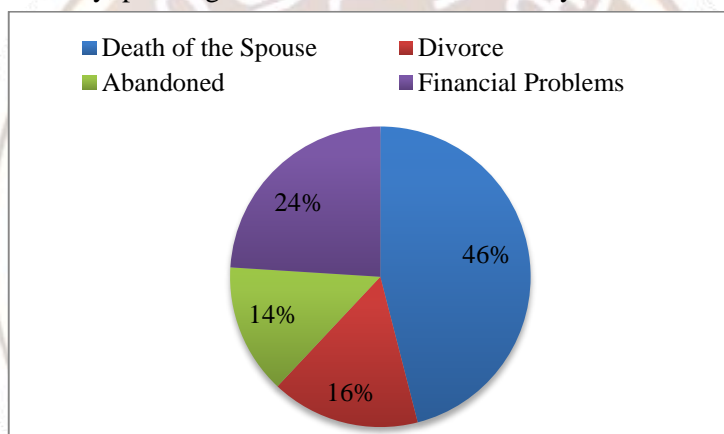
### **Causes for Being Single Parent Families**

**Table 2: Causes for Being Single Parent Families**

<b>S. No.</b>	<b>Causes for being Single Parents</b>	<b>Total</b>	<b>Percentage</b>
1)	Death of the Spouse	23	46
2)	Divorce	8	16
3)	Abandoned	7	14
4)	Financial Problems	12	24
<b>Total</b>		<b>50</b>	<b>100.0</b>

**Source: Primary Data**

Table 2 depicts that the data shows that the death of the spouse (46%) is the leading cause for single parenthood, nearly half of the cases. This indicates that widowhood is a major factor contributing to single-parent families in the study area. The second major cause is financial problems (24%), which forced some couples into separation, reflecting the role of economic stress in family breakdown. Divorce accounts for 16% of cases, showing a moderate share, while abandonment (14%) also contributes significantly, pointing to issues of marital instability and lack of responsibility.



**Figure 1: Reason for Single Parenthood**

### **Number of Years Spent as Single Mother**

**Table 3: Number of years spent as single mother**

<b>S. No.</b>	<b>Years</b>	<b>No. of the Respondents</b>	<b>Percentage</b>
1.	5 Years	29	58
2.	10 Years	15	30
3.	15 Years	6	12
<b>Total</b>		<b>50</b>	<b>100</b>

**Source: Primary data**

The data reveals that the majority of respondents have been single mothers for around 5 years (58%), indicating relatively recent entry into single parenthood. About 30% have managed for 10 years, while a smaller share, 12%, and have continued for 15 years, showing long-term endurance in this role. Therefore, most single mothers in the study have faced this responsibility for a shorter duration, while a notable proportion have sustained it for a decade or more, reflecting both recent and prolonged experiences of single parenthood.



### Financial Problems Faced By Single Mothers

A financial crisis is a standing situation with most of the single parent families. It becomes difficult in meeting the basic needs of children such as food, clothing, school fees, maintaining the previous standard of living and meet personal expense. Data was collected to determine information regarding earning prior to marriage, financial problems faced after husband's death, present source of income, present financial problems faced by single mother, help reeked during financial crises.

**Table 4: Immediate Financial Problems after husband's Death**

S. No.	Financial problems faced by Single Mothers	No. of the Respondents	Percentage
1.	Fulfilling basic needs of the family and Personal expense.	25	50
2.	School Fee	18	36
3.	Maintaining previous standard	7	14
<b>Total</b>		<b>50</b>	<b>100.0</b>

#### Source: Primary Data

The data clearly shows that the death of the husband brings a sudden financial burden on women, as they become the sole breadwinners of the family. The most significant problem, reported by half of the respondents (50%), is the difficulty in fulfilling the basic needs of the family along with their own personal expenses. This highlights how the sudden loss of the primary earner destabilizes the household economy, forcing women to prioritize food, clothing, healthcare, and daily essentials with very limited income. The second major issue is related to children's school fees (36%). Many single mothers struggle to provide continuous education for their children due to the absence of financial support. This often leads to delayed payments, risk of discontinuation of studies, or forcing children into low-cost schools with limited opportunities. It also affects the adolescents in such families, as financial stress on education reduces their chances of accessing better opportunities in the future. A smaller, yet notable, share of respondents (14%) expressed difficulty in maintaining their previous standard of living. This indicates that after the husband's death, many families experience a decline in their economic and social status. Mothers often sacrifice their own needs, cut down on household comforts, and sometimes rely on relatives, neighbours, or debt to manage.

The table reflects how the death of a husband pushes families into a state of economic vulnerability. Survival needs take priority over educational and lifestyle aspirations. While half of the families struggle to meet daily necessities, over one-third face obstacles in providing consistent education to their children, which in turn affects adolescents' future opportunities. Maintaining the earlier standard of living becomes less important compared to survival and education. This underlines the urgent need for financial assistance, welfare schemes, and community support systems to ensure that single mothers can stabilize their families and safeguard their children's education and well-being.

### Conclusion

The study highlights that the most common form of single-parent family is mother-headed, with women constituting about 70% of single parents. The role of a single mother is particularly challenging because she must balance multiple responsibilities, including breadwinning, childcare, and household management, often without prior work experience. Despite the heavy workload, a significant proportion (88%) of mothers reported being satisfied with their dual roles, as they believed their sacrifices were for the betterment of their children.

However, the findings also reveal that financial stress remains the most serious problem, as mothers struggle to meet basic needs, education expenses, and maintain their previous standard of living with limited resources. Alongside economic difficulties, emotional issues such as loneliness, helplessness, depression, and low confidence were widely reported. Socially, many mothers withdrew

from gatherings, adopted poor dietary habits, and faced challenges in making educational decisions for their children due to lack of guidance and financial constraints.

Single mothers bear a heavy burden of economic, emotional, and social problems, yet they continue to work hard and show resilience for the sake of their children. The findings underline the urgent need for financial support, counselling, and social interventions to strengthen their well-being and family stability.

### Suggestions

Suggestions to address the financial problems of single mothers:

1. **Government Support** – Ensure access to widow pensions, free ration, and education fee waivers for children.
2. **Educational Assistance** – Provide scholarships, free uniforms, and textbooks to reduce schooling expenses.
3. **Employment Opportunities** – Offer skill training (tailoring, computer literacy, handicrafts) and promote self-help groups for income generation.
4. **Financial Literacy** – Encourage savings habits, microfinance access, and affordable insurance schemes.
5. **Community/NGO Support** – Establish childcare centres, counselling services, and local support networks to ease economic and social pressures.

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## 22. A STUDY OF MODERN AND EARLY TRADITIONAL (SIDDHA) MEDICINE SYSTEMS

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### Abstract

Medicine is the art and science of treating diseases .The rise and dominance of modern medicine began in the 1800s in Western countries. Modern medicine uses health sciences, biomedicine, biomedical research, and medical technology to diagnose and treat injuries and diseases.This type of treatment is often done through medications, surgery, and other treatments. Ancient medicine existed before modern medicine, and was unique to that society.Prehistoric medicine included plants, animal organs, and minerals Ancient medical systems include Siddha medicine of the Indian subcontinent.Modern Medicine has so Many Divisions , at the same time Siddha medicine also has Common Medicine ,Special Medicine (varma ). Modern Medicine has some Treatment methods in siddha medicine 32type internal therapy and 32 type of extranal therapy. **Aim:** This study is to compare the modern medicine and Siddha medicine. **Methodology:** This study compiles Data on modern medicine and siddha medicine from authentic text books. **Results:** Modern Medicine is well Developed System of Medicine, more Needed Medicine all over the world. At the same time siddha system of Medicine is unique One, its Fundamentals, treatment methods are different form modern Medicine. But it has wild books and specific Medicines and treatment, it can be cured from Root of the course. **Conclusion:** This developed medicine pushed Siddha medicine downplayed it as alternative medicine. So Siddha medicine is Need to prove scientifically and clinically through the research.

**Key wards:** Modern medicine, Siddha medicine, Surgery, Herbal, External medicines, internal medicines

### Introduction

Medicine is the art and science of treating diseases. It can be described as the science or activity that helps in diagnosing, treating, and preventing diseases. The rise and dominance of modern medicine began in the 1800s in Western countries such as the United States, Canada, and Europe. At that time, there was no such thing as general medicine, but many medical disciplines.

At that time, there were no solid theories such as the Germ theory of disease, antibiotics, or genetics. There were no standardized methods for diagnosing and treating disease. This situation began to change in the late 1800s. Allopathic medicine was the mainstream medicine at that time. Those doctors formed an association and took action for their own benefit. They either belittled the other groups of the time or brought their own controls.

In the 1900s, medical education was standardized through the work of medical unions, and it became law that medicine was a profession that required licensure.Private colleges were started and medicine rapidly developed into a business.

Only after this did medicine become more scientifically oriented, giving importance to education and work. Scientific studies led to many advances in the study of diseases, methods of diagnosis, and methods of treatment. After the scientificization of medicine, many sub-disciplines emerged. For example, physiotherapy, occupational therapy, x-ray technology, nursing, and pharmacy.

Furthermore, this developed medicine pushed other pre-scientific medical systems such as Siddha medicine and Chinese medicine behind, or downplayed them as alternative medicine.In the early 1900s, medical education and the medical profession were largely in the hands of private



businesses. This situation began to change in Canada and many European countries after the 1950s. The private healthcare sector did not meet the medical needs of a large number of people. It had the characteristic of curing diseases after they occur, rather than preventing them before they occur for profit. This led the majority of the people to demand that the government help provide medical services.

As an extension of this, in the 1960s, Canada and some European countries began to provide medical education and services primarily through the government. After medicine came under government control, doctors were considered government servants.

Modern medicine uses health sciences, biomedicine, biomedical research, and medical technology to diagnose and treat injuries and diseases. This type of treatment is often done through medications, surgery, and other treatments. While medical technology and expertise are essential to modern medicine, understanding human emotions and compassion continue to be essential to reducing the real suffering of patients.

Ancient medicine existed before modern medicine, and was unique to that society. Prehistoric medicine included plants, animal organs, and minerals. Medical anthropology studies various prehistoric medical systems and their interactions with society. Learn from Sangam medical methods. Ancient medical systems include Siddha medicine of the Indian subcontinent, Ayurvedic medicine, ancient Egyptian medicine, and traditional Chinese medicine.

#### **Methodology**

This study compiles Data on modern medicine and siddha medicine from authentic text books. for the understanding and validation of the collected information. Reputed journals and Database were Referred.

#### **Literature Review**

Ancient Greek medicine is seen as a form of medicine provided by ancient American inhabitants (Mayans, Native Americans)

The ancient Greek physicians Hippocrates and Calen laid the foundation for the later development of rational medicine.

Methods used in the pre-scientific era are still used today, either in addition to or as an alternative to scientific medicine. They are called traditional or alternative medicine or alternative medicine. The universal sacred scripture, Tirukkural, has mentioned about medical concepts.

The disease-causing nadi is the nadi that cures the disease. The mouth-cadi is the action of the mouth. Tirukkural; 948

The amount of time, the amount of pain, and the time The action of the learner. Thirukkural; 949

**நோய் நாடி நோய் முதல் நாடி அது தணிக்கும்**

**வாய்நாடி வாய்ப்பச் செயல்.**

**திருக்குறள்; 948**

**உற்றான் அளவும் பிணியளவும் காலமும்**

**கற்றான் கருதிச் செயல்.**

**திருக்குறள்; 949**

There are major divisions in medicine, including basic medical sciences, specialized medicine, and multidisciplinary medicine. Basic science divisions help to study the causes of diseases in a more detailed manner and to cure the disease. Cytology - The science of cells, the basic unit of life. This field of study (or cell biology) helps in oncology and in understanding cell-based diseases. Genetics - provides knowledge about genes, how they are passed down through generations, and what their role is. Histology - The study of the structure of living tissues using various types of microscopes and immunohistochemistry. Immunology - provides knowledge about the functioning of the immune system in living organisms. Microbiology - The science of the effects, control, toxicity, pharmacology, and medical treatment of disease-causing microorganisms such as bacteria, viruses, fungi, and protozoa. Molecular biology - a branch of biochemistry concerned with the functioning of

living molecules (DNA replication, RNA transcription, translation (biology), protein and genetics).Neurology - The study of the nervous system. The physiology of the brain and spinal cord. The basic science of neurosurgery, diseases, and psychology.

Psychology - The science of mental functions and behavior.Nutritional Science - The science that helps to understand the nutrition, digestion, assimilation, essential nutrients for a healthy body and the diseases related to their deficiencies.Pharmacology - The science of drugs and their actions and functions.Nutritional Science - The science that helps to understand the nutrition, digestion, assimilation, essential nutrients for a healthy body and the diseases related to their deficiencies.Pharmacology - The science of drugs and their actions and functions.

Photobiology - The science of the changes that non-ionizing radiation (infrared rays, radio waves, microwaves) causes in the bodies of living organisms.Physiology - The science of the daily movement of body organs.Radiobiology - the science of the biological uses and effects of ionizing radiation.Pathology - is the science of diseases, their causes, infections, and pathogens. The ever-changing nature of drug resistance and the updating of new studies underscore the importance of specialized medicine.After basic medical education, specialized medical training is pursued by practicing doctors.In addition to general medicine, there are also specialized medical and surgical departments.

Trained doctors need to learn more about these specialized medical fields. Surgical medicine Organ-based (or) therapeutic specialtyAge-specific specialtyPathology (or) treatment of disease are the types of specialty medicineSurgery is considered a specialty. The subspecialties of surgery are:Cardiac surgery, Orthopedic surgery, Gastrointestinal surgery, Renal surgery,Otolaryngology, Cancer Surgery,General Surgery, Obstetric Surgery, Transplant Surgery, Plastic Surgery,Vascular Surgery, Trauma Surgery, However, anesthesia is a part of surgery.Cardiology - Specialization of heart diseases (heart attack, heart failure) Gastroenterology, Hematology - Specialization of blood vessels Nephrology Neurology Pulmonology Ophthalmology, Dentistry, Orthopedics, and Surgical Specialties Pediatrics, Geriatrics, Age-specific medicine, Pathology, Lifesaving pharmacology - emergency and medical care, Infectious diseases, Oncology Types of Multidisciplinary Medicine, Emergency Care, Biomedical Engineering Veterinary Medicine, Tourism Medicine. Defense Medicine, Forensic Medicine, Hospital and Palliative, Medicine, Pathology, Evolutionary Medicine, Sexual Medicine, Gender-Based Medicine, Disaster, Medicine, Addiction Treatment, Medical Informatics, Laser Medicine, Pain Management, Wilderness Medicine, Sports Medicine.

Traditional medicine is a medical science that has been passed down through generations through knowledge, skills, beliefs, experience, and culture.In this, the traditional medicine of the Tamils called Siddhamaruthuvam is used in South India and the northern and eastern parts of Sri Lanka. Siddhamaruthuvam, Siddha medicine is a South Indian Tamil medical system. Siddha medicine is a system of medicine taught in Tamil by Siddhas in traditional medicine., It is a Tamil medical system compiled by eighteen Siddhas under the guidance of Agasthiyar. . The Siddhas have understood it well and have explained it very precisely through their experience.

It is impossible to say precisely when Siddha medicine originated. It has spread through traditional traditions.The doshas are divided into three categories: Vata, Pitta, and Kapha. Changes in these three doshas are considered as diseases.

Siddha MedicinesClassification of Siddha Medicines: Herbal - Medicines made from plant leaves and stems, Minerals - Medicines made from minerals (salt, water, metal, resin, sulfur) Jivam (a) Sangamam - Medicines made from by-products extracted from animals.TheNavaratnam, Navalokas, Rasam are made from the countless herbs, herbs, trees, plants, vines, roots, bark, leaves, flowers, shoots, fruits, seeds, etc. available in nature.

With mineral materials such as sulfur, camphor, tar, iron, coral, etc., and with shellfish such as conch, clam, crab, etc. Trikaduku, Trisathi, Triphala, Baspam, Senthuram, tablets, bandages, powders, bath oils, decoctions, etc. are used for various diseases in various categories, such as good water, sea water, spring water, well water,It is a medical system created with various types of water,

such as milk, honey, sugar, ghee, etc., and vegetable oils such as coconut, fenugreek, fenugreek, neem, and sesame.

Siddha medicine does not stop with Siddha medicine. Siddha medicine encompasses the knowledge, science, physical philosophy, religion, astrology, Panchapatsi, string, medicine, medicine, remedy, etc. that excel in Siddha medicine. There is evidence of basic medical principles in Sangam literature. Astrology, Panchapakshi, Tulangiya, Saranul, Margam, Godaru, Vakara, Vidhai, Gurumuni, Othu, Padal, Didhilak, Kakkidangal, Seppiya, Kanma, Kandam, Itelaam.

These learned men are the doctors..... (-- SiddharNadi Book 18 --)The human body is divided into three types. The elements that sustain life in the physical body are: Vata (air), Pitta (heat), Silethumam (water), and chime (rasadatu). Our intake foods are converted to Blood (இரத்ததாது), Muscles (மாமிசதாது), Fat (மேதோதாது), Bone (அஸ்திதாது), Bone Marrow(மச்சைதாது), semen,ovam சுக்கிலதாதுFeces(மலம்), Urine (மூத்திரம்) above The twelve elements are separated from the food we eat and provide strength and movement.

The food that is eaten is the water that is eaten - Purananuru,18"The food we eat is the medicine that keeps our body alive. Diseases are caused by eating foods that are not suitable for our body and that are not in the right way.The three elements of air, heat, and doubt in our body, whether present in excess or in deficiency, can cause disease. These are divided into Vata, pitta, and kapha diseases.

Vata -related diseasesThere are eighty diseases mainly related to Vata . These include neuralgia, neuralgia, epilepsy, stroke, gas, blood pressure, heart disease, etc. The land of Neithal, which is a sea and maritime area, is prone to arthritis-related diseases.

Diseases related to bileThere are forty diseases mainly related to bile. Indigestion, stomach pain, stomach ulcer, jaundice, anemia, hematemesis These include diseases such as liver and gallbladder damage. Fields and fields, which are fertile lands, are prone to diseases related to bile.

Diseases related to sylhet, Ninety-six diseases are important in sylhet. These include runny nose, nasal congestion, congestion, cough, wheezing, and asthma.Regarding the method of avoiding diseases, Thirukkural says, "If you do not need medicine, eat what is not eaten." (If you only eat foods that are said to be non-diseasing, you don't need any medicine.)

## **Medicine**

There are 64 forms of medicine in Siddha medicine, 32 internal medicines and 32 external medicines.It is considered a medicine for stomach diseases. Denial is the medicine for the disease of deathRejection is the medicine for the disease of death (-- Thirumoolar Thirumanthiram --) According to Thirumula Siddha, medicine is not only about curing diseases of the body and mind, but also about preventing diseases from occurring.And it should also prevent death from occurring. Such medicines are widely found in Siddha medicine.

The internal medicines and their shelf life are as follows:

“உள்மருந்து சுரசஞ்சாறு குடிநீர் கற்கம்  
உட்களி அடை ஓர் சாமம்  
உயர்தூரணம் பிட்டு வடகம் வெண்ணெய் நான்கின்  
உயிர்மூன்று திங்களாகும்  
விள்மணப்பாகு நெய் இரசாயனம் இளகம் நால்  
மேவும் அறுதிங்கள் எண்ணெய்  
விரலிடும் உயர்ந்த மாத்திரை கடுகு பக்குவம்  
மிளிறும் தேனூறல் தீநீர்  
கொள்ளாறும்ஓராண்டுமெழுகோடுகுழம்புஜந்து



கோப்பதங்கம்பத்தாகும்  
குருதிபொடிஎழுபானோடு ஐந்தாண்டு நீறுகட்டு  
உருக்குகளங்குநானூறு  
எள்ளிடாச்சுண்ணம்ஐநூறுகற்பம்சத்து  
குருகுளிகைமிக்கஆயுள்ளன்று  
எவரும்மகிழ்ச்சித்தர்முப்பத்திரண்டகமருந்து  
இசைத்தவராய்உள்ளனவரோ”

(சித்த மருத்துவமும் சித்தர் தத்தவமும்)

அகமருந்துகளும், அவற்றின் எடுத்துக்காட்டுகளும்:

1.சுரசம் - இஞ்சிசுரசம் 2.சாறு - கற்றாழைச்சாறு 3.குடிநீர் - ஆடாதோடைக்குடிநீர்  
4.கற்கம் -கீழாநெல்லிக்கற்கம் 5.உட்களி -கடுகு உட்களி6.அடை - தூதுவளைஅடை 7.சூரணம்  
- அமுக்கிராச்சூரணம் 8.பிட்டு 9.வடகம் -தாளிசாதி வடகம்10.வெண்ணெய்- குங்கிலிய  
வெண்ணெய்11.மணப்பாகு - மாதாளை மணப்பாகு12.நெய் - ஆடாதோடைநெய்13.இரசாயனம் -  
இஞ்சிஇரசாயனம்14.இளகம்- கேசரிஇளகம்15.எண்ணெய்- பூரஎண்ணெய் 16.மாத்திரை-  
பாலசஞ்சீவி மாத்திரை 17.கடுகு - 18.பக்குவம்- பாவனக்கடுக்காய் 19.தேனூறல் -இஞ்சி  
20.தீநீர்- ஓமம் 21.மெழுகு - கிளிஞ்சல் மெழுகு 22.குழம்பு- சாதி ஜம்பீரக்குழம்பு 23.பதங்கம் -  
சாம்பிராணிப்பதங்கம் 24.செந்தூரம்- இரசசெந்தூரம்25.நீறு அல்லதுபற்பம்- முத்துப்பற்பம்  
26.கட்டு- இரசக்கட்டு 27.உருக்கு -28.களங்கு 29.சுண்ணம்- வெடியுப்பச்சுண்ணம் 30.கற்பம்  
31.சத்து- கடுக்காய் சத்து32.குருகுளிகை- இரசமணி

External or topical medications and their shelf life are as follows:

“வெளிமருந்தேகட்டுபற்றுஒற்றடம்பூச்சு  
வேதுபொட்டணம்தொக்கணம்  
மென்புகைமைபொடிதிமிர்தல்கலிக்கம்நசியம்ஊதல்  
மேவுநாசிகாபரணமும்  
களிம்புசீலைநீர்வர்த்திசுட்டிகைசலாகைபசை  
களிபொடிமுறிச்சல்கீறல்  
காரம்அட்டைஅறுவைகொம்புறிஞ்சல்குருதி  
கண்டுவாங்குதல்பீச்சுஇவை  
வெளிமருந்துமுப்பத்திரண்டென்றுகூறினார்  
விண்ணுலவுசித்தராமால்  
மேல்வர்த்தியும்புகைபீச்சுமைநசியமும்  
மென்கலிக்கங்கள்ஓராண்டு  
ஒளிவர்த்திபொடிநீர்நாசிகாபரணம்இவை  
ஒருமுன்றுதிங்களாகும்  
உயர்சீலைகளிம்புஇவைகள்ஆறுதிங்கள்ஆகுமென்று  
ஓதினாராய்உளருமரோ”

(சித்த மருத்துவமும் சித்தர் தத்தவமும்)

**வெளி அல்லது புறமருந்துகள்:**

- 1.கட்டு - இலைகள் அல்லது பட்டைகளை நைய இடித்தோ அரைத்தோ வதக்கியோ புளித்த நீர் முதலியவற்றில் வேகவைத்தோ கட்டுதல்
- 2.பற்று - சரக்குகளை நீர்மப் பொருள் விட்டு அரைத்து சுடவைத்தோ சுடவைக்காமலோ நோயுள்ள இடங்களில் அப்புதல்
- 3.ஒற்றடம் - சரக்குகளை துடுபடுத்தித் துணியில் முடிந்து நோயுள்ள இடங்களில் ஒற்றுதல்
- 4.பூச்சு - நீர்மப் பொருட்கள் மற்றும் பசை குழம்பு நிலையில் உள்ளவற்றை நோயுள்ள இடங்களில் பூசுதல்
- 5.வேது - சரக்குகளை எடுத்துக் கொதிக்க வைத்து அதனின்றி எழும் ஆவியை நவது வாரங்களில் ஏதாவது ஒன்றின் வழியாக இழுத்தல்
- 6.பொட்டணம் - சரக்குகளைத் துணியில் முடிந்துச் சுடவைத்த நெய்ப்புப் பொருட்களில் நனைத்து நோயுள்ள இடங்களில் ஒற்றடமிடுதல்
- 7.தொக்கணம் - இது மர்த்தனம் எனப்படும். இது வெறுங்கையால் பிடிப்பதும் தைலங்களைத் தடவிப் பிடிப்பதும் என இரு வகைப்படும்.
- 8.புகை - சரக்குகளை நெருப்பிலிட்டு எழும்புகையைப் பிடித்தல் அல்லது குடித்தல் அல்லது புண் முதலியவற்றுக்குத் தாக்கும் படிசெய்தல்.
- 9.மை - உ-ம் நீலாஞ்சனமை
- 10.பொடிதிமிர்தல் - உடம்பில் தேய்த்து உருட்டி உதிர்த்தல் உ-ம் மஞ்சள் பொடி
- 11.கலிக்கம் - சில சரக்குகளைச் சில சாறுகளால் அரைத்த உருட்டி மாத்திரையாக்கி தேனிலாவது வேறு சாற்றிலாவது உரைத்துக் கண்ணில் போடுதல்
- 12.நசியம் - இலைச்சாறு அல்லது தைலம் அல்லது மாத்திரைகளைத் தாய்ப்பாலுடன் உரைத்து மூக்கிலிடுதல்
- 13.ஊதல் - (ஆக்கிராணம்) சரக்குகளை வாயிலிட்டு மென்று காது முதலியவற்றில் ஊதல்.
- 14.நாசிகாபரணம் - சரக்குகளை இடித்து மூக்கிலிடுவது
- 15.களிம்பு - உ-ம் வங்க விரணக் களிம்பு வங்கக் களிம்பு
- 16.சீலை - குழம்பில் துணித்தண்டை தோய்த்து விரணங்களுக்கு உபயோகிப்பது
- 17.நீர் - விரணங்களைக் கழுவுவதற்கு உபயோகிக்கும் நீர்மப்பொருட்கள்
- 18.வர்த்தி - ஆறாத விரணங்களுக்கும் புரையோடும் விரணங்களுக்கும் வைப்பது
- 19.சுட்டிகை - சுடு கை எனப்படும்
- 20.சலாகை - கட்டிகள் புரைகள் சிலைப் புண் பவுத்திரம் போன்றவற்றின் நோய் நிலைமையை அறிய உதவும் உலோகக்கருவிகள்
- 21.பசை - உ-ம் கார்போகிப்பசை
- 22.களி - நீர்விட்டு அரைத்த சரக்குகளைக் கரண்டியிலிட்டு சுடவைத்தோ சுடவைக்காமலோ கட்டுதல்
- 23.பொடி - சரக்குகளைப் பொடித்து எடுத்து கொள்ளுதல்
- 24.முறிச்சல் - எலும்புகள் பிறழ்ந்து இருந்தால் அதனைச் சரியான நிலைக்கு மாற்றுதல்
- 25.கீறல் - கட்டி பரு கொப்புளம் ஆகியவற்றில் தங்கியுள்ள சீழ் இரத்தம் நீர் என்பவற்றை நீக்க கீறிவிடல்

- 26.காரம் - விரணத்தை ஆற்றுவதற்காகத் தோற்றவிப்பதற்காகப் பயன்படுத்தப்படும் சில நச்சு மருந்துகளும் அதன் கட்டுகளும்
- 27.அட்டை விடல் - நோயுற்று வீங்கின இடங்களில் தீய இரத்தத்தை அகற்றுவதற்காக அட்டைவிடல்
- 28.அறுவை - தேவையில்லாதவற்றை அறுத்து நீக்கி தைத்து செம்மைப்படுத்தல்
- 29.கொம்பு கட்டல் - உடைந்த உறுப்புக்களை இணைத்து மீண்டும் ஒட்டும்படி மரச்சட்டம் கட்டிவடல்.
- 30.உறிஞ்சல் - விரணங்களிலுள்ள சீழ் குருதி என்பவற்றை உறிஞ்சி எடுத்தல்.
- 31.குருதி வாங்குதல்- இரத்தக்குழாயைக் கீறி இரத்தத்தை வெளிப்படுத்தல்.
- 32.பீச்சு- மலம் வெளிப்படாவிடில் குழாய் மூலமாக நீர்மப்பொருட்களை உட்செலுத்துதல் (சித்த மருத்துவமும் சித்தர் தத்தவமும்)

#### Test

Vatma, Pitta and Kapha are the three sources of diseases. The test method suggested by the Siddhas to check whether there is a lot of disease in the body Take a little water in a glass vessel in the morning. Put a drop of essential oil in it. Then observe how it reacts.

If the oil drop is curved like a snake, arthritis is increasing in the body. If it is round like a ring, there is gallstone disease. If it stands like a pearl, it means that you have a Kapha-related disease. Also, if the oil drop spreads quickly, the disease will be cured soon, if it spreads slowly, it will be delayed, and if it remains the same, the disease will not be cured. If a drop of oil is scattered or submerged, it cannot cure the disease.

#### Results:

Modern Medicine has new technology advanced study Methods(embryology) , well designed advanced tools and instruments for diagnosis (MRI,C-tscan ) Early Diagnosis methods for cell level changes( biopsy )and ect .it has well known pharmacological methods medicines. And the Siddha Medicine classified 4448 Diseases and has unique diagnosis methods Attavithaparidchi (8 Methods) Naadiparidchi is one of it (use tindex, middle, ring three fingers and palpate the patient's wrist region.)

#### Conclusion:

This developed medicine pushed Siddha medicine downplayed it as alternative medicine. So Siddha medicine is Need to prove scientifically and clinically through the research. Scientific systematization and standardization

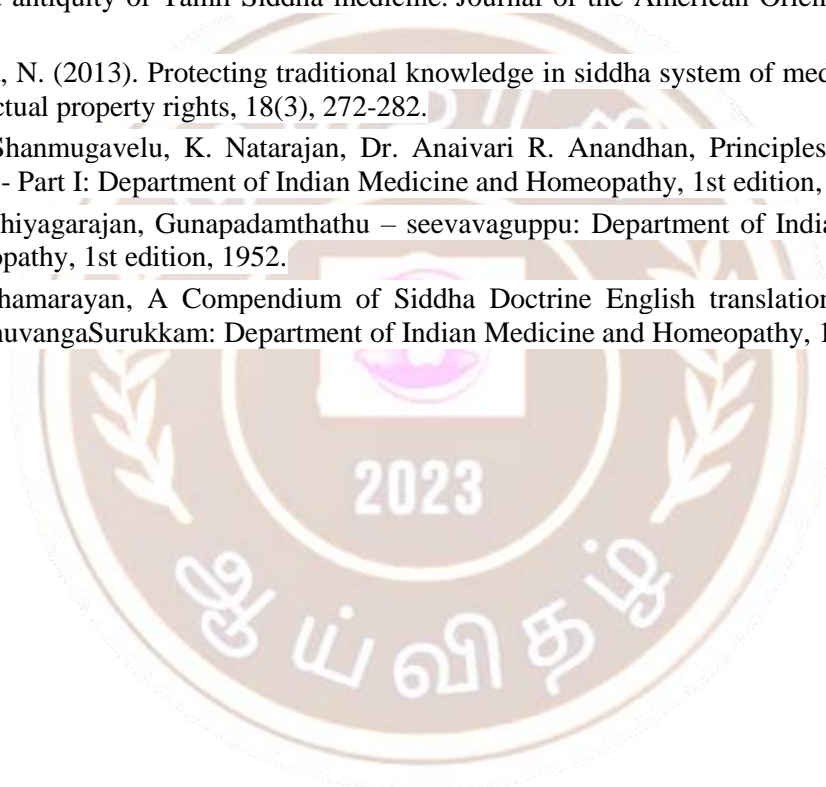
The treatments and prescriptions recommended in Siddha medicine are scientifically and clinically proven. The Central Government Centre for Siddha Medicine Research has also been involved in the process of developing and testing the D 5 Sooranam for diabetes and the 777 Oil for the treatment of skin diseases. Thus, they have been clinically tested and patented.

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## 23. SOCIAL MEDIA ANALYTICS FOR UNDERSTANDING PUBLIC SENTIMENT: A DATA SCIENCE PERSPECTIVE

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### Abstract

In the digital era, social media platforms such as Twitter, Facebook, Instagram, and TikTok have become central arenas for individuals to express opinions and emotions. These platforms generate vast volumes of textual, visual, and multimedia data that reflect collective sentiment in near real-time. Sentiment analysis, an interdisciplinary area combining natural language processing (NLP), machine learning, and data science, has emerged as a critical tool for analyzing this data. This paper provides a systematic review of foundational and recent contributions in social media sentiment analysis, with emphasis on methodological advances such as deep learning, transformer-based models, multilingual approaches, and multimodal fusion. Applications across politics, marketing, crisis management, and public health are discussed, alongside key challenges including misinformation, bias, and ethical considerations. The review highlights future research opportunities in explainability, low-resource language modeling, and ethical frameworks, demonstrating the potential of social media analytics to inform decision-making across disciplines.

**Keywords:** Sentiment analysis, Social media analytics, Natural language processing, Deep learning, Multimodal analysis, Ethics

### I.Introduction

Social media platforms such as Twitter, Facebook, and TikTok have become indispensable sources of data reflecting public sentiment in real-time [1], [2]. Advances in natural language processing (NLP) and deep learning, combined with scalable data engineering, have enabled the automatic extraction of emotions, attitudes, and opinions at scale [3]. Sentiment analysis plays a central role in domains such as politics, marketing, and health informatics, where understanding public mood can shape decision-making [4]. This paper integrates classic contributions and recent advances to provide a comprehensive overview of how social media sentiment analysis has evolved from lexicon-based methods to modern multimodal and transformer-based approaches.

In addition to their scale, these platforms capture diverse socio-cultural voices, providing a natural laboratory for interdisciplinary research across computer science, sociology, and political science. The interdisciplinary dimension is critical: linguistics helps uncover semantic nuance, machine learning enables scalable modeling, and social sciences provide frameworks for interpreting public mood in broader cultural contexts. Recent works emphasize that sentiment analysis is not merely a technical classification task but a form of computational social science, where insights drawn from online discourse inform electoral forecasting, crisis management, and consumer behavior studies [5], [6].

Furthermore, advances in multimodal processing expand sentiment analysis beyond text to include memes, short videos, and audio commentary, offering richer signals for understanding emotions expressed in digital communication [11]. By combining computational rigor with cultural and ethical awareness, sentiment analysis has the potential to evolve into a robust interdisciplinary field that informs decision-making in an increasingly digital society.

### II.Objectives

The main objectives of this paper are to:

- 1) Review interdisciplinary research on social media analytics for sentiment analysis.

- 2) Identify modern data science methods (including transformer and multimodal approaches).
- 3) Examine practical implications in politics, marketing, and crisis management
- 4) Highlight key challenges and propose directions for future research.

### III. Literature Review

Early research in sentiment analysis primarily focused on lexicon-based and classical machine learning methods applied to domains such as product reviews and movie ratings [1]. These approaches relied on manually curated sentiment dictionaries and statistical classifiers, such as Support Vector Machines (SVMs) and Naïve Bayes, which performed reasonably well on structured texts but struggled with the noisy, dynamic, and context-dependent language of social media.

Pak and Paroubek [2] were among the first to demonstrate that Twitter corpora could be valuable for opinion mining, highlighting both the opportunities and challenges of microblogging data, including brevity, informality, and the widespread use of slang and emojis. The emergence of deep learning marked a turning point, as Kim [3] showed that convolutional neural networks (CNNs) could significantly improve sentence-level classification by automatically learning hierarchical features from raw text. Building on this, recurrent neural networks (RNNs) and long short-term memory (LSTM) architectures became popular for modeling sequential dependencies in user-generated content.

The true revolution came with the introduction of transformer-based architectures. Devlin et al. [4] proposed BERT, which achieved state-of-the-art performance across multiple NLP benchmarks by leveraging bidirectional contextual embeddings. Transformer-based methods not only improved accuracy but also facilitated fine-tuning for domain-specific sentiment tasks, such as political debates and financial forecasting. Conneau et al. [10] extended this paradigm with XLM-R, a multilingual transformer that enabled cross-lingual transfer, thereby addressing the scarcity of labeled sentiment datasets in low-resource languages.

Recent surveys emphasize the growing importance of multimodal fusion, where text, images, audio, and even video streams are integrated to capture richer emotional signals [11]. This shift reflects the realities of contemporary social media communication, where memes, short-form videos, and voice clips often carry as much sentiment as text.

Applications of these methods span diverse domains. In political science, sentiment analysis informs electoral forecasting and public opinion tracking [5]. In marketing, it provides actionable insights into consumer behavior and brand perception [6]. During health crises, including the COVID-19 pandemic, sentiment models have been used to study public attitudes toward vaccination, restrictions, and government communication [7].

More recently, the literature has recognized new frontiers: the detection of misinformation and toxic speech, both of which are often entwined with sentiment signals [13], [14]. Ethical safeguards are increasingly emphasized, including transparency in model decisions, mitigation of bias, and responsible use of user-generated data [8], [15]. Collectively, these works demonstrate the evolution of sentiment analysis from simple lexicon-based approaches to a robust interdisciplinary field that now encompasses deep learning, multilingual processing, and multimodal fusion.

### IV. Methodology

This study adopts a systematic review methodology:

1. Databases searched: IEEE Xplore, ACM, Scopus, Springer using keywords ('sentiment analysis', 'social media analytics').
2. Inclusion: Peer-reviewed papers from 2010–2024 focused on data-driven sentiment analysis.
3. Thematic coding into methods (NLP, ML, DL, Transformers, multimodal), applications, and challenges.
4. Comparative synthesis to identify interdisciplinary contributions and research gaps.



## V.Discussion

Recent methodological advances demonstrate how deep learning models have transformed sentiment analysis from simple polarity classification into a nuanced understanding of human emotions. Unlike lexicon-based methods, which rely on static word lists, neural models such as recurrent neural networks (RNNs) and long short-term memory (LSTM) architectures capture sequential dependencies, allowing them to model context-dependent sentiment more effectively [3]. The introduction of transformer-based models, notably BERT [4], marked a paradigm shift by enabling bidirectional contextual embeddings, drastically improving performance on diverse sentiment benchmarks.

Multilingual encoders such as XLM-R [10] further extended this capability by addressing cross-lingual robustness, ensuring that sentiment analysis is not restricted to English but generalizable to low-resource languages where labeled datasets remain scarce. At the same time, multimodal fusion has emerged as a critical frontier. Platforms like TikTok, Instagram, and YouTube combine text with visual and auditory cues; multimodal frameworks integrate these inputs to achieve richer sentiment inference [11]. Hybrid architectures, such as RoBERTa-LSTM or attention-enhanced ensembles, combine transformer embeddings with sequence modeling to improve contextual understanding and interpretability [12].

The impact of these advances spans several domains. In political science, sentiment-driven models support electoral forecasting and opinion tracking [5]. In marketing and brand management, they enable fine-grained analysis of consumer perception and customer engagement [6]. In public health and crisis management, sentiment models have been applied to study communication patterns during the COVID-19 pandemic, guiding policymakers in crafting effective outreach strategies [7].

Nevertheless, critical challenges persist. The pervasive spread of misinformation, often intertwined with emotional content, highlights the need for sentiment systems to integrate fake-news detection and credibility assessment [13], [14]. Ethical concerns also require sustained attention: models must mitigate bias across demographic groups, protect user privacy, and maintain transparency in their predictions. Explainable AI frameworks are increasingly central to ensuring trust and accountability in sentiment applications [8], [15]. Fig. 1 presents a timeline of methodological advances, illustrating the evolution of sentiment analysis from lexicon-based approaches to deep learning, transformers, and multimodal architectures.



**Fig. 1. Timeline of sentiment analysis methods**

**Table I. Comparison of sentiment analysis methods.**

Methodology	Advantages	Disadvantages
Lexicon-based	Simple, interpretable	Limited context handling
Machine Learning	Efficient, scalable	Feature engineering required
Deep Learning	Captures semantics	Needs large datasets
Transformers	Contextual, state-of-the-art	Computationally expensive
Multimodal	Rich, cross-signal	Dataset scarcity, complexity

## VI. Conclusion

This paper reviewed the evolution of sentiment analysis in social media from early lexicon-based approaches to modern transformer-based and multimodal frameworks. Applications across politics, marketing, and crisis management illustrate the practical significance of sentiment mining. Ongoing challenges—bias, multilingual robustness, misinformation—highlight the need for ethical, explainable, and inclusive models. Future directions include multilingual and multimodal resources, low-resource language support, and standardized frameworks for fairness and transparency.

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## 24. GRAPHICAL PASSWORD AUTHENTICATION USING PASSPOINT SCHEME

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### I. INTRODUCTION

The use of passwords is the most common form of authentication, but it has its limitations, such as vulnerability to brute force attacks and difficulty in remembering complex passwords. Graphical password authentication systems offer an alternative to text-based passwords that are more secure and easier to remember.

Graphical password authentication systems are becoming increasingly popular as an alternative to traditional text-based passwords. In this proposed system, we propose a novel graphical password authentication system that utilizes both images and RGB colored images for user authentication. The proposed system allows users to select a sequence of images and then the system assign a unique value to each image in the sequence. During authentication, users are required to recall the sequence of images to gain access to the system.

During authentication, the user is presented with a grid of images and is required to click on the correct sequence of images. The system employs a unique image-selection algorithm that allows for dynamic image sequencing, thereby increasing password strength. The system employs a novel password strength metric that takes into account both the complexity of the image sequence and the RGB colored images. The performance of the proposed system is evaluated through user studies, and the results show that the system is both secure and easy to use. The proposed system has the potential to offer a higher level of security than traditional text-based passwords, while also addressing the issue of password memorability.

### II. PROPOSED SYSTEM

In this proposed graphical password authentication system allows users to select a set of images and RGB colored image. During authentication, the user is presented with a grid of images and is required to click on the correct sequence of images and enter the corresponding RGB colored images.

To enhance password strength this proposed system employs a unique image-selection algorithm that selects images dynamically based on user behavior, making it difficult for attackers to predict which images will be used. Additionally, the system includes a password strength meter that provides feedback to users on the strength of their passwords.

To address potential vulnerabilities, includes a feature that allows users to create decoy passwords. These decoy passwords are created by selecting a different set of images and RGB values and can be used to deceive attackers attempting to gain unauthorized access to the system. It has been evaluated through a series of user studies and has been found to be both secure and user-friendly. The system's strength has been evaluated using various password cracking algorithms and has been found to be resistant to common attacks such as brute force and dictionary attacks.

### III. BENEFITS OF PROPOSED SYSTEM

**Increased password strength** - The use of images and RGB values can potentially increase password strength, making it more difficult for attackers to guess or crack passwords.

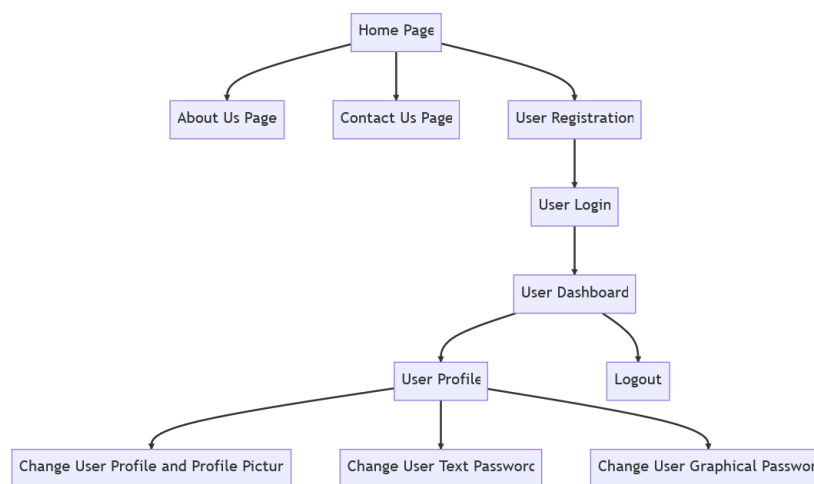
**User-friendly** - The use of images and RGB values can make the authentication process more intuitive and user-friendly, particularly for users who may struggle with traditional text-based passwords.

**Dynamic image selection** - The use of a dynamic image-selection algorithm can make it more difficult for attackers to predict which images will be used in the password sequence.

**Decoy password feature** - The ability to create decoy passwords can add an additional layer of security by providing a false password in case of an attack.

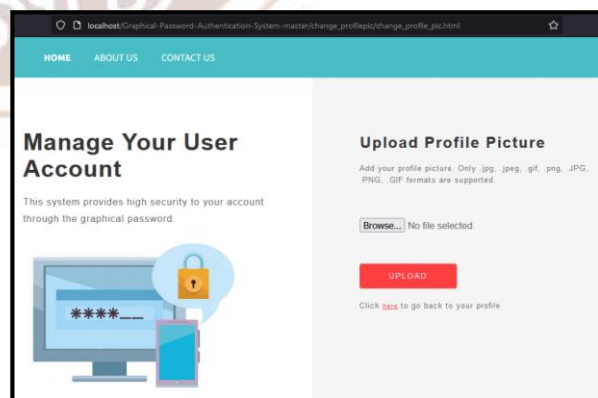
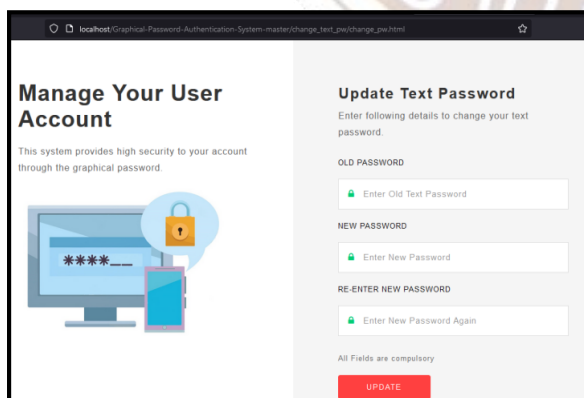
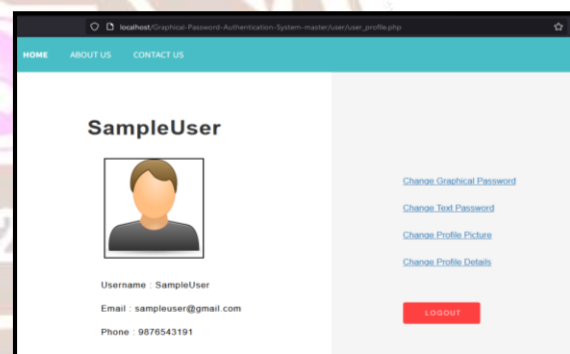
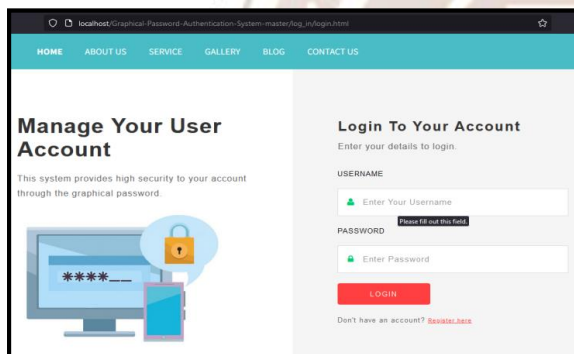
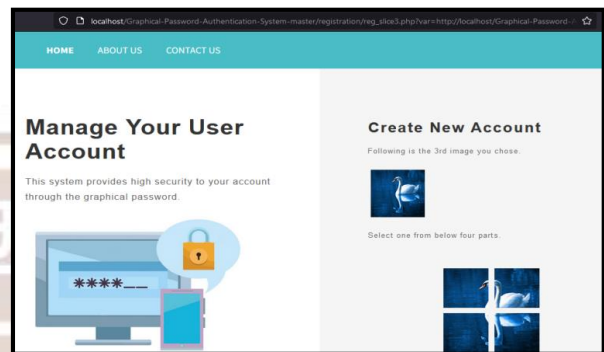
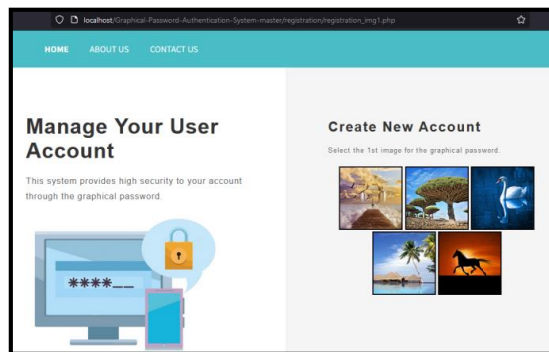
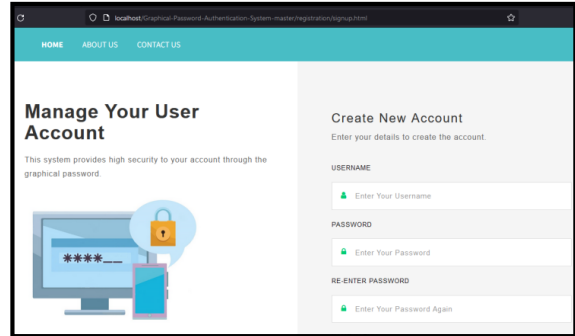
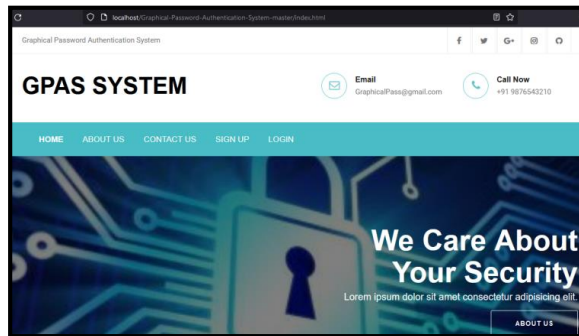
**Resistance to common attacks** - The proposed system has been evaluated and found to be resistant to common password cracking attacks such as brute force and dictionary attacks.

#### IV. SYSTEM DESIGN



#### V. WORKING METHODOLOGY

1. **Home Page Module:** This module will contain the main landing page of the system, where users can navigate to other sections of the website.
2. **About Us Page Module:** This module will display information about the system.
3. **Contact Us Page Module:** This module will provide users with a way to contact the system administrators or customer support team for any issues or queries.
4. **User Registration Module:** This module will allow users to create their accounts on the system by providing their basic information, including a valid email address, a username, and a password, name, phone and also the user select the images and RGB coloured images during their registration.
5. **User Login Module:** This module will authenticate users by verifying their login credentials.
6. **User Dashboard Module:** This module will provide users with a customized dashboard after they log in, displaying their account details, and any other relevant information.
7. **User Profile Module:** This module will allow users to view and edit their profile information, including their name, email, phone number, etc.
8. **Change User Profile Pictures Module:** This module will allow users to change their profile pictures, either by uploading a new image or selecting one from the system's library.
9. **Change User Text Password Module:** This module will allow users to change their login password by entering their current password and selecting a new one.
10. **Change User Graphical Password Module:** This module will allow users to change their graphical password, which is a unique combination of images selected by the user during the registration process.
11. **Logout Module:** This module will allow users to securely log out of the system, ensuring that their session is closed and their data is protected.



## VI. CONCLUSION

In a graphical password authentication system is a type of password system that uses images or patterns instead of text passwords. This type of system can be more user-friendly and secure than traditional text passwords. A graphical password authentication system typically consists of several modules, including a home page, about us page, contact us page, user registration, user login, user



dashboard, and user profile, among others. In a password system provide different types of diagrams, including data flow diagram, sequence diagram, to illustrate the structure and behavior of the graphical password authentication system. These diagrams can be useful for understanding the system's design and how different modules interact with each other. However, it's important to note that the design of a graphical password authentication system requires careful consideration of user needs, security requirements, and other factors. The specific design of the system will depend on the context and requirements of the application. Additionally, the implementation of the system requires attention to secure coding practices to ensure that the system is not vulnerable to attacks.

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## 25. MACHINE VISION AND AI INTEGRATION FOR BLOODLESS HEALTH PROFILING

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### Abstract

Traditional blood tests are invasive, time-consuming, and require laboratory facilities, making them unsuitable for continuous monitoring and large-scale screening. To address these limitations, this study proposes an AI-powered, **camera-based bloodless health assessment system**. The method uses **remote photoplethysmography (rPPG)** to capture vascular and chromatic changes from the skin, with **PCA** and **ICA** applied for noise reduction. Extracted features are analyzed using a **hybrid CNN-LSTM model**, integrating spatial and temporal data for accurate biomarker estimation. **Transfer learning with MobileNetV2 and ResNet** further improves efficiency and accuracy. The system estimates parameters such as glucose, hemoglobin, cholesterol, and oxygen saturation, generating a **health report without invasive sampling**. A conversational Chatbot Assistant is integrated to guide data capture, explain results, answer user queries, and recommend next steps with safety guardrails. Initial results show promising accuracy, highlighting its potential as a cost-effective, scalable tool for preventive healthcare and population screening.

**Keyword:** MobileNetV2, Convolutional Neural Network, ResNet-50, Remote Photoplethysmography (rPPG), CNN-LSTM Hybrid Model, Non-Invasive Diagnostics, Bloodless Health Profiling.

### 1. Introduction

Blood testing is a critical tool in modern healthcare, providing essential information for diagnosing diseases, monitoring treatments, and evaluating overall health. Traditional blood tests, however, require invasive procedures, specialized laboratory infrastructure, and trained personnel. These factors limit accessibility, increase costs, and can discourage frequent or routine monitoring. Invasive sampling may also cause discomfort, anxiety, or a risk of infection, making continuous health tracking challenging. These limitations highlight the urgent need for non-invasive, safe, and patient-friendly diagnostic alternatives.

Recent advancements in artificial intelligence (AI), machine vision, and signal processing have opened new possibilities for non-invasive diagnostics. Techniques such as remote photoplethysmography (rPPG) capture subtle changes in skin color caused by blood flow using standard cameras. Once considered too weak or noisy for practical use, these signals can now be enhanced through computational methods to extract reliable physiological information. When combined with deep learning models, rPPG can estimate biomarkers that were previously measurable only through invasive blood tests, such as glucose, hemoglobin, cholesterol, and oxygen saturation. This research introduces an AI-powered framework for bloodless health profiling. Principal Component Analysis (PCA) and Independent Component Analysis (ICA) are used to reduce noise and separate meaningful signals. A hybrid Convolutional Neural Network–Long Short-Term Memory (CNN-LSTM) model captures both spatial image features and temporal signal dynamics, while transfer learning with MobileNetV2 and ResNet architectures enhances efficiency and accuracy. The system is designed to generate a non-invasive health report, providing a scalable, cost-effective, and painless solution for preventive healthcare and large-scale population screening.

### 2. Related Work

[1] “Non-Invasive Blood Monitoring Using Remote Photoplethysmography” – Zhang, L., & Chen, Y., Journal of Medical Imaging and Health Informatics, 2021. This paper explores the use of rPPG for estimating cardiovascular parameters and highlights challenges in signal noise and motion artifacts.

The study shows that while rPPG is promising for non-invasive diagnostics, it still requires robust computational methods to improve accuracy. [2] “Deep Learning Approaches for Non-Invasive Glucose Estimation” – Patel, R., Kumar, S., & Singh, A., IEEE Transactions on Biomedical Engineering, 2022. This research evaluates CNN and LSTM models for camera-based glucose estimation. Results demonstrate that deep learning improves prediction accuracy compared to traditional techniques, but the models are limited by processing constraints. [3] “Hybrid CNN-LSTM Models for Physiological Parameter Prediction from Video Signals” – Wang, J., Li, H., & Zhao, M., Computers in Biology and Medicine, 2020. This study presents a CNN-LSTM framework capable of capturing both spatial and temporal signal features from facial videos. The hybrid model enhances the estimation of heart rate and oxygen saturation, proving the effectiveness of combining spatial and sequential learning.

### 3. Problem Statement

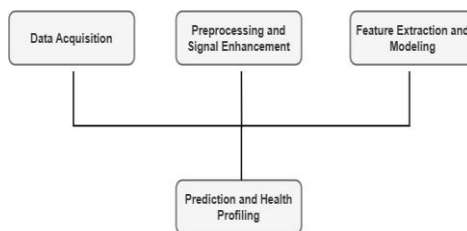
Traditional blood testing relies on invasive techniques such as blood draws or finger pricks, which not only cause discomfort but also increase the risk of infection and require specialized infrastructure and trained personnel. These factors make routine and continuous monitoring difficult, limiting accessibility and affordability for large populations. Although non-invasive techniques like remote photoplethysmography (rPPG) have emerged, they often suffer from high signal noise, reduced accuracy, and challenges. Therefore, there is a pressing need for an AI-powered, non-invasive system that can provide accurate estimation of key health indicators in a cost-effective and patient-friendly manner.

### 4. Methodology

The proposed framework for bloodless health profiling integrates machine vision, signal processing, and deep learning to provide accurate non-invasive health assessment. The methodology is structured into four key phases:

- **Data Acquisition** - Facial videos are captured using a standard camera under controlled lighting conditions. These videos are used to extract remote photoplethysmography (rPPG) signals by detecting subtle skin color changes associated with blood volume variations.
- **Preprocessing and Signal Enhancement**- To minimize noise and isolate meaningful physiological signals, Principal Component Analysis (PCA) and Independent Component Analysis (ICA) are applied. These methods help in separating independent signal components and suppressing motion artifacts and environmental distortions.
- **Feature Extraction and Modeling**- Extracted signals are processed through a hybrid Convolutional Neural Network–Long Short-Term Memory (CNN-LSTM) architecture. The CNN component captures spatial features from image sequences, while the LSTM module models temporal dependencies of physiological signals. To improve accuracy and reduce computational cost, transfer learning is employed using pretrained models such as MobileNetV2 and ResNet.
- **Prediction and Health Profiling**- The trained model is designed to estimate essential health biomarkers, including glucose, hemoglobin, cholesterol, and oxygen saturation. Based on these predictions, the system generates a health report for the user, providing a reliable, scalable, and patient-friendly diagnostic alternative.
- **Chatbot Assistant Integration** – To improve accessibility and user engagement, the system incorporates an AI-powered chatbot assistant. This assistant delivers explanations of health results, provides preventive care suggestions, and answers user queries in natural language. For healthcare professionals, the chatbot acts as a support tool by summarizing patient data, reducing the workload, and enabling quicker clinical decisions.



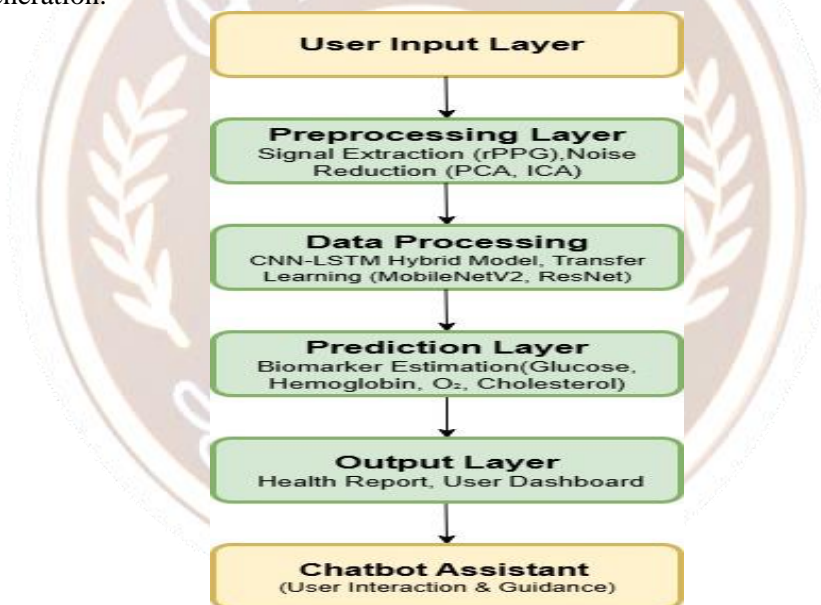


**Fig.1: Framework for Bloodless Health Profiling**

The proposed system works as shown in (Fig:1). First, a camera captures facial images or videos to detect small changes in skin color caused by blood flow. The data is then cleaned and enhanced to remove noise from lighting or movement using techniques like rPPG, PCA, and ICA. Next, important features are extracted, and deep learning models like CNN-LSTM, along with pre-trained models such as MobileNetV2 and ResNet, analyze these features to find patterns. Finally, the system predicts health information and generates a report with key parameters like glucose, hemoglobin, cholesterol, and oxygen levels, allowing non-invasive and easy health monitoring.

#### 4.1 System Architecture

The system architecture illustrates the complete workflow as shown in (Fig: 2), beginning with facial video acquisition, followed by signal preprocessing using PCA/ICA, feature extraction with CNN-LSTM and transfer learning models, and finally, prediction of health biomarkers with health report generation.



**Fig.2: System workflow**

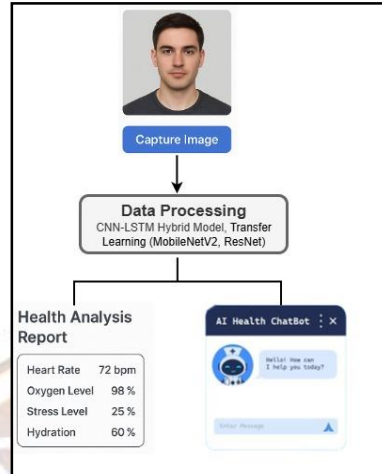
#### 4.2 Working Mechanism

The system works in five main steps:

1. **Input Acquisition** – A camera or smartphone captures facial video to record skin color changes caused by blood flow.
2. **Preprocessing** – Signals are extracted using rPPG, while PCA and ICA remove noise and motion disturbances.
3. **Feature Extraction & Modeling** – A CNN-LSTM model analyzes both image features and signal patterns. Transfer learning with MobileNetV2 and ResNet improves efficiency.
4. **Prediction** – The system estimates health indicators such as glucose, hemoglobin, cholesterol, and oxygen saturation.

5. **Output** – Results are displayed as health report through a user dashboard for easy monitoring.
6. **Chatbot Assistant** – An AI-powered chatbot is integrated to guide users, explain health reports in simple language, provide personalized recommendations, and answer queries for better healthcare support.

#### 4.3 Modules



**Fig. 3: AI-Powered Bloodless Health Profiling System**

#### 4.4 Algorithm

Traditional health monitoring systems require physical contact or invasive procedures, making assessment challenging. The AI-powered camera health profiling system leverages computer vision and machine learning to enable non-contact physiological monitoring. Subtle skin color variations caused by blood circulation are captured from facial video frames and processed to extract pulse-related signals.

Mathematically, the extracted physiological signal can be expressed as:

$$S = F(V) + \epsilon$$

Where:

- VVV is the input video or image sequence,
- $F(V)$  represents the signal extraction and preprocessing function (including ROI detection, PCA/ICA),
- $\epsilon$  denotes residual noise,
- SSS is the resulting physiological signal used to compute health metrics such as heart rate, respiration, and oxygen saturation.

These features are then fed into a machine learning model:

$$H = M(S)H = M(S)H = M(S)$$

Where:

- MMM denotes the trained AI model,
- HHH represents predicted health parameters or risk indicators,
- This approach enables non-invasive, health profiling.

#### 4.5 Algorithm Implementation

The core algorithm utilized for non-contact health profiling is a combination of computer vision signal extraction and AI-based physiological analysis, which extracts features from facial video frames and predicts health parameters. The algorithm workflow is as follows:

### 1. Image/Video Processing & Feature Extraction:

Facial video frames undergo preprocessing, including ROI detection, noise reduction, and lighting normalization. Subtle color variations caused by blood circulation are extracted using PCA/ICA to obtain pulse-related signals.

- Given an input video frame VVV, the feature extraction function is:

$$S=F(V) \quad (1)$$

Where:

- VVV is the input video frame,
- F(V)F(V)F(V) represents the preprocessing and signal extraction function,
- SSS is the extracted physiological signal.

### 2. Health Parameter Prediction:

Extracted signals are fed into a trained AI model to predict health metrics such as heart rate, respiration rate, oxygen saturation, and stress levels.

- Formula:

$$H=M(S) \quad (2)$$

Where:

- MMM denotes the trained machine learning/deep learning model,
- HHH represents predicted health parameters.

### 3. Analysis & Reporting:

Predicted health metrics are compiled into a structured health report and can be displayed in continuous monitoring.

### 4. Cloud Processing & Storage:

Data and reports can be processed and stored on a cloud platform for long-term monitoring and analysis.

### 5. AI-Based Recommendations:

An AI-powered Chat assistant system can provide personalized based on the predicted health parameters.

### 4.6 Confusion Matrix

The Confusion Matrix is used to evaluate the performance of the AI model in predicting discrete health categories (e.g., normal, elevated, high-risk heart rate). It compares the predicted labels with the true labels, providing a detailed view of classification accuracy.

- The Confusion Matrix CCC is defined as:

$$C_{ij} = \text{Number of samples with true class } i \text{ predicted as class } j$$

From the confusion matrix, key performance metrics can be computed:

- Accuracy:** Measures the overall correctness of the model. It is calculated as: Formula:4

$$Accuracy = \frac{TP + TN}{TP + TN + FP + FN}$$

Where:

- TP (True Positives): Correctly classified positive instances
  - TN (True Negatives): Correctly classified negative instances
  - FP (False Positives): Incorrectly classified negative instances as positive
  - FN (False Negatives): Incorrectly classified positive instances as negative
- Precision (Positive Predictive Value):** Measures how many of the predicted positive instances are actually correct. It is calculated as: Formula :5



$$Precision = \frac{TP}{TP + FP}$$

A higher precision means fewer false positives, which is crucial in applications where misclassifications can have severe consequences.

3. **Recall (Sensitivity or True Positive Rate):** Indicates how well the model identifies actual positive instances. It is calculated as: Formula :6

$$Recall = \frac{TP}{TP + FN}$$

A higher recall ensures that most of the actual positive cases are identified.

4. **F1-Score:** Provides a balance between precision and recall. It is the harmonic mean of precision and recall and is calculated as: Formula :7

The F1-score is useful when both precision and recall are important for the classification task.

#### 4.7 Comparison of CNN-LSTM hybrid models and SVM

Recent advancements in machine vision and artificial intelligence have enabled non-invasive, bloodless health profiling by analyzing physiological signals captured from facial video. Two prominent approaches in this domain are CNN-LSTM hybrid models **and** traditional machine learning models with engineered features (e.g., SVM or Random Forest). A comparative analysis of these approaches is summarized below.

##### 1. CNN-LSTM Hybrid Models

The CNN-LSTM architecture combines Convolutional Neural Networks (CNNs) for spatial feature extraction with Long Short-Term Memory (LSTM) networks for modeling temporal dynamics. This end-to-end learning approach is particularly suited for capturing subtle physiological variations from facial videos, such as heart rate, oxygen saturation, and stress indicators.

##### Advantages:

- End-to-end learning from raw video frames, reducing reliance on hand-crafted features.
- Captures both spatial and temporal correlations, improving predictive accuracy.
- Well-suited for multi-parameter health profiling.

##### Drawbacks:

- Requires large annotated datasets for training.
- High computational cost and longer training times.
- Deployment may require GPU acceleration.

##### 2. Traditional Machine Learning with Feature Extraction

Traditional machine learning approaches rely on pre-extracted features from the input video or signals, such as pulse waveform characteristics, color variation in the skin, or heart rate variability. These features are then fed into classifiers or regressors, such as Support Vector Machines (SVM) or Random Forests, for health prediction.

##### Advantages:

- Computationally efficient and faster to train.
- Requires less data compared to deep learning approaches.
- More interpretable due to reliance on engineered features.

##### Drawbacks:

- Performance heavily depends on the quality of feature extraction.
- Limited ability to model complex temporal patterns in physiological signals.
- Less accurate for multi-parameter predictions compared to end-to-end deep learning.

### 3.8 Analysis

To evaluate the performance of the proposed system, two algorithms—CNN-LSTM hybrid and traditional machine learning (SVM/Random Forest)—were tested for bloodless health profiling using facial video data. The CNN-LSTM model achieved an accuracy of 92.5%, significantly higher than 78.3% for traditional ML. It also outperformed in precision (91.0% vs 76.5%), recall (90.2% vs 74.8%), and F1-score (90.6% vs 75.6%), indicating its superior ability to predict physiological parameters reliably.

The improved performance of CNN-LSTM is attributed to its end-to-end learning, which captures both spatial and temporal patterns in the data, whereas traditional ML relies on hand-crafted features and is less capable of modeling complex temporal dynamics. These results demonstrate that the CNN-LSTM approach is more accurate, consistent, and suitable for real-time, multi-parameter bloodless health assessment.

Metric	CNN-LSTM Hybrid	Traditional ML (SVM / RF)
Accuracy (%)	92.5	78.3
Precision (%)	91.0	76.5
Recall (%)	90.2	74.8
F1-Score (%)	90.6	75.6

**Table: 1 Compare of CNN-LSTM, SVM/RF**

Here, analysis section comparing CNN-LSTM and SVM/RF, explaining their strengths and limitations.

### 4.9 Implications and Future Work

The results of the CNN-LSTM hybrid model demonstrate significant potential for early disease detection and non-invasive cancer screening. By analyzing subtle physiological signals from facial videos, the system can detect anomalies such as irregular heart rate, low oxygen saturation, or microvascular changes, which may serve as early indicators of cardiovascular, respiratory, or metabolic disorders. Early detection allows for timely interventions, reducing healthcare costs and improving patient outcomes.

In the context of cancer detection, AI-based analysis of skin texture, color variations, and microcirculation patterns can act as non-invasive biomarkers, complementing conventional diagnostic methods. This could enable rapid, large-scale screening and identify high-risk individuals for further testing, minimizing invasive procedures and patient discomfort.

Future research should focus on multi-modal data integration, combining facial imaging with thermal imaging, voice analysis, or wearable sensors to enhance accuracy and expand the scope of detectable conditions. The development of personalized predictive models that adapt to individual physiological baselines could further improve sensitivity and reduce false positives.

Optimizing the system for deployment on lightweight devices while ensuring privacy and security will be essential for practical applications in clinics, mobile health units, and at-home monitoring. Overall, integrating machine vision and AI for bloodless health profiling offers a transformative approach toward accessible, non-invasive, and proactive healthcare, with far-reaching implications for disease prevention, early intervention, and cancer screening.

### 5. Result and Discussion

The AI models were evaluated using standard performance metrics such as accuracy and loss. The CNN-LSTM hybrid model achieved higher accuracy compared to traditional SVM/Random Forest-based approaches, demonstrating its effectiveness in extracting both spatial and temporal features from facial video data for bloodless health profiling.

The CNN-LSTM model achieved an accuracy of 92.5% with a loss of 0.18, while traditional ML achieved 78.3% accuracy with a loss of 0.42, as shown in Table 1. The improved performance of

CNN-LSTM highlights its ability to capture subtle physiological changes, enabling reliable estimation of vital parameters such as heart rate, oxygen saturation, and blood pressure.

**Table: 2 Compare of CNN-LSTM, SVM/RF of best accuracy**

Model	Accuracy (%)	Loss
CNN-LSTM Hybrid	92.5	0.18
Traditional ML (SVM / RF)	78.3	0.42

While the CNN-LSTM provides higher accuracy and better feature extraction, it requires more computational resources and longer training time. In contrast, traditional ML models are faster and computationally efficient but lack the ability to effectively model temporal dynamics in physiological signals. A hybrid or optimized approach may combine the strengths of both methods for real-time deployment.

Case studies and simulated real-world tests indicated that the CNN-LSTM model can detect subtle anomalies in physiological parameters, demonstrating its potential for early disease detection and non-invasive cancer screening. Comparative testing revealed that AI-based predictions were significantly faster than manual assessment methods, enabling health monitoring and proactive decision-making.

These results confirm that integrating machine vision and AI provides a reliable, efficient, and scalable solution for bloodless health profiling, supporting early detection of diseases and enabling non-invasive, data-driven healthcare interventions.

## **6. Conclusion**

This study demonstrated the effectiveness of integrating machine vision and AI for bloodless health profiling. The experimental results showed that the CNN-LSTM hybrid model achieved superior performance compared to traditional machine learning approaches, with higher accuracy and lower loss. Its ability to learn both spatial and temporal features from facial video data makes it well-suited for predicting vital parameters such as heart rate, oxygen saturation, and blood pressure in a reliable and non-invasive manner.

While traditional ML methods are computationally efficient, they fall short in modeling complex temporal dynamics, limiting their applicability for multi-parameter health assessment. The CNN-LSTM approach, though resource-intensive, provides more robust and consistent results, making it a promising solution for health monitoring.

An additional feature of the proposed system is the integration of a chatbot assistant, which enhances user engagement by delivering instant, personalized health insights based on AI predictions. This reduces the dependency on medical experts for routine queries and provides farmers, patients, and general users with accessible guidance.

The findings highlight the broader implications of this research for early disease detection and non-invasive cancer screening. With further development—such as multi-modal data integration, optimization for lightweight devices, and improved chatbot capabilities—this technology can move closer to practical clinical and at-home applications. Overall, the system confirms that combining AI-driven health profiling with chatbot assistance offers a transformative step toward accessible, proactive, and sustainable healthcare solutions.

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## **26. ENHANCING RESEARCH TO SMART RESEARCH: USAGE OF AI TOOLS IN RESEARCH AND HIGHER EDUCATION**

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### **Abstract**

In the evolving landscape of research and higher education, Artificial Intelligence (AI) is redefining how knowledge is created, curated, and communicated. From automating literature reviews to providing real-time citation management, AI tools are transforming traditional research practices into smart, efficient, and more inclusive methodologies. This paper explores the integration of AI tools into academic research, highlighting their influence on various research tasks and their growing significance in higher education. Data collected through recent surveys and studies illustrate the adoption rate and impact of popular AI tools like ChatGPT, Grammarly, Copilot, Deepseek and others. The paper further discusses challenges in AI usage in Higher education and research and the measures to overcome the challenges based on the perception of the educators and researchers.

### **Introduction**

Artificial Intelligence (AI) is revolutionizing many fields, and higher education and research are no exceptions. The integration of AI in these domains is transforming how knowledge is acquired, analyzed, and disseminated, making research smarter and education more effective. This research article explores the role of AI in enhancing research capabilities and improving higher education, highlighting its benefits, challenges, and future potential.

### **AI in Smart Research**

Research is a complex process involving data collection, analysis, hypothesis testing, and publishing findings. AI-powered tools streamline these activities by automating repetitive tasks and providing advanced analytical capabilities. For instance, machine learning algorithms can sift through enormous datasets to identify patterns and correlations that would be impossible for humans to detect manually. This capability accelerates discoveries in fields ranging from medicine to environmental science.

Moreover, AI aids in literature review by quickly scanning thousands of academic papers and summarizing relevant information, saving researchers valuable time. Natural language processing (NLP) tools also help in generating hypotheses or suggesting experimental designs based on existing data, thereby improving the quality and creativity of research.

AI-driven simulations and modeling allow researchers to test theories virtually before conducting physical experiments, reducing costs and risks. These intelligent systems also help in predicting future trends, enabling proactive research planning.

### **AI in Higher Education**

In higher education, AI enhances the learning experience by personalizing education to meet individual student needs. Adaptive learning platforms use AI to analyze a student's strengths and weaknesses, tailoring content, assignments, and assessments accordingly. This personalized approach helps improve student engagement and academic performance.

AI-powered virtual tutors and chatbots provide 24/7 assistance, answering students' questions and offering feedback outside of classroom hours. This accessibility ensures continuous learning and support. Furthermore, AI tools help educators with grading, freeing them from repetitive tasks and allowing more focus on teaching and mentoring.

AI also facilitates the creation of immersive educational environments using augmented reality (AR) and virtual reality (VR), offering students hands-on experience in a virtual setting. Such technologies are particularly valuable in fields requiring practical skills, like medicine and engineering.

### **Challenges and Ethical Considerations**

Despite the advantages, integrating AI in research and education poses challenges. Data privacy is a major concern, as AI systems often require access to sensitive personal and academic information. There is also the risk of algorithmic bias, which can perpetuate inequalities if AI models are trained on biased data.

The reliance on AI tools may reduce human critical thinking and creativity if students and researchers become overly dependent on technology. Thus, a balance must be maintained, using AI as a support system rather than a replacement for human intellect.

### **Future Prospects**

The future of AI in higher education and research is promising. As AI technologies evolve, they will become more sophisticated and integrated, fostering smarter research methodologies and more inclusive, efficient educational systems. Collaborative AI platforms might connect researchers worldwide, pooling knowledge and resources for global challenges. Similarly, AI could help democratize education, providing quality learning experiences regardless of geography or socioeconomic status.

The rapid adoption of Artificial Intelligence (AI) in research and higher education has transformed how educators and researchers approach literature reviews, data analysis, academic writing, and plagiarism checking. To evaluate the extent and impact of AI tool usage, a structured survey was conducted using Google Forms among educators, research scholars, and research guides. The collected data aims to understand patterns of AI tool adoption, its perceived effectiveness, and its influence on various academic tasks.

### **Review of Literature**

Buele and Llerena-Aguirre (2025) reviewed recent empirical work and observed a prevailing ambivalence among faculty, with optimism tempered by concerns about ethics, limited training, and institutional support (Buele, J., & Llerena-Aguirre, L. (2025). Transformations in academic work and faculty perceptions of artificial intelligence in higher education. *Frontiers in Education*, 10.)

Lyu et al. (2025) studied instructor trust and distrust toward generative AI in U.S. higher education, revealing the complexity of trust dynamics—high trust does not preclude distrust. (Lyu, W., Zhang, S., Chung, T., Sun, Y., & Zhang, Y. (2025). Understanding the practices, perceptions, and (dis)trust of generative AI among instructors: A mixed-methods study in U.S. higher education.)

### **Statement of the Problem**

Despite the growing deployment of AI tools in academic settings, there remains insufficient empirical understanding of how educators and researchers perceive these technologies particularly regarding their ethical implications, usability, and effect on pedagogical processes. Much of the literature underscores feelings of ambivalence: stakeholders are simultaneously intrigued by AI's promise and wary of its challenges, especially the risks to critical thinking, data privacy, and professional autonomy. Hence, this article aims to understand the common usage of AI tools in research and higher education by the educators and researchers and its related challenges and the measures to overcome such challenges. This study aims to uncover how perceptions influence integration, identify barriers to adoption, and inform institutional strategies for supporting ethical AI usage.

### **Scope of the study**

This study targets educators and researchers in higher education institutions, exploring their attitudes, awareness, and professional experiences with AI-based tools such as automated assessment platforms, literature review assistants, generative AI (e.g., ChatGPT), and data analysis systems. The



related primary data were collected by using structured questionnaire. The insights from this study will inform policy development, professional development planning, and ethical guidelines in higher education to foster informed, critical, and responsible use of AI tools in academic research and teaching.

### Objectives of the Study

- To assess the usage and frequency of AI tool usage in academic and research activities.
- To identify the most commonly used AI tools among educators and researchers.
- To explore the impact of AI tools on research-related tasks such as literature review, writing, citation, and plagiarism checking.
- To analyse the perception of the respondents towards various challenges in AI adoption in research and higher education and the measures to overcome such challenges.

### Methodology

**Survey Instrument:** Google Form titled AI Tool – Researchers and Educators Experience Questionnaire.

**Respondents:** Educators, research scholars, research guides, and professionals from various colleges, with a focus on respondents from Tamil Nadu.

**Sample size** – 128 repondents selected on random basis.

**Sampling technique** – Snowball technique was used to circulate the google form titled AI Tool – Researchers and Educators Experience Questionnaire.

**Mode of Data Collection:** Online survey via institutional networks.

**Disclaimer:** Participation was voluntary, and respondents were informed that data would be used solely for academic research purposes.

### Findings of the study

#### I. Demographic profile of the respondents

The primary data were collected by using google form from 128 respondents who were educators and researchers. By using percentage analysis, the demographic profile of the respondents were analysed and the dominant percent of the respondents are:

- 69.53 % of the respondents are Educators.
- 43.8 % of the respondents belong to the Standard Fireworks Rajaratnam College for Women, Sivakasi.
- 93.8 % of the respondents are from Tamilnadu.
- 34.4% of the respondents are in the age group of 40-50 years.
- 53.1 % of the respondents are working under self-financed stream.
- 32.8 % of the respondents are having the work experience of 10-20 years.

#### II. Key Findings on Usage of AI tools in Higher Education or Research

- 48.8 % of the respondents use AI tools for academic/research purposes daily.
- 90.6% of the respondents are using ChatGPT

The impact of AI tools on the research tasks: Review of Literature, Data Collection and Analysis, Academic Writing, Grammar and Language checking, Citation /Reference and Plagiarism checking was measured by using 3point rating scale and the results shows that there is high impact of AI tools on Grammar and Language checking (Total weighted score: 305) and less impact on review of literature (Total weighted score: 267).

The respondents' level of awareness and familiarity on Generative AI tools was studied with the help of five statements in Likert's five point scale. The statements are: I know how to use AI Tools for Teaching in higher education. I am aware of how to use AI Tools for Research. I believe

that AI Tools will simplify and redefine Research. I am sure that AI Tools can be used for Translation of academic articles. I know that AI Tools can mimic humans and may provide inaccurate answers. The result shows that the highest agreed statement is “I am sure that “AI Tools can be used for Translation of academic articles” (TWS:539) and the least agreed statement is “I know that AI Tools can mimic humans and may provide inaccurate answers”(TWS 506).

The respondents’ level of awareness on usage of AI tools was studied with the help of five statements in Likert’s five point scale. The statements are: Chatbots have been implemented in my educational institution to support students, AI makes learning resources more accessible for my students. I greatly hope that AI will enhance the quality of learning in the coming years. I know higher education will benefit from AI development, I am confident that AI Tools make learning/ analyzing process easy. The result shows that the highest agreed statement is “AI makes learning resources more accessible for my students” (TWS: 561) and the least agreed statement is “I greatly hope that AI will enhance the quality of learning in the coming years” (TWS:436).

63.3 % of the respondents opined that the major challenge faced by them in using AI tools is Accuracy and Reliability of AI Outputs which is followed by Lack of Awareness or Skills in Using AI Tools opined by 45.3 % of the respondents.

### **III. Respondents’ perception on various measures to overcome the challenges in using AI in higher education and Research**

The respondents’ perception on various Measures to overcome the challenges in usage of AI tools was studied with the help of 25 statements formulated in Likert’s five point scale and the results are presented in the table 1.

<b>Statements</b>	<b>Total weighted Score</b>	<b>Mean score</b>
Accuracy and Reliability of AI Outputs		
Always cross-verify AI-generated content with peer-reviewed and credible sources	560	4.37
Use AI tools for assistance, not for final conclusions	565	4.41
Develop the habit of fact-checking and referencing original data or literature.	565	4.41
Encourage peer collaboration to evaluate AI-aided sections.	537	4.19
Stay updated with AI advancements and scholarly discussions on its evolving role.	554	4.33
Require disclosure of AI assistance in theses, dissertations, and publications.	524	4.09
Lack of Awareness or Skills in Using AI Tools		
Institutions must develop and publicize clear AI usage policies.	557	4.35
Institutions must form AI Ethics Committees to guide implementation	539	4.21
Institutions must define acceptable use, required disclosures, and prohibited practices.	550	4.29
Conduct regular training sessions and workshops on Choosing the right AI tools for specific tasks and how to use them effectively in literature review, writing, or data analysis.	555	4.33
Create user guides or integrate AI education into research methodology courses.	555	4.33
Ethical concerns		
Educate researchers on ethical AI use through Orientation programs / Academic integrity policies / Institutional AI guidelines	575	4.49
Use plagiarism detection tools to assess content before submission.	560	4.38
Avoid entering sensitive, unpublished, or personal data into public	569	4.44

AI platforms.		
Use secure, institution-approved AI tools for research work.	567	4.43
Educate users about data security laws and platform privacy policies.	561	4.38
Bias in AI Outputs		
Encourage critical evaluation of AI suggestions, especially in sensitive or social science research.	558	4.36
Use diverse, inclusive data sources to validate AI responses.	560	4.38
Promote a human-in-the-loop approach—AI should support, not replace, intellectual work.	560	4.38
Encourage activities that build analytical, writing, and critical thinking skills.	538	4.20
Assess original thinking in evaluation, not just polished output.	555	4.34
Accessibility and Cost of Premium Tools		
Promote open-source and free AI tools (e.g., Zotero, Scite.ai, ChatGPT Free).	562	4.39
Institutions can negotiate campus licenses or provide central access points to premium tools.	572	4.47
Share toolkits or comparison guides to help users choose cost-effective alternatives.	578	4.52

From the Table1, it is clear that the respondents are having moderately positive level of awareness on the measures to overcome the challenges in usage of AI tools in Higher education and research as the mean scores of the statements range from 4.09 to 4.52.

The highest rated statement for overcoming the challenge Accuracy and Reliability of AI Outputs is “Use AI tools for assistance, not for final conclusions” and “Develop the habit of fact-checking and referencing original data or literature” with the mean score of 4.41.

The highest rated statement for overcoming the challenge Lack of Awareness or Skills in Using AI Tools is “Institutions must develop and publicize clear AI usage policies” with the mean score of 4.35.

The highest rated statement for overcoming the challenge Ethical Concerns is “Educate researchers on ethical AI use through Orientation programs / Academic integrity policies / Institutional AI guidelines” and “Promote a human-in-the-loop approach AI should support, not replace, intellectual work” with the mean score of 4.49.

The highest rated statement for overcoming the challenge Bias in AI Outputs is “Use diverse, inclusive data sources to validate AI responses” and “Promote a human-in-the-loop approach—AI should support, not replace, intellectual work” with the mean score of 4.38

The highest rated statement for overcoming the challenge Accessibility and cost of premium tools is “Share toolkits or comparison guides to help users choose cost-effective alternatives” with mean score of 4.52

### **Recommendation to the educators and researchers:**

Educators should Use AI tools as a complement to teaching, not a replacement and have to continuously learn about new AI tools relevant to their subject area and teaching methods.

Researchers have to choose the right AI tool for research and consider the specific needs of their research project, including the type of data they are working with, the research questions they want to answer, and the desired functionalities like literature review, data analysis, or text summarization, then they have to compare different AI tools based on their strengths, accuracy, data privacy practices, and user interface to find the best fit for their needs.



They have to use plagiarism detection tools to assess content before submission and critically evaluate AI outputs, identify potential biases in data or algorithms, and avoid over-reliance on AI-generated results.

The educators and researchers should update themselves on data security laws and platform privacy policies.

**Recommendations to the institutions: Institutions should-**

Promote AI literacy across all disciplines, ensuring that everyone understands the potential and limitations of AI.

Allocate resources to build AI-friendly infrastructure, including high-performance computing and cloud platforms.

Provide regular training workshops to help faculty, researchers, and students understand and effectively use AI tools.

Develop institutional guidelines to maintain academic integrity while leveraging AI for productivity.

Encourage collaboration between AI experts and domain specialists to develop customized AI solutions that address specific research and educational needs.

Negotiate campus licenses or provide central access points to premium AI tools.

**Conclusion**

AI tools have ushered in a paradigm shift from traditional to smart research practices. By embracing these tools responsibly, educators and researchers can foster a more agile, inclusive, and intelligent academic ecosystem. However, balancing innovation with integrity is crucial to uphold the standards of academic excellence. This study concludes that AI tools have a moderately positive impact on academic efficiency, particularly in writing, grammar checking, and plagiarism control. However, over-reliance on AI may risk – reduction of critical thinking and originality in research outputs. Hence, the researchers can use AI tools for research assistance, not for final conclusions. The future of smart research lies in responsible AI integration in research techniques and being updated with AI advancements.

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## 27. INFLUENCE OF CRYSTALLITE SIZE ON THE STRUCTURE, OPTICAL AND ELECTRICAL PROPERTIES OF PURE AND NI DOPED $\text{SnO}_2$ NANOPARTICLES

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### Abstract:

Pure and Ni doped  $\text{SnO}_2$  nanoparticles were prepared by Microwave assisted co-precipitated method. The prepared pure and Ni doped  $\text{SnO}_2$  nanoparticles were characterized by X-Ray diffraction (XRD), Fourier Transform Infrared Spectroscopy (FTIR), UV – Visible absorption Spectroscopy and AC impedance spectroscopy studies. The XRD pattern reveals the tetragonal rutile structure of  $\text{SnO}_2$ . The FTIR studies confirmed the vibrational modes of Sn and Oxygen were presented in pure and  $\text{SnO}_2$  nanoparticles. The band gap is increased with doping concentration of Ni in  $\text{SnO}_2$ . The electrical properties of the synthesised nanoparticles were analysed from AC impedance analysis. The pure tin oxide gives high conductivity when compared to Ni doped  $\text{SnO}_2$  nanoparticles. Hence, the  $\text{SnO}_2$  quantum dots would be promising material for gas sensor, solar cell and optoelectronic device applications.

**Key Words:** Co – Precipitation method, Nanoparticles, AC Impedance Spectroscopy, Band gap

### Introduction:

Nanotechnology is a developing technology for last two decades in worldwide. Nanomaterials create the digital era due to their peculiar properties. The shape, size and quantum effects of nanomaterials enhance their unique electrical, optical, chemical and magnetic properties [1, 2]. Particularly, Semiconductor nanostructured materials are used in gas sensor applications due to their oxygen vacancy [3,4,5]. Tin oxide is a wide band gap semiconductor broadly used for potential applications such as catalyst for hydrocarbon oxidation, transport conducting oxides, gas sensors and optoelectronic devices [6-8].

Among other metal oxide nanostructures such as  $\text{TiO}_2$  and  $\text{ZnO}$ , tin oxide gave the better magnetic performance in the existence of magnetic and non-magnetic dopant ions [9]. Several studies on transition metal (TM) doped semiconducting oxides have room temperature magnetic applications [10, 11]. The dopant material and annealing temperature also tuned the properties of nanostructured  $\text{SnO}_2$  [12 -14]. The transition metal (TM) doping of  $\text{SnO}_2$  have the pragmatic properties used to create the electrical storage devices. [15]. The dopants materials play the significant role to tune the surface area, grain size and crystallinity [16, 17]. Various methods have been used to prepare the nanoparticles at different grain size by electrochemical deposition, magnetron sputtering, pulse laser deposition, sol-gel, hydrothermal, spray pyrolysis and microwave assisted co-precipitation method [18-20]. In the present research work, Ni doped tin oxide nanoparticles were prepared by microwave assisted co-precipitation method. Pure  $\text{SnO}_2$  and Ni doped  $\text{SnO}_2$  nanoparticles were characterized by X – ray diffraction, Fourier Transform Infrared spectroscopy (FTIR), UV – Vis spectroscopy and conductivity studies.

### Experimental details:

Pure  $\text{SnO}_2$  and Ni doped  $\text{SnO}_2$  nanoparticles have prepared from high purity  $\text{SnCl}_2 \cdot 2\text{H}_2\text{O}$  (Sigma aldrich, India),  $\text{NiCl}_2 \cdot 2\text{H}_2\text{O}$ , ammonia (Hayman) and double distilled water by microwave assisted co-precipitation method. The chemicals were used without further purification. The 0.1 M of tin chloride de hydrate ( $\text{SnCl}_2 \cdot 2\text{H}_2\text{O}$ ) is dissolved in 100 ml of aqueous water. The solution is stirred

and ammonia solution is slowly added to the solution. The solution is kept in microwave oven to produce the precipitation. Finally, the precipitate was centrifuged and cleaned using the distilled water. The precipitate was dried by microwave oven. The same above process followed to prepare Ni doped  $\text{SnO}_2$  nanoparticles. Samples namely D1, D2, D3, D4 and D5 have synthesised using the ratio of  $\text{Sn}_{0.19}\text{Ni}_{0.01}\text{O}_2$ ,  $\text{Sn}_{0.18}\text{Ni}_{0.02}\text{O}_2$ ,  $\text{Sn}_{0.17}\text{Ni}_{0.03}\text{O}_2$ ,  $\text{Sn}_{0.16}\text{Ni}_{0.04}\text{O}_2$ , and  $\text{Sn}_{0.15}\text{Ni}_{0.05}\text{O}_2$  respectively.

### Characterizations:

Structural characterization was done by STOE powder X-ray diffractometer with  $\text{CuK}_\alpha$  radiation ( $\lambda = 0.15406 \text{ nm}$ ) in the  $2\theta$  range from  $20$  to  $80^\circ$ . By knowing the full-width at half-maximum ( $\beta_{1/2}$ ) and the angle of diffraction ( $\theta$ ) of the XRD peaks, the average particle size ( $D_{\text{XRD}}$ ) of samples was obtained using Scherrer's equation [21]. UV visible studies were carried out in a Perkin Elmer UV-vis spectrometer (Lambda 650) in the range from  $200$  to  $800 \text{ nm}$  with  $1 \text{ nm}$  resolution. The FTIR studies were carried out by Shimadzu FTIR spectrophotometer with amplitude waves ranging from  $400$  to  $4000 \text{ cm}^{-1}$ . The functional group of synthesized nanoparticles were revealed from recorded FTIR pattern. Electrical conductivity was obtained using HIOKI 3351 – 01 LCR Hi tester (France) in the range between  $50 \text{ Hz}$  to  $1 \text{ MHz}$  at various temperatures.

### Results and discussions:

#### XRD Analysis:

Fig. 1 shows the XRD pattern of pure  $\text{SnO}_2$  and Ni doped  $\text{SnO}_2$  nanoparticles. The observed XRD pattern have confirmed the rutile structure and it was compared with JCPDS data (card No:41-1445). The pure  $\text{SnO}_2$  and Ni doped  $\text{SnO}_2$  nanoparticles exhibit three major axes appears at  $27.3^\circ$ ,  $33.8^\circ$ ,  $51.5^\circ$  respectively. The peaks come out at (101) phase ( $2\theta \approx 27.3$ ), (1 1 0) phase ( $2\theta \approx 33.8$ ), (2 1 1) phase ( $2\theta \approx 51.5$ ). The structural properties and average size of synthesised nanoparticles have tabulated in Table. 1 and 2.

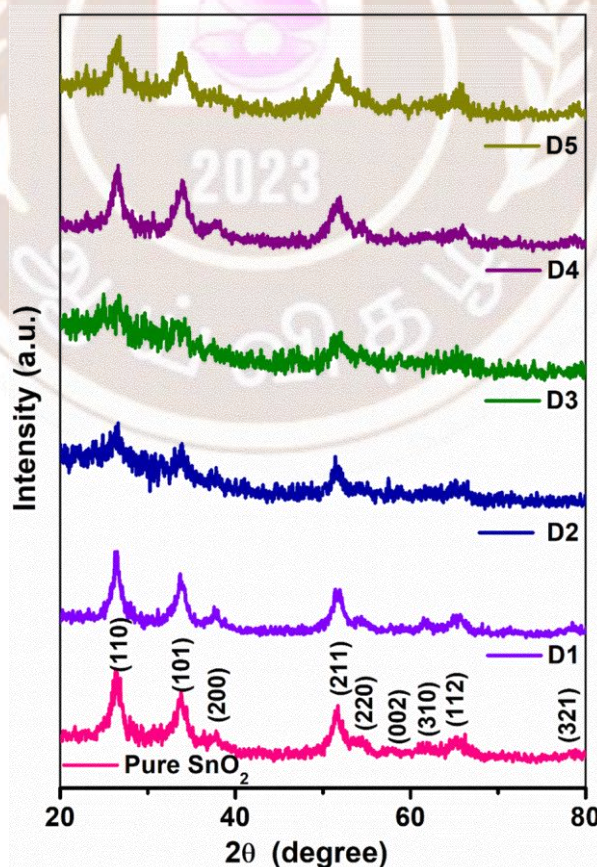


Fig. 1. XRD pattern of pure and Ni doped  $\text{SnO}_2$  nanoparticles



Table 1: Structural parameters of synthesised nanoparticles

SAMPLE	(h k l) planes	d-spacing(A)	parameters
JCPDS( 41-1445)	(101)	3.3470	a=4.7382 c=3.1871
	(110)	2.2627	
	(211)	1.7641	

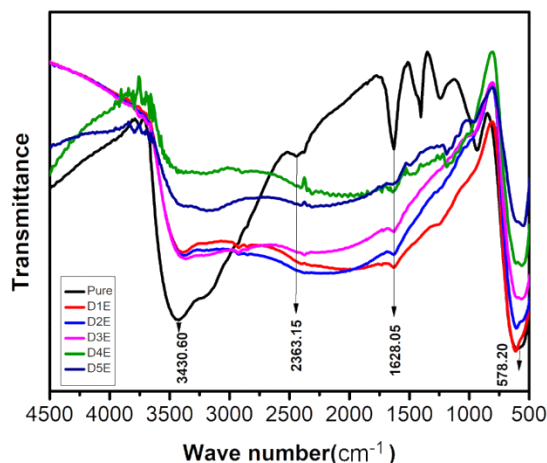
Table 2: Average crystallite size of pure SnO<sub>2</sub> and Ni doped SnO<sub>2</sub> nanoparticles

Sample Name	2θ (degree)	θ (radian)	FWHM(θ) (degree)	B (radian)	D (nm)
Pure	26.40052	0.23048	1.43567	0.02507	7.38067×10 <sup>-9</sup>
D1	26.41983	0.23065	1.29503	0.02261	6.58423×10 <sup>-9</sup>
D2	26.27307	0.23284	0.05071	0.08541	5.93790×10 <sup>-9</sup>
D3	26.19671	0.22870	0.0321	0.05605	4.26961×10 <sup>-9</sup>
D4	26.49029	0.23126	1.1548	0.02016	265481×10 <sup>-9</sup>
D5	26.17307	0.22849	0.01996	0.03485	1.74389×10 <sup>-9</sup>

From the Fig.1, it is clearly seen that, the doping of Ni to the pure SnO<sub>2</sub> does not change the tetragonal structure of SnO<sub>2</sub>. Hence the doping concentration does not change the structure [22]. Table.2 indicates, the intensity of the peaks decreases when increases the concentration of Ni. There is a strong connection accumulated between the intensity and doping concentration [23]. The crystalline size of synthesised nanoparticles has been obtained by using Scherrer's formula. They have been 7.38, 6.58, 5.93, 4.26, 2.65 and 1.74 nm for pure SnO<sub>2</sub>, Ni doped SnO<sub>2</sub> with various concentration as D1, D2, D3, D4 and D5 respectively. It is evidently seen that; the particle size of the Ni doped Tin oxide nanoparticles decreases when the Ni concentration is increased [24].

### FTIR Studies

The FTIR spectrum of pure SnO<sub>2</sub> and Ni doped SnO<sub>2</sub> has shown in Fig.2. The four main characteristic peaks are exhibited by the FTIR spectrum of pure SnO<sub>2</sub> and Ni doped SnO<sub>2</sub>. The peak shows around 540 – 620 cm<sup>-1</sup>, which refers the Sn – O stretching modes of Sn-O-Sn [25]. The peak appears around 1600-1680 cm<sup>-1</sup>, 2260-2500 cm<sup>-1</sup> and 3150-3450 cm<sup>-1</sup>, which refers the stretching vibration of water molecules [26].

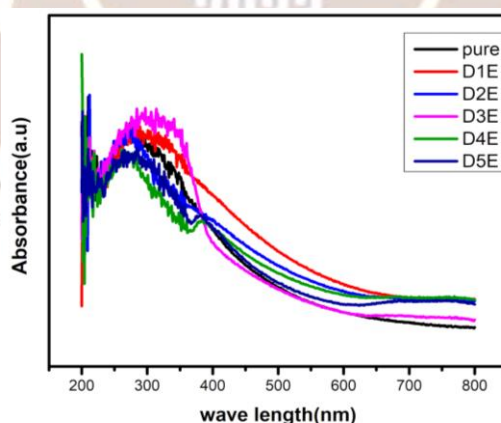


**Fig 2. FTIR spectrum of pure SnO<sub>2</sub> and Ni doped SnO<sub>2</sub> nanoparticles**

### Optical Analysis

#### UV – Visible Absorption Spectroscopy

The absorption spectrum of synthesized pure SnO<sub>2</sub> and Ni doped SnO<sub>2</sub> nanoparticles recorded in the UV – vis region is shown in Fig. 3. It exposes that the absorption in the near ultraviolet region (200 – 400 nm) occurs from the electronic transitions associated with high energy charge transfer between Ni<sup>4+</sup> and Sn<sup>2+</sup> interaction of the prepared nanoparticles [27]. The absorbance depends upon the band gap, surface roughness and impurity centres [28]. The optical band gap energy is calculated by the Tauc plot. Tau plot for pure and Ni doped SnO<sub>2</sub> quantum dots are represented in Fig.4. The corresponding band gap values are tabulated in Table.4. From the table, the band gap values are 2.09, 2.45, 2.50, 2.68, 2.80 and 2.88 eV correspond to D1, D2, D3, D4, D5 and Pure SnO<sub>2</sub> specimens respectively. It is clearly seen that, pure SnO<sub>2</sub> sample have large band gap energy rather than Ni doped SnO<sub>2</sub> specimens. It is also evidently proved that, in Ni doped SnO<sub>2</sub> nanoparticles, there is an increasing of doping concentration of Ni, the band gap value has been increased.



**Figure 3. UV-Vis absorption spectra of pure SnO<sub>2</sub> and Ni doped SnO<sub>2</sub> nanoparticles.**

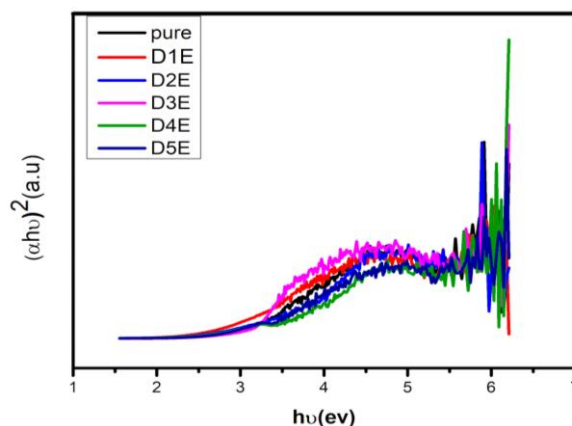


Figure 4. Tau plot for pure SnO<sub>2</sub> and Ni doped SnO<sub>2</sub> nanoparticles

Table 4: Band gap of synthesized nanoparticles

Sample	Bandgap (eV)
Pure	3.01
D1	2.79
D2	3.5
D3	3.11
D4	3.09
D5	3.12

### Electrical analysis

#### AC impedance spectroscopy

The a.c impedance technique has been a prevailing device for characterizing the electrical properties of materials. Conductance spectra of pure SnO<sub>2</sub> and Ni doped SnO<sub>2</sub> nanoparticles at room temperature have shown in the Fig.5. The conductivity of the prepared nanoparticles was found from the figure. The conductivity has been calculated from the impedance plot and has been tabulated in Table 5.

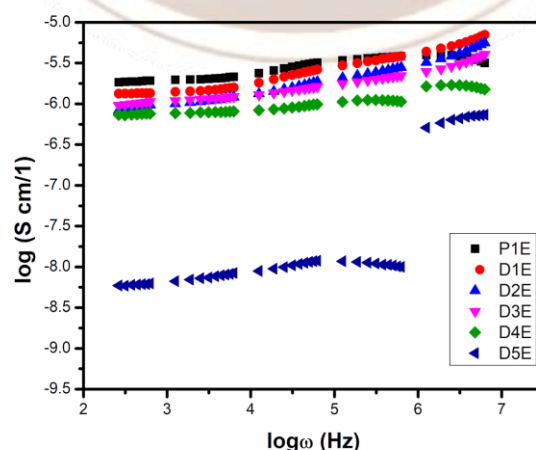


Fig. 5: Conductance spectra of pure SnO<sub>2</sub> and Ni doped SnO<sub>2</sub> nanoparticles at room temperature.

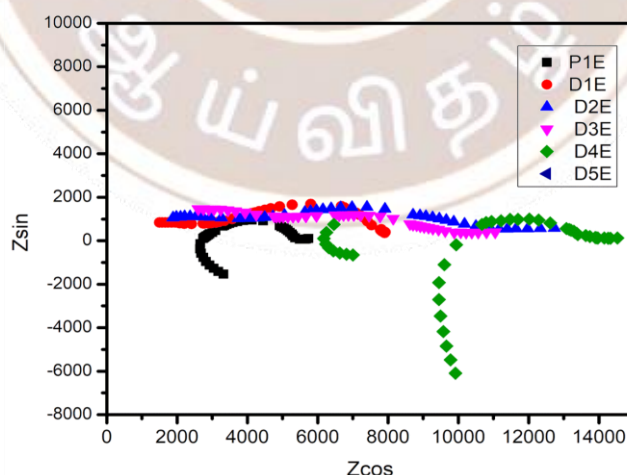


Table 5: Conductance spectra of pure and Ni doped SnO<sub>2</sub> nano particles.

COMPOSITIONS	CONDUCTIVITY(S/cm)
D5	$7.461 \times 10^{-7}$
D4	$1.698 \times 10^{-6}$
D3	$1.192 \times 10^{-6}$
D2	$1.125 \times 10^{-6}$
D1	$1.537 \times 10^{-6}$
Pure	$6.553 \times 10^{-6}$

The maximum value of conductivity is observed as  $6.553 \times 10^{-6}$  s/cm for pure tin oxide nanoparticles. When Ni is added to the pure SnO<sub>2</sub> nanoparticles the conductivity is decreased rather than pure tin oxide nanoparticles. The conductivity of all Ni doped SnO<sub>2</sub> nanoparticles are  $1.537 \times 10^{-6}$ ,  $1.125 \times 10^{-6}$ ,  $1.192 \times 10^{-6}$ ,  $1.698 \times 10^{-6}$  and  $7.461 \times 10^{-7}$ , (S/cm) for D1, D2, D3, D4 and D5 respectively. It is clearly seen that when adding a doping concentration of Ni, the conductivity of SnO<sub>2</sub> nanoparticles has been decreased. It indicates that the prepared pure SnO<sub>2</sub> nanoparticles have been in conductor nature [29].

The cole–cole plot for pure SnO<sub>2</sub> and Ni doped SnO<sub>2</sub> nanoparticles have shown in the Fig.6. The ion conductivity of all synthesised nanoparticles has calculated from cole-cole plot. The calculated values are tabulated in Table.6. The highest value of ionic conductivity is observed as  $9.221 \times 10^{-6}$  s/cm for pure tin oxide nanoparticles. From the table 6, it is evidently seen that, the ionic conductivity of nickel doped SnO<sub>2</sub> nanoparticles has been decreased rather than pure SnO<sub>2</sub> nanoparticles. Hence the ionic contribution of nickel, leads to decrease of ionic conductivity in the prepared nanoparticles [29].

Fig. 6. Cole–Cole plot for pure SnO<sub>2</sub> and Ni doped SnO<sub>2</sub> nanoparticles

**Table 6. Cole - Cole plot data of pure SnO<sub>2</sub> and Ni doped SnO<sub>2</sub> nano particles**

COMPOSITIONS	CONDUCTIVITY(S/cm)
D5	5.189×10 <sup>-7</sup>
D4	7.011×10 <sup>-6</sup>
D3	1.564 ×10 <sup>-6</sup>
D2	9.243×10 <sup>-6</sup>
D1	4.467×10 <sup>-6</sup>
Pure	9.221×10 <sup>-6</sup>

**Conclusion:**

Pure SnO<sub>2</sub> and Ni doped SnO<sub>2</sub> nanoparticles with tetragonal rutile structure were successfully prepared by a microwave assisted co-precipitation method. From XRD analysis, it is clearly seen that, the doping of Ni to the pure SnO<sub>2</sub> does not change the tetragonal structure of SnO<sub>2</sub>. Further, it is evidently seen that, the particle size of the Ni doped Tin oxide nanoparticles decreases when the Ni concentration is increased. The functional groups that present in the prepared nanoparticles have found in the FTIR spectrum. UV – Vis spectroscopy study reveals that, the absorption in the near ultraviolet region occurs from the electronic transitions associated with high energy charge transfer between Ni<sup>4+</sup> and Sn<sup>2+</sup> interaction of the prepared nanoparticles. In addition, there is a large optical band gap energy has observed for pure SnO<sub>2</sub> nanoparticle rather than Ni doped SnO<sub>2</sub> nanoparticles. From the AC impedance analysis, it is observed that, when Ni is added to the pure SnO<sub>2</sub> nanoparticles the conductivity is decreased rather than pure tin oxide nanoparticles. It indicates that the prepared pure SnO<sub>2</sub> nanoparticles have been in conductor nature. The pure tin oxide gives high conductivity when compared to Ni doped SnO<sub>2</sub> nanoparticles. Hence, the SnO<sub>2</sub> quantum dots would be promising material for gas sensor, solar cell and optoelectronic device applications.

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**Conflict of interest**

There is no conflict of interest

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## **28. TELLING INDIA OTHERWISE: NARRATIVE MEDIATION AND GLOBAL LEGIBILITY IN ARAVIND ADIGA'S FICTION**

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### **Abstract:**

Aravind Adiga's fiction relentlessly disrupts the official narratives of "shining India" by bringing to the centre stage the lives of servants, migrants, failed sportspeople, and marginalized urban subjects. This paper, "Telling India Otherwise: Narrative Mediation and Global Legibility in Aravind Adiga," discusses how Adiga builds up counter-narratives of India that defy nationalist triumphalism and neoliberal optimism. At the heart of this project is narrative mediation: the strategies by which Adiga makes subaltern lives knowable, comprehensible, and engaging to a world readership. From epistolary confessions by Balram Halwai in *The White Tiger* to migrant testimony framed in pieces by Danny in *Amnesty*, Adiga selects narrative conventions that explain and stage Indian realities for readers habitually positioned elsewhere in India. By placing these texts in the context of postcolonial representation debates, world literature markets, and the "legibility" of the Global South, the paper contends that Adiga holds a contradictory position: he raises occluded or muted voices, but at the same time encases them in modes—satire, confession, melodrama—that appeal to global expectations of postcolonial fiction. This disjuncture between resistance and readability is the core of Adiga's narrative habit. In the end, the essay argues that Adiga "tells India otherwise" by offering counter-narratives of inequality, corruption, and moral struggle, yet remaining deeply implicated within the politics of global circulation and recognition.

**Keywords:** Postcolonial literature, Narrative mediation, Global literary markets, Subaltern representation, Transnational readership.

### **Introduction**

Over the last two decades, the international imagination of India has been increasingly driven by the discourse of "India Rising"—the narrative of high-speed economic growth, technological sophistication, and integration into the world. State and popular discourses alike tend to paint India as a tale of achievement, resonating with neoliberal imaginations of progress and modernization. But literature has always served as a counter-narrative to such congratulatory accounts, revealing the contradictions and omissions on which they are based. Aravind Adiga is one of the Indian English novelists of recent times who consciously "tells India otherwise," bringing lives and experiences to the forefront that disrupt the myth of unilinear progress.

Adiga's work—starting with his Booker Prize-winning novel *The White Tiger* (2008), followed by *Last Man in Tower* (2011), *Selection Day* (2016), and *Amnesty* (2020)—presents a persistent critique of neoliberal India and its peripheries. Each of the novels highlights characters who occupy unstable spaces: Balram Halwai, the servant-entrepreneur narrator of India's inequalities in scathing satire; Masterji, the schoolteacher fighting back against urban renewal; Radha and Manju, young cricketers caught up in the gears of sports capitalism; and Danny, the undocumented worker in Sydney navigating invisibility and survival. These numbers are also narrative filters through which Adiga reframes India and diasporic offshoots from viewpoints usually left out of majority narratives.

Two useful concepts organize the analysis in this paper: narrative mediation and global legibility. Narrative mediation involves the techniques through which Adiga frames his novels—letters, confessions, testimonies, satire—such that local conditions of poverty, corruption, and marginality can be made intelligible to multiple audiences. Global legibility, on the other hand, is the process by which these mediated narratives move out and become understandable within global literary economies and readerships (Huggan 2001). Together, these ideas point to the paradox of Adiga's fiction: while his novels deflect nationalist triumphalism by giving voice to marginalized voices, they are also defined by genres that guarantee worldwide accessibility. This paper contends that Adiga weaves counter-narratives of India that subvert prevalent representations of success and flourishing, but that are inextricably involved in the politics of global circulation. His fiction thereby instantiates the double imperative of postcolonial literature: to speak otherwise and remain readable across borders.

### Discussion

The hegemonic "India Rising" discourse places in the foreground a tale of booming development, IT parks, skyscrapers, and global capitalism. Adiga's fiction undercuts this by recounting India from the outside, putting the subaltern, the migrant, and the common citizen at the heart of his narrative. In *The White Tiger* (2008), Balram Halwai's story is not filtered through elite voices or middle-class anxieties but told through his own confessional letters to Wen Jiabao, the Chinese Premier. This narrative choice is significant: it stages an "India" not for its own middle classes but for an international interlocutor. Balram's account "otherwise" dramatizes the rupture between India's shiny public face and the harsh realities of servants, drivers, and rural poor. His ironic tone, indulging in confession as well as self-rationalization, substitutes the myth of meritocratic achievement with the harsh reality of exploitation and corruption (Sethi 28).

In the same way, *Last Man in Tower* (2011) tells India's property boom not by developers or city planners but by Masterji, an ageing schoolteacher who resists selling his flat in a building destined for demolition. The struggle between Masterji and his neighbours sets the stage for the moral fault lines below the triumphalist discourse of "modern Mumbai." Here, Adiga frames development not as some kind of universal good but rather as a contested process defined by dispossession, betrayal, and moral compromise (Chandra 65). By making Masterji the narrative centre, Adiga enacts the vulnerability of resistance when collective solidarity is eroded by capitalist desire.

In *Amnesty* (2020), the action goes beyond India's shores. Danny, an irregular Tamil migrant in Sydney, both disappears and becomes hyper visible: invisible to the state as a rightful inhabitant but visually surveyed at all times as a racialized body. The interesting thing here is that India is told not from within its national confines but through one of its migrants' displaced consciousness. Danny's life narrates "India otherwise" by performing how the weight of India—its inequalities, violent histories, and broken citizenship—accompanies its people. His unstable life troubles the idea of India as somehow an "emerging power," revealing instead how its citizens fight for their survival in world cities.

Together, these works shift Indian literature away from its most conventional cosmopolitan and middle-class perspectives. They foreground lives usually overlooked, excluded, or silenced. By recounting "India otherwise," Adiga reminds us that the narrative of national achievement is not complete until the unseen, the excluded, and the dispossessed are heard. Whereas Adiga's novels displace official narratives of modernity, they also depend on narrative techniques that translate these experiences for a transnational public. His fiction is cultural translation, providing foreign readers with access to India's contradictions in carefully crafted forms.

The confessional narrative mode is the most jarring instance of narrative mediation in *The White Tiger*. Balram's letters to Wen Jiabao serve a twofold purpose: they present an insider's view of India's social hierarchies while, at the same time, interpreting these hierarchies for an imagined international audience. This is what Gayatri Chakravorty Spivak refers to as "strategic essentialism," a rhetorical device that reduces cultural realities for purposes of communication without eliminating

their complexity (Spivak 13). Balram's sarcastic and humorous voice immerses readers in his universe even as it sets up the untranslatability of cultures.

Adiga's satirical and humorous tone across his novels also narrows cultural distance. In *The White Tiger*, corruption is presented with a black irony that repels and delights. In *Last Man in Tower*, betrayals by neighbours are told in nearly comic hyperbole, showing how greed eats into communal ties. Humour in this case serves as a narrative tool that converts dark social realities into legible and palatable stories for readers from around the world. According to Graham Huggan in *The Postcolonial Exotic*, postcolonial authors tend to navigate a space of resistance and accommodation to Western expectation, making texts that are "familiar enough to be marketable but strange enough to be exotic" (Huggan 30). Adiga's satire works exactly at this point of tension.

In *Amnesty*, Adiga takes up the voice of the migrant, one that is local and global simultaneously. Danny's existence in Sydney is filled with the uncertainty of undocumented migrants everywhere—precarity, deportation anxiety, and invisibility. But his Tamil roots, his recollections of Sri Lanka and India, and his dealings with white Australian society place him in particular transnational histories. His voice brokers these spaces for readers who may see the universal condition of migration, even if not specifically his own. Likewise, *Selection Day* (2016) takes cricket, a sport deeply rooted in South Asia but with global recognition as well, as the narrative vehicle. Cricket is a space where Indian aspiration, family stress, and global consumerism intersect. For international readers, cricket functions as a familiar spectacle through which to understand Indian aspirations; for local readers, it grounds the novel in the textures of everyday life. Arjun Appadurai's notion of "global cultural flows" is useful here, as cricket operates as a medium of both global legibility and local specificity (Appadurai 32). Therefore, Adiga's narrative strategies—confession, satire, humour, migrant voice, and global spectacle—are not accidental but organic to the ways his novels circulate. They allow narratives of India's margins to be made legible, readable, and consumable globally. Simultaneously, they bring out the contradiction of postcolonial literature: to counter canonical narratives of progress, it has to make itself visible in global literary markets as well.

Adiga's worldwide popularity raises urgent issues of representation and legibility. On the one hand, his books bring hidden lives into visibility, locating servants, slum-dwellers, and migrants on the global literary map. On the other hand, his use of some tropes—corruption, slums, exploitation—threatens to reinforce stereotypes about India for Western audiences. It is this double-edged movement that lies at the heart of Adiga's status as a global writer. The global reception of *The White Tiger* shows this tension. Winner of the Man Booker Prize in 2008, it was hailed for its unvarnished portrayal of India's "dark side." Western critics tended to compliment the novel for exposing corruption and discrimination, but Indian reviewers sometimes charged that Adiga had gone too far in catering to Western perceptions by emphasizing poverty and violence (Ghosh 91). The text thus exemplifies what critics call the "global legibility paradox": the very qualities that grant visibility to marginal lives may also reduce them to consumable stereotypes.

*Last Man in Tower* and *Amnesty* extend this tension in different ways. While *Last Man in Tower* critiques Mumbai's real estate frenzy, it still relies on the recognizable trope of urban greed, a narrative easily digestible for global audiences familiar with neoliberal critiques. *Amnesty*, though, makes the narrative more complicated by moving the action to Australia. India here is not described as a slum nation but as a source that pursues its migrants. Danny's invisibility as an illegal worker recasts the issue: rather than depicting India as corrupt, Adiga depicts how world systems exploit migrant vulnerability. And even so, here the migrant's condition becomes a familiar figure in world literature—Spivak's term, the "native informant," whose pain is filtered for the sake of others' understanding (Spivak 6).

There are disagreements among critics about whether Adiga finally resists or reinforces stereotypes. On one hand, his books indisputably subvert the triumphalist story of India's ascension by placing its inequalities at the centre stage. On the other hand, they travel within a literary economy where accounts of slums, corruption, and precarity are what define the Global South. Huggan's "postcolonial exotic" model comes into play once more: Adiga's accounts, even when they are critical,



become part of a commodity-friendly repertoire of "Third World difference" (Huggan 38). But to reduce Adiga to simply catering to global markets would be reductionist. His novels are also deeply ethical, probing the costs of development, the fragility of community, and the moral ambiguities of survival. Masterji's resistance, Balram's confession, and Danny's fear—all point to the irreducible complexity of human experience beyond stereotype. As scholars such as Elleke Boehmer argue, postcolonial writers often inhabit this ambivalent space, negotiating between resistance and recognition in unequal global circuits (Boehmer 102).

Ultimately, Adiga's fiction is the embodiment of the paradox of global legibility: it speaks India otherwise by voicing its margins, but in the process, risks reiterating the very images it wants to critique. Such tension is not an imperfection but a predicament of postcolonial writing in the era of globalization. Adiga's work reminds us that narrative mediation is a double bind: necessary for visibility and replete with ethical imperatives.

### Conclusion

Aravind Adiga's fiction discloses the contradictory pressures on modern Indian English literature: the requirement to represent India otherwise, from the perspective of its margins, and at the same time to make such narratives transnationally readable. Across his oeuvre—from Balram Halwai's letters in *The White Tiger* to Masterji's defiance in *Last Man in Tower*, from Danny's migrant precarity in *Amnesty* to the cricket-fueled ambitions of *Selection Day*—Adiga resists the triumphalist discourse of "India Rising." His novels foreground servants, teachers, migrants, and strivers, characters who embody the exclusions beneath the nation's success story. In so doing, he discomfits homogenized visions of India as either radiant world power or eternal foreign land. But, as has been demonstrated in this study, Adiga's counter-narratives are always mediated. They are forged through narrative devices—confession, satire, humour, spectacle—that make them readable to global publics.

Narrative mediation is not merely a matter of style; it is a requirement of circulation within the global literary marketplace. The confessional tone in *The White Tiger*, the cartoonish hyperbole of *Last Man in Tower*, and the migrant's transnational perspective in *Amnesty* all act as go-betweens between India's unpalatable realities and those of non-Indian readers. Adiga's novels, therefore, inhabit a border space: they render local realities into globally readable forms without dissolving their contradictions. Tensions accompany this mediatory role. The same attributes that earn Adiga's place on the international literary circuits stand to reinforce familiar stereotypes of India—migrant illegality, corruption, inequality—that audiences in the West anticipate. Critics of *The White Tiger* long have argued that part of the novel's global popularity came from its convergence with familiar tropes of the "Third World novel." *Amnesty* similarly stands to reduce migrant experience to criminality and fear, even as it humanizes Danny's moral complications. These tensions do not undermine Adiga's project but highlight the complexity of it: to narrate India otherwise is also to take up the contested terrain in which resistance and recognition converge. What results is a reading of Adiga as a writer who lives within the contradictions of postcolonial writing in the era of globalization. His writings challenge the nationalist narrative of advancement by focusing on peripheral lives, but they also acknowledge that those histories need to be made readable to people beyond India. This indecision does not detract from the merits of his writing; rather, it places him in the negotiated settlement between authenticity, exposure, and marketability that shapes much of postcolonial literature today.

Ultimately, Adiga's fiction forces us to re-imagine both India's narrative and the terms upon which that narrative is narrated. It is not only to narrate India "otherwise," then, but to interrogate how these counter-narratives are disseminated within the world imagination. His novels are a reminder that world literature is not merely about national representation, but about the uncomfortable co-operation of voice, mediation, and listenership. Adiga's success is exactly in occupying this uncomfortable space, making visible what is not seen, yet laying bare the compromises that this visibility involves.

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## 29. A STUDY ON FUTURE OF ARTIFICIAL INTELLIGENCE AND ITS TRANSFORMATIVE IMPACT ON SOCIETY

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Artificial intelligence (AI) is quickly evolving from limited, task-oriented systems to more autonomous and intelligent functionalities, placing humanity on the brink of significant technological change. In the coming twenty years, AI is expected to reach human-level capabilities in various cognitive areas, suggesting the possible arrival of artificial general intelligence (AGI). These advancements may transform human-machine interactions by facilitating improved reasoning, creativity, scientific discovery, and effortless blending of robotics with Internet of Things ecosystems.

The impactful advantages of adopting AI extend across various sectors. In healthcare, AI offers potential advancements in precision medicine, diagnostics, and pharmaceutical research. Environmental uses encompass enhanced energy systems and climate strategies, whereas education could gain from tailored, adaptive learning experiences. By 2035, innovations driven by AI might add 10–15% to global GDP and tackle labor shortages in aging populations via automation. Additionally, AI-supported research can speed up scientific advancement at unmatched levels.

Nevertheless, these possibilities are matched by significant obstacles. Job displacement might impact as many as 40% of jobs, leading to economic and social issues. Algorithmic bias may worsen inequality, and widespread surveillance along with cybersecurity weaknesses jeopardizes privacy and international security. Prolonged issues like the AI alignment problem and military uses of AI also present existential threats.

To address these challenges, societies need to reform education to prioritize human-centered skills, investigate economic models such as universal basic income, and create strong ethical guidelines for AI governance. Global collaboration on safety standards, flexible regulations, and extensive workforce retraining will be vital.

Ultimately, AI symbolizes humanity's most significant chance for advancement and its most intricate governance dilemma. The decisions taken in the next ten years will shape whether AI acts as a driver for human advancement or a source of existential danger, highlighting the immediate necessity for responsible teamwork.

**Keywords:** artificial intelligence, artificial general intelligence, technological transformation, automation, AI governance, algorithmic bias, technological unemployment, AI safety, human–AI collaboration.

### 1. Introduction

The rapid advancement of artificial intelligence (AI) technologies has necessitated comprehensive research into their future trajectory and societal implications. This literature survey examines contemporary research on AI's future development, focusing on benefits, risks, and transformative impacts across multiple domains. The review synthesizes findings from recent academic papers, industry reports, and policy documents published between 2023-2025.

### 2. AI Development Trajectory and Technological Progress

#### 2.1 Current State and Growth Projections

Recent industry analyses reveal unprecedented growth in AI adoption and capabilities. McKinsey's 2023 survey indicates that generative AI has achieved significant breakthrough status, with hiring challenges for AI-related roles showing some improvement due to technology sector restructuring [1]. The UK's 2024 AI sector study demonstrates robust growth expectations, with



almost 90% of AI business representatives anticipating revenue growth within 12 months, and 58% expecting growth exceeding 50% [2].

The Stanford AI Index Report 2024 provides comprehensive metrics for AI progress measurement, highlighting the inherent challenges in quantifying AI system capabilities and impact [3]. The report identifies six summary challenges in measuring AI progress and impact, synthesizing over 40 presentations from leading researchers [3].

## **2.2 Artificial General Intelligence (AGI) Development**

The transition toward AGI represents a critical inflection point in AI development. Recent research utilizing PRISMA framework and BERTopic modeling identifies five key pathways shaping AGI's trajectory: societal integration, technological advancement, explainability, ethical considerations, and brain-inspired development approaches [4].

Systematic reviews of AGI risks emphasize that AGI represents the next generation of AI expected to exceed human intelligence across all cognitive domains [5]. Google DeepMind researchers have proposed frameworks for classifying AGI capabilities and behavior, establishing operational definitions for measuring progress toward AGI [6].

## **3. Economic and Productivity Impacts**

### **3.1 GDP and Productivity Growth Projections**

Economic modeling by the Penn Wharton Budget Model estimates that AI will increase productivity and GDP by 1.5% by 2035, nearly 3% by 2055, and 3.7% by 2075, with the strongest boost to annual productivity growth occurring in the early 2030s [7].

Stanford's 2024 AI Index Report demonstrates that AI enables workers to complete tasks more quickly and improve output quality, while potentially bridging the skill gap between low- and high-skilled workers [8].

### **3.2 Workplace Transformation**

McKinsey's 2025 workplace report identifies five key innovations driving business impact: enhanced intelligence and reasoning capabilities, agentic AI, multimodality, improved hardware innovation, and increased transparency [9]. Early 2024 surveys indicate mixed results for cost reduction from generative AI use, with HR being a notable exception where half of users reported cost reductions [10].

## **4. Risks and Security Implications**

### **4.1 National Security and Geopolitical Risks**

Leading AI researcher YoshuaBengio's 2024 analysis warns of national security threats from adversaries using AGI, including potential facilitation of mass destruction through CBRN attacks and sophisticated cyber warfare [11]. The systematic review of AGI risks emphasizes concerns about control, alignment, and potential existential threats [5].

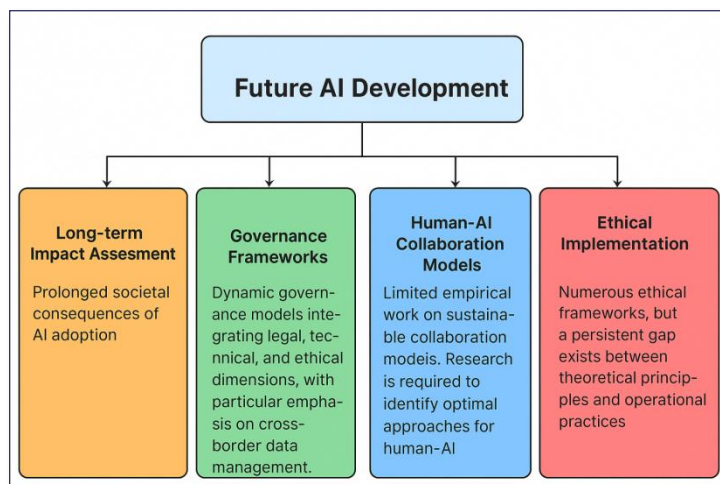
### **4.2 Trust and Autonomy Concerns**

Recent surveys reveal significant trust gaps, with only 31% of IT professionals trusting AI-driven systems for autonomous decisions without human oversight, while 44% explicitly distrust such systems [12]. Data security concerns have increased, with 85% of people taking security-related actions in the past year, up from 79% in 2023 [12].

## **5. Scientific and Healthcare Acceleration**

Anthropic CEO Dario Amodei's 2024 analysis hypothesizes that powerful AI could accelerate biological sciences research by a factor of ten, potentially creating a "compressed 21st century" where 50-100 years of innovation occurs in decades [13]. This acceleration potential represents one of AI's most promising applications for addressing global challenges.

## 6. Research Gaps and Future Directions



The rapid evolution of Artificial Intelligence (AI) has generated significant scholarly interest, yet critical gaps remain in existing literature that limit a holistic understanding of its societal, economic, and ethical implications. Addressing these gaps is essential to ensure responsible development and deployment of AI systems, particularly in the context of emerging Artificial General Intelligence (AGI).

### 6.1 Long-term Impact Assessment

Current research is predominantly concerned with short-term technological outcomes, such as automation efficiency, productivity enhancement, and economic gains. However, limited longitudinal studies exist that examine the sustained societal consequences of AI adoption. Key questions surrounding intergenerational equity, cultural transformation, employment dynamics, and human well-being remain insufficiently addressed. Future research must develop longitudinal and cross-cultural methodologies to evaluate the enduring impacts of AI on social structures and human development.

### 6.2 Governance Frameworks

While policy discussions and ethical guidelines for AI are increasing, governance research remains fragmented, reactive, and region-specific. There is inadequate exploration of adaptive, globally coordinated regulatory mechanisms capable of keeping pace with the accelerating evolution of AI technologies. Future studies should investigate dynamic governance models that integrate legal, technical, and ethical dimensions, with particular emphasis on cross-border data management, cybersecurity, and accountability in autonomous decision-making systems.

### 6.3 Human-AI Collaboration Models

Existing literature often frames AI either as a substitute for human labor or as a risk factor, with limited empirical work on sustainable collaboration models. Research is required to identify optimal approaches for human-AI partnerships across diverse domains, including education, healthcare, industry, and creative sectors. Critical questions include how to establish trust, define role allocations, ensure explainability in AI-assisted decisions, and address the psychological and cognitive effects of prolonged human-AI interaction.

### 6.4 Ethical Implementation

Although numerous ethical frameworks have been proposed, a persistent gap exists between theoretical principles and operational practices. Current literature lacks detailed, context-specific guidelines for mitigating algorithmic bias, ensuring transparency, and safeguarding privacy. Moreover, mechanisms for enforcing accountability in autonomous systems remain underdeveloped.

Future research should adopt an interdisciplinary approach, integrating insights from computer science, law, ethics, and sociology to design implementable ethical protocols.

### 6.5 Future Research Directions

Recent studies underscore the urgent need for robust governance frameworks and ethical standards to address decision-making, accountability, and data privacy in AGI development [14]. Building on these insights, future research should prioritize three areas: (i) establishing scalable and enforceable global governance structures, (ii) developing interdisciplinary methodologies for responsible AI integration, and (iii) creating evaluation mechanisms that measure both benefits and unintended consequences of AI adoption. Addressing these gaps will be crucial in steering AI toward outcomes that are not only technologically innovative but also socially equitable, ethically grounded, and globally sustainable.

### 7. Conclusion

The literature demonstrates consensus on AI's transformative potential across economic, scientific, and social domains, while highlighting significant risks requiring proactive management. Research indicates AI is progressing at unprecedented rates, reaching and surpassing human capabilities in many previously challenging tasks [15]. The convergence of technological advancement, economic impact, and security concerns necessitates interdisciplinary research approaches and international cooperation frameworks.

Future research priorities should focus on developing robust governance mechanisms, advancing AI safety research, and creating adaptive frameworks for managing AI's societal integration while maximizing benefits and minimizing risks.

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### **30. CONSUMPTION AND USAGE PATTERN OF GREEN LEAFY VEGETABLES IN SIVAKASI BLOCK**

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#### **Introduction:**

Green leafy vegetables (GLVs) are among the most important sources of essential nutrients, including vitamins such as A, C, and K, minerals like iron, calcium, and magnesium, dietary fiber, and important phytochemicals that offer various health benefits. They play a significant role in preventing micronutrient deficiencies such as iron deficiency anemia, which continues to be a serious public health issue in India, especially in rural and semi-urban areas. Despite their well-recognized benefits, the consumption of GLVs shows a highly variable pattern, influenced by multiple factors including socio-economic status, cultural practices, accessibility, seasonal availability, awareness, and dietary habits.

Sivakasi Block, situated in the southern region of Tamil Nadu, is particularly known for its industrial activities, with firecracker production, printing, and matchstick manufacturing forming the backbone of the local economy. A large proportion of the population in this area is engaged in manual labor and small-scale industrial employment. The demographic structure of the block largely consists of rural households, many of which face significant economic constraints. As a result, the purchasing power of these families is limited, and food choices are strongly influenced by affordability and immediate energy needs. Most families tend to prioritize staple, energy-dense foods such as rice, millets, and pulses as the core part of their diet, while green leafy vegetables are often considered secondary or optional components of meals.

Although the region offers a variety of GLVs such as spinach (keerai), amaranth leaves (thandukeerai), fenugreek (vendhayakeerai), drumstick leaves (murungaikeerai), coriander leaves (kothamallikeerai), and curry leaves (karuveppilai), their regular consumption is inconsistent and irregular. These vegetables are commonly available in local markets and sold by small-scale vendors, and many households grow a few varieties in their own kitchen gardens. However, the availability of these vegetables is highly seasonal. Some types of GLVs are available only during specific months, while others have a shorter shelf life due to their perishable nature. This leads to challenges in purchasing and storing them, particularly because cold storage facilities are inadequate in rural areas. As a result, many households are reluctant to buy these vegetables in large quantities, fearing spoilage and waste.

The cost of GLVs also fluctuates considerably depending on the season. During off-season periods, the prices rise significantly, making them relatively expensive for low-income families. Given such fluctuations, many families deprioritize green leafy vegetables in favor of more affordable and energy-rich foods that provide immediate sustenance. Consequently, the overall quantity of GLVs consumed per person per day in Sivakasi Block remains significantly lower than the recommended dietary allowance (RDA) for essential micronutrients.

Cultural habits and traditional dietary practices further influence the pattern of GLV consumption. In many households, green leafy vegetables are used only occasionally, often in small quantities and mainly as flavoring agents or side dishes rather than as key components of meals. These vegetables are typically included during festivals, religious events, or special family gatherings rather than as a regular part of everyday meals. Additionally, the taste preferences of adults and children alike often discourage frequent use of these vegetables, especially varieties with a bitter taste. This leads to their neglect despite awareness of their general health benefits.

The methods of preparation and cooking prevalent in the region also contribute to the problem. Prolonged boiling of green leafy vegetables is a common practice, which leads to significant nutrient loss, particularly of sensitive vitamins and iron. Many families are unaware of cooking techniques that better preserve the nutrient content, such as minimal cooking or steaming. As a result, even when GLVs are consumed, their contribution to improving nutritional status remains limited.

One of the most significant barriers to regular consumption of green leafy vegetables in Sivakasi Block is the lack of awareness about their nutritional importance, especially in preventing and managing micronutrient deficiencies like iron deficiency anemia. Although public health programs promote balanced diets and nutrition education, their reach and effectiveness have been limited in rural areas such as Sivakasi. Many households do not fully understand the role that green leafy vegetables play in preventing anemia, supporting child development, strengthening immunity, and promoting general well-being. Health education programs have largely focused on maternal and child health, immunization, and sanitation, while the significance of micronutrient-rich foods has remained underemphasized.

The absence of reliable, local sources of information further compounds the issue. Village-level health workers and community outreach programs generally focus on curative health rather than preventive nutrition practices. Therefore, many families continue to rely on traditional diets that lack variety and nutritional adequacy, perpetuating cycles of undernutrition and poor health outcomes.

The inadequate consumption of green leafy vegetables has serious health implications in the region. Iron deficiency anemia is among the most common nutritional problems, affecting a large proportion of women of reproductive age, children, and adolescents in Sivakasi Block. The consequences of iron deficiency anemia include chronic fatigue, reduced cognitive ability, poor concentration, weakened immunity, and higher risks during pregnancy such as low birth weight, premature delivery, and increased maternal mortality. Children who do not regularly consume GLVs often experience stunted growth, developmental delays, and higher vulnerability to infections. These health challenges translate into a larger economic burden, with increased healthcare expenses, decreased productivity of the workforce, and rising absenteeism affecting household income and local economic development.

To address these complex challenges, innovative strategies are required that do not rely solely on supplementation or fortification but integrate sustainable solutions into everyday diets. The study titled “Development and Standardization of Green Leafy Vegetables Incorporated Iron-Rich Food Products” is designed as a practical and scalable intervention to improve the consumption of GLVs in Sivakasi Block. The study seeks to develop iron-rich food products that incorporate green leafy vegetables in a way that is easy to prepare, culturally acceptable, affordable, and palatable.

By integrating GLVs into commonly consumed food products such as biscuits, snacks, breads, and ready-to-eat meals, the study aims to increase the daily intake of non-heme iron and other essential nutrients without requiring significant dietary changes from the population. These food solutions are designed to fit seamlessly into the current dietary habits of the people of Sivakasi Block, removing barriers related to taste, cost, and preparation time. The standardized nature of these food products ensures consistent nutritional content, taste, and shelf-life, which are essential for consumer trust and large-scale adoption.

The study emphasizes the use of locally available green leafy vegetables like spinach, fenugreek, and amaranth, which support sustainable agriculture and the local economy. Incorporating locally sourced ingredients reduces costs and promotes environmental sustainability, as GLVs require fewer resources compared to animal-based sources of iron. Furthermore, the study explores complementary ingredients and processing techniques that enhance the bioavailability of non-heme iron. For example, combining GLVs with sources of vitamin C during food processing helps increase iron absorption, while minimizing inhibitors such as phytates that reduce iron uptake.

This approach contributes to the broader goals of improving public health nutrition by promoting dietary diversity, reducing micronutrient deficiencies, and ensuring food security in a



sustainable manner. Unlike short-term solutions such as iron supplementation, which requires continuous external intervention, promoting GLV-based food products offers a long-lasting, culturally appropriate strategy that empowers individuals to improve their own health through everyday dietary choices.

Successful implementation of this study would represent a significant step toward reducing the prevalence of iron deficiency anemia in Sivakasi Block and similar rural communities. It would provide an affordable, easy-to-use solution that can be adopted widely, especially among vulnerable groups such as pregnant women, children, and low-income families. Standardizing these food products also enables scalability, allowing their production at a larger scale and distribution beyond local markets, reaching a wider population.

In the long term, improving the consumption pattern of green leafy vegetables in Sivakasi Block contributes not only to better individual health outcomes but also to the economic stability and social well-being of the community. Healthier individuals are more productive and better able to participate in education and work, which strengthens families and communities. Reduced prevalence of anemia lowers healthcare costs and lessens the economic burden on families and government resources.

Ultimately, addressing the low consumption of green leafy vegetables is not merely a matter of individual choice but a public health priority that requires integrated efforts involving nutrition education, food innovation, market accessibility, and policy support. The development and standardization of GLV-incorporated iron-rich food products represent a sustainable and impactful solution that can bridge the gap between nutrition awareness and actual dietary practices. Through this study, there is potential to significantly enhance the nutritional well-being of the population in Sivakasi Block, paving the way for a healthier and more resilient society.

### **Objectives**

- To analyse the availability of green leafy vegetables in sivakasi residents.
- To analyze the frequency of consumption green leafy vegetables in sivakasi residents.

### **Review of Literature**

Green leafy vegetables (GLVs) are an essential component of a healthy diet due to their rich nutritional profile. They provide an abundant source of vitamins such as beta-carotene (vitamin A), ascorbic acid (vitamin C), riboflavin (vitamin B2), and folic acid, as well as key minerals like calcium, iron, and phosphorus. These vegetables are not only inexpensive and widely available but also highly beneficial for human health, particularly in developing countries where they serve as a vital source of nutrients for the population. India, with its diverse climatic conditions, boasts a wide variety of locally available GLVs, including spinach, amaranth, fenugreek, drumstick leaves, cabbage and cauliflower leaves.

In addition to their rich vitamin and mineral content, GLVs are also valuable sources of dietary fiber, which plays a crucial role in maintaining digestive health and preventing various chronic diseases. The micronutrient content of these greens is especially significant for preventing deficiencies, such as iron deficiency, which is prevalent in many regions. These vegetables are low in energy and calories, making them ideal for weight management and supporting overall health.

Moreover, certain GLVs are used for their flavor as leafy spices, such as curry leaves, coriander, and mint, adding variety and taste to local diets. Their protective health benefits are attributed to the presence of antioxidants and phytochemicals that help combat oxidative stress and inflammation. Despite their widespread availability, many of these greens remain underutilized, and there is a growing need to raise awareness about their nutritional potential, particularly among younger generations. By incorporating more GLVs into the diet, we can improve public health and combat malnutrition, especially in rural areas where access to a diverse range of nutrients may be limited. (Deepak Kumar, Satendra Kumar and Chandra Shekhar, 2020)

Traditional Leafy vegetables play an important role as a food source in rural areas and they are available all year. Green Leafy Vegetables are commonly thought to be the cheapest source of food for supplementing vitamins and micronutrients to reduce nutrient deficiencies. It's also used as a herbal and medicinal plant for a variety of ailments in various cultural; and traditional settings. Anti-nutritional factors in green leafy vegetables, mainly nitrates, oxalates, phytates, cynogenic glycosides and tannins may interfere with micronutrient absorption and makes them inaccessible. Pre-consumption thermal processing of leafy vegetables such as boiling, frying and blanching helps to minimize anti-nutrient levels. (V. Thakur, D. Mal, K. Soga, A. Gandhi, 2022).

Green Leafy Vegetables are very nutrient- dense and incredibly healthy. They are vital sources of antioxidants and they are the best which are very beneficial to providing weight loss and maintenance, because it keeps you feeling full and helps control your hunger. Also, leafy vegetables are full of fiber, vitamins, minerals and substances that help protect you from disease. For this choose five types of vegetables which are lettuce, cabbage, parsley, spinach and arugula to estimate some nutritional values present on them such as: carbohydrate (sucrose, fructose, glucose and starch), protein, amino acids, vitamin C and lipid. (Settaluri, Kholood Mohammed Khalaf Al-Mamari, Salwa Ibrahim Mohammed Al-Balus, 2015)

### **Methodology**

#### **Selection of Area**

Sivakasi, located in the Virudhunagar district of Tamil Nadu, is widely known as the "fireworks capital" of India. The town is home to a large population engaged in the firecracker industry, which forms the primary source of employment for many families in the region. However, the demanding nature of firecracker work, along with socio-economic constraints, often impacts the dietary habits and nutritional status of workers in this industry. Among the various food groups, the consumption of green leafy vegetables (GLVs), which are rich in essential vitamins, minerals, and dietary fiber, plays a crucial role in ensuring a balanced diet. Despite their known health benefits, the consumption of GLVs in Sivakasi has not been extensively studied, particularly in the context of firecracker workers.

This study aims to examine the consumption pattern of green leafy vegetables among the workers in Sivakasi Block, focusing on factors such as frequency of consumption, types of vegetables consumed, and the barriers preventing their inclusion in the diet. Green leafy vegetables, such as spinach, amaranth, fenugreek, and coriander, are essential sources of nutrients like iron, calcium, vitamin C, and folate, which are vital for maintaining overall health, especially for individuals engaged in physically demanding labor. The current study was a pilot study which was conducted on women of different age group in Raipur city.

#### **Selection of Sample**

This study was conducted on 100 women between ages group of 15 to above 45 years. All the samples were selected randomly from the various areas of Sivakasi. It was categorized in 2 zones: Town area and village area. Care was taken while selecting samples. It was ensured that samples should be selected in equal number from each zone as 50/50.

#### **Data Collection**

The study was carried out from July to August 2023, involving a diverse sample of participants from various occupations and economic backgrounds. The selection criteria for participants included a willingness to share their personal experiences. Based on initial discussions with the women, a structured interview schedule was created. Prior to the interview, participants provided written consent. Those who agreed to participate were given the interview schedule. The pretested interview schedule consisted of 32 questions, both open-ended and closed-ended, designed to evaluate participants' knowledge of Green Leafy Vegetables (GLVs). These 32 questions covered key themes, including: 1) Demographic details, 2) Knowledge of GLVs, and 3) Attitudes towards GLV consumption.

### Statistical Analysis

All the results were statistically analyzed by using percentage, Frequency and cumulative frequency.

#### Results:

The results are discussed under three heads namely 1) knowledge about GLVs, 2) attitude towards consumption of GLVs.

#### IV.1. Knowledge about GLVs

##### Awareness of Green Leafy Vegetables:

The knowledge and awareness of Sivakasi residents about the nutritional significance of green leafy vegetables are presented in Figure 1. The data indicates a concerning gap in understanding, with 58% of the population lacking adequate knowledge regarding the nutritional value and proper utilization of green leafy vegetables. This majority of individuals are either unaware of the health benefits or are not familiar with appropriate cooking methods to retain the vegetables' nutrient content.

On the other hand, 42% of the population demonstrates a satisfactory level of awareness. These individuals are knowledgeable about the nutritional importance of green leafy vegetables and understand how to cook them effectively to preserve their health-enhancing properties.

This disparity in awareness highlights the need for community-focused educational programs and awareness campaigns to bridge the knowledge gap, encouraging more people to include green leafy vegetables in their diets and adopt cooking practices that maximize their nutritional benefits.

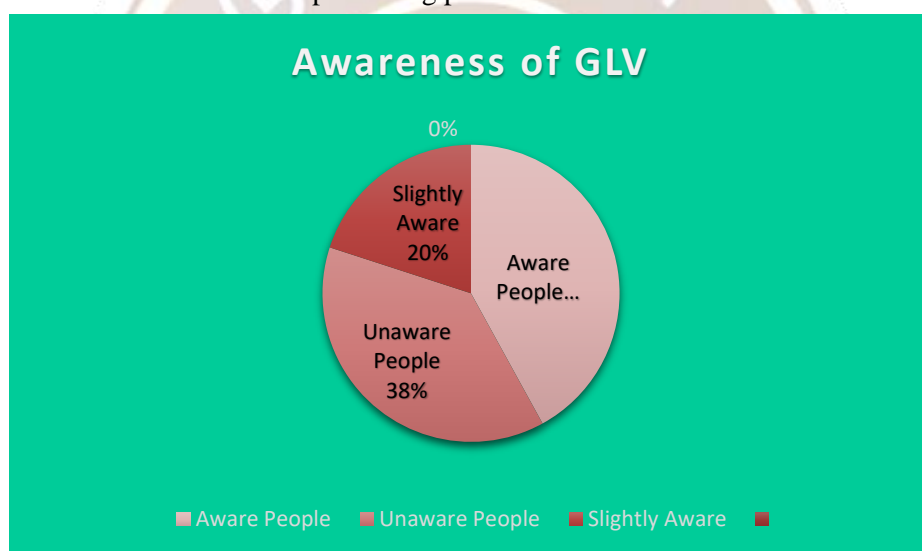


Figure I

#### IV.2. Attitude towards Consumption of GLVS.

##### Family Preferences for Consuming Green Leafy Vegetables:

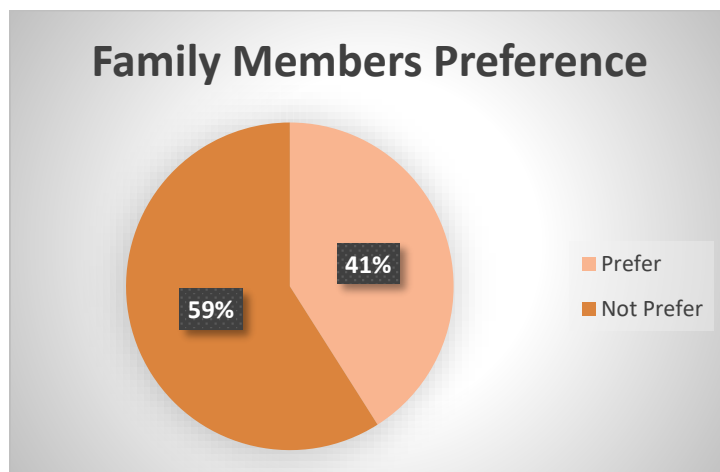
In many families, green leafy vegetables are a source of debate at the dinner table. Adults often prioritize their consumption for health, while younger members might avoid them due to their distinctive taste. Figure 2 provides insight into the preferences of family members regarding the consumption of green leafy vegetables (GLVs). The data reveals that 41% of the residents are willing to incorporate GLVs into their regular diet, recognizing their importance in maintaining a healthy lifestyle. These individuals likely value the nutritional benefits of GLVs, such as their richness in vitamins, minerals, and antioxidants, which contribute to overall well-being.

However, a significant 59% of the population is reluctant to include GLVs in their daily diet. This resistance could stem from a variety of reasons, including a lack of awareness about their nutritional value, taste preferences, difficulties in preparation, or misconceptions about their benefits.



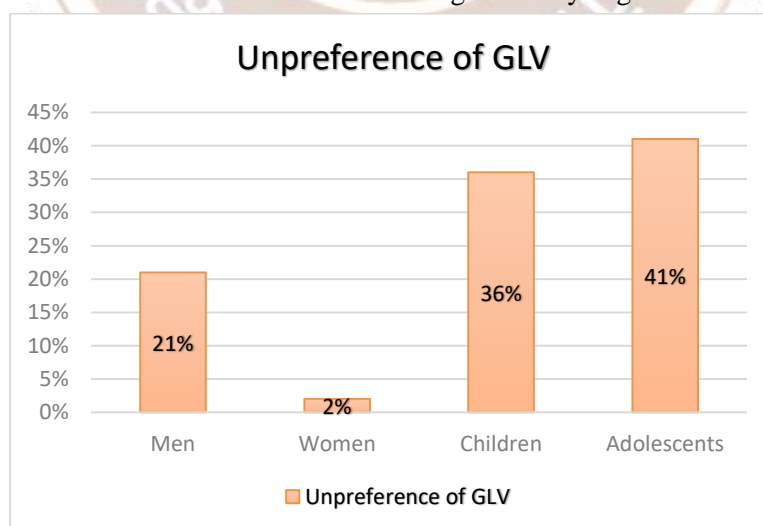
Cultural and familial influences might also play a role in shaping these preferences, with some individuals avoiding GLVs due to ingrained habits or alternative dietary choices.

Addressing these barriers through awareness campaigns, educational programs, and creative culinary approaches can help encourage broader acceptance of green leafy vegetables, ensuring more families can enjoy their numerous health benefits.



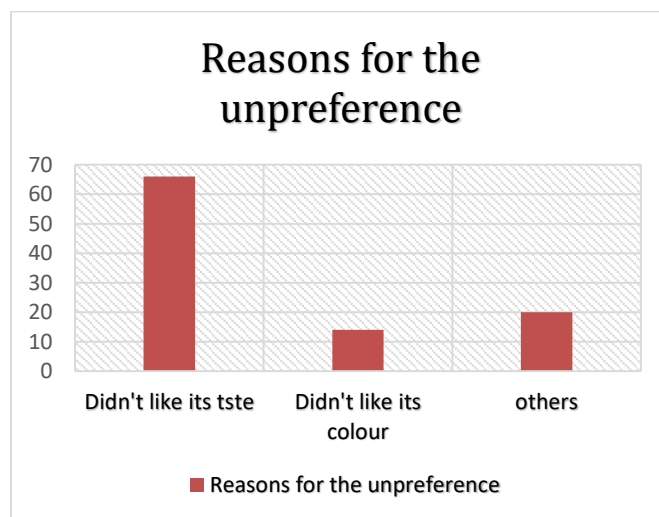
**Figure 2**

Figure 3 illustrates the percentage of individuals in different demographic groups—men, women, children, and adolescents—who are not inclined to consume green leafy vegetables (GLV). A relatively small proportion of men (21%) show unpreference towards GLVs. This indicates that a majority of men are either neutral or positive about including green leafy vegetables in their diet. Women demonstrate the lowest level of unpreference, with only 2% avoiding GLVs. This suggests that women are the most likely group to consume green leafy vegetables, possibly due to higher nutritional awareness or greater involvement in dietary decisions. Children show a higher level of unpreference, with 36% not favoring GLVs. This might be due to taste preferences, lack of familiarity, or their preference for more palatable foods. Adolescents have the highest percentage of unpreference at 41%. This could be attributed to factors such as peer influence, dietary habits favoring fast foods, or a general dislike for the taste or texture of green leafy vegetables.



**Figure 3**

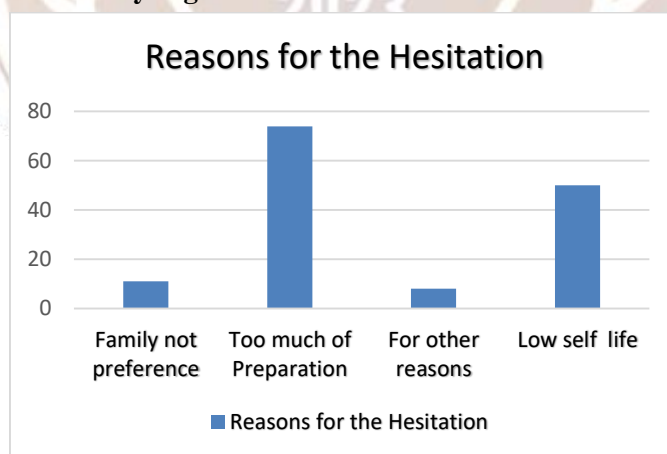
### Reasons for the Unpreference



**Figure 4**

Above Figure 4 titled "**Reasons for the Unpreference**" highlights the primary reasons why individuals avoid consuming green leafy vegetables (GLVs). The most significant reason for unpreference is the taste of GLVs, with around 70% of individuals citing this as the main factor. This indicates that the flavor profile of GLVs is not appealing to a large portion of the population, making taste a critical barrier to their consumption. A small percentage of individuals (approximately 10%) avoid GLVs due to their color. This reason may stem from a psychological association between the green color and unappetizing or bitter food. About 20% of respondents provided miscellaneous reasons under the "Others" category. These could include factors like texture, difficulty in preparation, lack of familiarity, cultural preferences, or even myths about the health impact of GLVs.

### Hesitate to cooking Green Leafy vegetable:

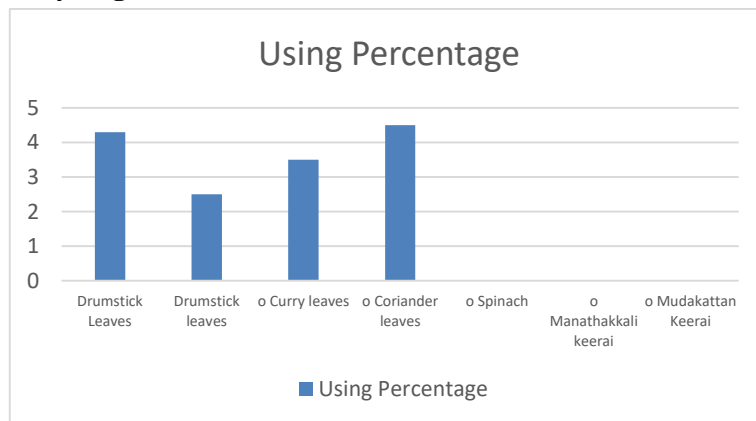


**Figure 5**

The bar chart titled "Reasons for the Hesitation" presents data on various factors contributing to hesitation, possibly in a decision-making or product adoption context. Family not preference accounts for a small proportion of hesitation, as indicated by the low bar height. It suggests that family-related preferences are not a significant concern for most people. Too much of Preparation is the most significant factor for hesitation, with the highest bar on the chart. It implies that the preparation process is considered overwhelming or excessively demanding by a majority. For other reasons is relatively minor, showing that only a small number of respondents cited miscellaneous or

unspecified reasons for hesitation. Low self-life is also substantial, with the second-highest bar. It indicates that concerns about short shelf life or durability strongly influence hesitation.

**Available Green Leafy Vegetables:**



**Figure 6**

Here is a table presenting the leafy greens along with their respective using percentages by sivaksi block residents:

Leafy Green	Percentage (%)
Drumstick Leaves	52%
Curry Leaves	15%
Coriander Leaves	50%
Spinach	38%
Manathakkali Keerai	25%
Mudakattan Keerai	35%
Mulai Keerai	40%
Sigappu Mulai Keerai	25%
Pirandai Keerai	20%
Ponnangkanni Keerai	48%
Pudina Ilai	35%
Siru Keerai	26%
Venthaya Keerai	30%
Vallarai Keerai	40%
Thoothuvalai Keerai	45%
Kasini Keerai	15%
Paruppu Keerai	35%

**Table 1**

**Conclusion:**

Leafy vegetables are excellent sources of essential minerals such as iron, calcium, potassium, and magnesium, as well as vitamins A, C, E, K, and several B vitamins. Regular consumption of these vegetables can significantly enhance the micronutrient intake of individuals. Additionally, they contain beneficial phytonutrients that help neutralize harmful free radicals produced during metabolic processes, playing a crucial role in the prevention of various chronic diseases. However, the current study shows that the availability and consumption frequency of green leafy vegetables remains low. To address this issue and encourage greater consumption among children and adolescents, it is



essential to introduce innovative food products that incorporate green leafy vegetables, making them more attractive to the younger population. Furthermore, educational intervention programs in sivakasi communities can help increase awareness of the nutritional benefits of these vegetables, ultimately boosting their intake and improving overall health.

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## **31. A STUDY ON CUSTOMER PREFERENCE TOWARDS CONSUMPTION OF ORGANIC FOODS IN SIVAKASI**

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### **Abstract**

Organic food promotes a balance of human, other living organisms and the nature. It also promotes no artificial preservatives and best maintain the originality of food. This prevents excess use harmful ingredients and thereby ensures health. In simplest words, organic food is minimally processed to maintain the integrity of the food without artificial ingredients, preservatives or irradiation. Organic products are obtained by processes friendly to the environment. For this study is attempted to “**A STUDY ON CUSTOMER PREFERENCE TOWARDS CONSUMPTION OF ORGANIC FOODS IN SIVAKASI**”.

**Key Words:** Organic food, Customer Preference, Consumption

### **Introduction**

Organic products have become very popular in many parts of the world. As the demand for organic food increases so does the production, but currently the demand still exceeds the supply. Organic foods are those that are produced using environmentally sound methods that do not involve modern synthetic inputs such as pesticides and chemical fertilizers, do not contain genetically modified organisms, and are not processed using irradiation, industrial solvents, or chemical additives. Organic food is produced by farmers who focus on using reusable resources and to conserve the soil and water so that ensure environmental quality for future generations.

Organic products refer to food items that are produced, processed and packaged without using chemicals. Organic is increasingly becoming popular due to its perceived health benefits over conventional food. The industry is growing rapidly since the past five years and has caught the attention of farmers, manufactures and, above all, consumers. Organic farming practices reduce pollution conserve water, reduce soil erosion, increase soil fertility, and use less energy. It is also better for the people who harvest our food.

### **Literature Review**

**Rupesh Mervin T., and Velmurgan R., (2013), “CONSUMER PREFERENCE TOWARDS ORGANIC FOOD PRODUCTS”** for this study reveals that increasing monthly income preferred organic food consumption. As the level of awareness increases, the consumers are serious about the authenticated labelling and certification of food products.

**Rabiya Khatun and Vennila Fathima Rani., (2021), “A STUDY ON CUSTOMER PREFERENCE TOWARDS ORGANIC FOOD PRODUCTS IN CHENNAI”** for this study concluded that the government can increase the trend for consumption of organic food by increasing public awareness through various programs and advertisements in TV and other channels and further come forward to provide various loans and subsidy for organic producers.

### **Objectives of the Study**

- To study the profile of the respondents.
- To identify the attitude of the respondents towards organic food.
- To know the consumption pattern of the organic food.
- To identify the benefits of using organic food.
- To analyze the level of satisfaction towards organic food

### Scope of the Study

The research is focused on “A STUDY ON CONSUMER PREFERENCE TOWARDS ORGANIC FOODS IN SIVAKASI”. The data are collected from the consumers who prefer organic food in sivakasi. The study is analyzed to find out the consumer's preference, buying behavior, awareness and loyalty of the consumers towards organic products.

### Hypothesis

**H0:** There is a significant relationship between Educational Qualification of the respondents and Customer preference towards Customer preference organic consumption in Sivakasi.

### METHODOLOGY

#### a. Research design

Research Design is the basic framework which provides guidelines for the rest of research process. The research design followed for this study is Descriptive research design

#### b. Sources of Data

The study has mainly depended on primary data. The primary data were collected through a structured questionnaire.

#### c. Sampling Plan

The sample design is a definite plan for obtaining a sample from a given population.

**Sampling Technique** – The technique adopted for the study is non-probability sampling technique of convenience sampling.

**Sample Size** - The study has depended on primary data. Primary data were collected through a sample survey with a questionnaire. The sample size is 50 respondents for the research.

#### d. Statistical tool used

The technique used in analyzing the collected data is known as tools for analyzing data. The tool used in this study is as follows:

- Percentage analysis
- Chi-Square Test Analysis
- Weighted Average Method

### ANALYSIS AND INTERPRETATION OF DATA

**TABLE 1**  
**Age of the Respondents**

S.No.	Age	No. of respondents	Percentage
1	Less than 20 years	15	30
2	20-30 years	32	64
3	30-40 years	-	-
4	40-50 years	3	6
5	50 years & above	-	-
	Total	50	100

#### Source: Primary Data

It is observed from the table that majority of 64 percent of the respondent are belong to the age group of 20-30 years.



**TABLE 2****Gender of the Respondents**

S.NO.	Gender	No. of. respondents	Percentage
1	Male	19	38
2	Female	31	62
	Total	50	100

**Source: Primary Data**

It is observed from the table 3.2 that a majority of 62 percent the respondents is female and the remaining 38 percent of the respondent are male.

**TABLE 3****Marital status**

S.NO.	Marital Status	No. of Respondents	Percentage
1	Married	11	22
2	Unmarried	39	78
	Total	50	100

**Source: Primary Data**

It is laborious from the table 3.4 that a majority of the 78 percent of the respondent is unmarried and the remaining 22 percent of the respondents are married.

**Table 4****Educational Qualification**

S.NO.	Educational qualification	No of respondents	Percentage
1	SSLC	-	-
2	HSC	4	
3	Under Graduate	8	
4	Post Graduate	21	
5	Diploma	15	
6	Professional	2	
	Total	50	100

**Source: Primary Data**

It is observed from the table 3.3 that majorities of 68 percent the respondents are Under Graduates, 10 percent of the respondents are Post Graduates, 8 percent of the respondents are HSC and another 8 percent of the respondents are Diploma and the remaining 6 percent of the respondents are Professional.

**TABLE 5****CHI-SQUARE TEST**

To obtain the relationship between the Educational Qualification of the respondents and Customer preference towards online shopping using tamil languages.

**Null Hypothesis ( $H_0$ )** – There is no significant relationship between the Educational Qualification of the respondents and Customer preference organic consumption in Sivakasi.

**Alternate Hypothesis ( $H_1$ )** – There is significant relationship between the Educational Qualification of the respondents and Customer preference organic consumption in Sivakasi.

Educational Qualification	HS	S	N	DS	HDS	TOTAL
Upto 10 <sup>th</sup>	2	2	-	-	-	4
Upto 12th	5	2	1	-	-	8
Diploma	4	11	4	1	1	21
Degree	-	9	3	2	1	15
Doctoral Level	-	-	-	2	-	2
Total	11	24	8	5	2	50

Observed Frequency (Oi)	Expected Frequency (Ei)	(Oi-Ei) <sup>2</sup>	(Oi-Ei) <sup>2</sup> /Ei
2	0.88	1.25	1.43
2	1.92	0.01	0.00
5	1.76	10.50	5.96
2	3.84	3.39	0.88
1	1.28	0.08	0.06
4	4.62	0.38	0.08
11	10.08	0.85	0.08
4	3.36	0.41	0.12
1	2.1	1.21	0.58
1	0.84	0.03	0.03
9	7.2	3.24	0.45
3	2.4	0.36	0.15
2	1.5	0.25	0.17
1	0.6	0.16	0.27
2	0.2	3.24	16.20
TOTAL			26.47

Calculated Value = 26.47 Table Value = 26.296

Calculated Value > Table Value Null hypothesis is rejected.

Therefore calculated value of chi-square is **26.47**. The table value at **0.05** Degree of level of significance is **26.296**. Since the calculated value is greater than the tabulated value, the null hypothesis is accepted.

### Inference

There is no significant relationship between the Educational Qualification of the respondents and Customer preference towards organic consumption in Sivakasi.

**TABLE 6**  
**REASON FOR PURCHASING OF ORGANIC FOOD**

S. No.	Particular	Rank I		Rank II		Rank III		Rank IV		Rank V		Rank VI		Rank VII		Total	Per cent age	Rank
		N R	W A	N R	W A	NR	W A	N R	W A	N R	W A	NR	W A	NR	W A			
1	Nutritious	9	63	7	42	12	60	5	20	6	18	8	16	3	3	222	15.80	III
2	Tasty	11	77	11	66	10	50	6	24	4	12	4	8	4	4	241	17.15	II
3	Quality	16	112	18	108	3	15	3	12	3	9	3	6	4	4	266	18.93	I
4	Animals are treated better	1	7	2	12	4	20	5	20	12	36	7	14	19	19	128	9.11	VII
5	Environmental Pollution	2	14	2	12	7	35	12	48	9	27	8	16	9	9	161	11.45	V
6	Feel fresh	9	63	4	24	11	55	13	52	5	15	4	8	4	4	221	15.72	IV
7	Support local or small farmers	1	7	7	42	2	10	12	48	10	30	11	22	7	7	166	11.81	VI
	Total															1405	100	

**Source: Primary Data**

NR- No. of respondents    WA- Weighted Average

It is lucid from the table 3.18 that a majority of the respondent prefers to purchase the organic food because of the nutritious factor with the weighted index of its 266 points with 1 rank constituting 18 percent for Quality aspect.

**Suggestion**

- In the sivakasi town there is low awareness among people but they are keen to know about organic food. The farm can create awareness among people through promotions of organic products.
- The farm can introduce number of stores to stores to provide facility to the customers and provide services like home delivery for the convenience of the customers

**Conclusion**

The awareness about organic food products is among the people and their intention to buy organic food is shaped by various beliefs. Their actual buying behavior is direct result of strong intention and attitudinal values towards the benefits of the organic products. The research shows that they give importance of being an ethical consumer and after this they are also getting conscious towards health can be the change in eating habits because of the change in food menu as an outcome of globalization. Also the work time the change in taste increased likely to junk food has also influenced them to get less health conscious as compared to other generation.

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## **32. ANARKALI'S LOVE – A HISTORICAL LEGEND**

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### **Abstract:**

When history is mixed with fiction. It is impossible to separate it. History is not written completely truthfully. Fiction fills its gaps. Many times, people believe in fiction more than historical facts. Here it is pointed out one important historical legend. That is Akbar's son Salim, fell in love with the slave girl Anarkali. Akbar, who did not like it, buried Anarkali alive. There have been debates about Anarkali since the release of the Hindi film 'Mughal-e-Azam'. Did the dancer 'Anarkali' really exist? Was she buried alive for the crime of loving Salim? The questions still remain today. As an alternative version of the same event, there is also the story of Ambikapati, the son of Kambar, falling in love with the Chola princess Amaravati. Such legends take deep roots throughout history. They cannot be dismissed as completely false. Nor can they be proven by saying that there is evidence. They are stories that have created the trust of the people.

### **Introduction:**

The memorial built for Anarkali, Lahore, is there to prove the story of Anarkali. It is said that this was the precursor to Shah Jahan building the Taj Mahal in memory of his beloved. Even today, there is a place called 'Anarkali Bazaar' in Lahore. That memorial map is located next to it. There. The poem that Salim wrote is found in an inscription. The inscriptions say that this mahal was built in memory of a dancer named 'Nagira', and some say that these are the proofs that Anarkali lived.

### **Salim:**

Salim is a Mughal ruler, the son of Akbar, and he succeeded his father on the throne after Akbar as Jahangir. But why did Salim, who was deeply in love with Anarkali, not write a single line about Anarkali in his memoirs? There is no information about Anarkali in Akbar's biographical notes either. Apart from these, there is not a single word about Anarkali in the Punjabi historical books that describe the history of Lahore. Therefore, this is a myth. They are struggling to prove the story fabricated for the sake of self-interest as reality. Historians deny that there is any direct evidence for this in history.

### **Anarkali in Film and Drama:**

"Mughal-e-Azam" is an epic in the history of Indian cinema. Released in 1960 under the direction of Asif, this film, with poetic dialogues, celebrates the love of Salim and Anarkali. Looking at Prithviraj Kapoor, who plays the role of this film, it seems that Akbar would have been like this and would have spoken like this. Such perfect acting. Similarly, the performances of Dilip Kumar, who plays Salim, and Madhubala, who plays Anarkali, are also wonderful.

Even before the release of this film, the story of Anarkali had become popular among the public in the form of drama and story songs all over North India. The Himalayan success of this film made Anarkali an incomparable monument of love.

### **Where did the story of Anarkali begin?**

Who created such a legend in history? William Finch, a white man from the East India Company, was the first to record the story of Anarkali. From 1608 to 1611, he travelled to India to sell dyes. He wrote in his book that he had found an ancient tomb in a flower garden in Lahore, and that the tomb was built for the death of one of Akbar's favorite heroines, and that her name was 'Anarkali', and that Akbar, who did not want Prince Salim to love her, killed Anarkali.

This legend has grown and spread throughout India. Before William Finch, there were no other historical records of the love between Anarkali and Salim. Like Finch, a white man named 'Edward Terry', who traveled to India, wrote in his notebook that he had also heard this story in Lahore and that he had seen a memorial hall that proved it to be true.

Urdu historians, relying on the references of these two white men, have linked the Nadira Memorial Palace in Lahore to this story. That is how the Anarkali-Salim love story was born. The Urdu playwright Syed Imtiaz Ali transformed Anarkali's love into an unforgettable tragic drama. He was the first to write Anarkali's love story as a play and achieved success. His play was staged in 1922. The film 'Mughal-e-Azam' was adapted from that play.

### **Legendary of Imtiaz Ali:**

Imtiaz Ali, a native of Lahore, wanted to write a play about Anarkali based on the stories he had heard in his childhood. For this, he sought out Urdu historians and collected details. Although there was no direct evidence, he wrote his play based on the diary written by Abul Fazal, who said that Salim was in love with Jain Khan's daughter, which Akbar did not like. In the preface to the play, Imtiaz Ali himself has mentioned that this is a fictional play and there is no evidence for the historical information contained in it. But the tragic story drips with People who enjoyed that romantic drama a lot started believing that it was a hidden truth in history.

The picture of Anarkali on the cover of the play. How Anarkali was used as a support for it was published by Imtiaz Ali. Copies of that painting are still circulating today as a painting depicting Anarkali as the cover picture of the first person to publish the painting that said she would be there.

The painting of Anarkali for Imtiaz Ali was drawn by his friend and famous painter Abdul Rahman Sukti. Anarkali means a young 'pomegranate flower' with a flower in her hand, as drawn in the tradition of microphotography. Therefore, Abdul Rahman has drawn Anarkali with a smile as a Mughal woman. This painting greatly helped to believe that Anarkali was a real woman.

Following the success of the play, many people started trying to make it into a film. In 1923, Anarkali was made as a silent film in Mumbai. Subsequently, during the era of talkies, Imtiaz Ali himself edited and wrote his play and helped produce a talkie film called 'Anarkali'. After that, Anarkali was released as a story film in Bengali and in 1953 in Hindi under the direction of Nandalal Jaswant Lal. In 1960, the grand film 'Mughal-e-Azam' was released under the direction of Asif and was a huge success. Since then, the story of Anarkali has been recorded in the minds of the people as an unchanging historical event.

The story of Anarkali is not entirely fictional. There are historical facts buried within it. In the 'Akbar Nama' written by Abul Fazal, it is mentioned that there were differences of opinion between Akbar and Prince Salim, and that Salim entered the king's palace without permission, and Akbar ordered him to be severely punished.

### **Was Akbar an enemy of love?**

There were countless dancing girls in Akbar's court. There is a story that Akbar ordered her beheading because one of them, 'Nadira', had a crush on Prince Salim. The name 'Nadira' is found in the Anarkali Memorial Hall in Lahore. Therefore, it is said that it is the hall built by Salim in memory of Nadira.

Many of the incidents narrated in the film 'Mughal-e-Azam' about Akbar's third son and later ruler with the title 'Jahangir' are fictional. Since they are stories woven with historical references, they seem real. Akbar married many women to maintain harmonious relations with the kings under his rule. One of them was Jodha Bai from Rajputana. Salim was the child born to him. Salim was allowed to rule alone as a mansaptar at a young age. At the age of 12, he was given exclusive authority as the commander of the Kabul region. At the age of 16, he married the princess of Amber named 'Manbhawavati'. The woman belonged to Salim's maternal Rajputana.

### **Salim as Jahangir:**

After Salim was crowned Emperor Jahangir, there were more than a thousand women in the palace. Jahangir had 12 marriages. Among them, at the age of 42, he married Nur Jahan, the wife of Sher Khan, the governor of the Burdwan region of Bengal. He forcibly seduced her and made her his mistress, and then married her. Therefore, it is not clear at what age he fell in love with Anarkali.

It is said that Anarkali may have been one of Akbar's mistresses. If so, the next question arises as to whether the incident of her falling in love with Salim is true. There are three opinions: Anarkali is Nadira, one of the court ladies; Anarkali is a woman named Mehranisa; and Anarkali is a woman named Sharpunisa. Salim loves Anarkali, Akbar's favorite heroine. Akbar did not like it and ordered her to be buried alive. This was a rivalry between father and son. Moreover, Muhammad Bashir, an Urdu teacher, has mentioned that Akbar was not an enemy of love.

### **Conclusion:**

The main reason why Anarkali took various forms is the reference of 'William Finch'. As those who came after copied those notes exactly, it began to take shape as a true story. Moreover, Anarkali became a part of history as it was imprinted in the minds of the people as a play, a film, and a long poem. The story of Anarkali is the only reason why an ordinary person remembers the great emperor Akbar today. This is a perfect example of how powerful fiction is in history. This forbidden love story serves as a powerful reminder of the often sacrificial nature of love in the face of duty, the tension between personal desires and familial obligations, and the heartbreaking consequences of defying authority. Whether fact or fiction, the tale of Anarkali, Salim, and Akbar continues to resonate as a poignant narrative of love, betrayal, and loss—one that is immortalized in both history and legend.

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### **33. CULTURAL ANTHROPOLOGY OF TEXTILE CONSUMPTION: FAST FASHION AND SUSTAINABLE ALTERNATIVES**

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#### **Abstract**

Textiles transcend their material form to serve as carriers of cultural values, social identities, and collective memory. From an anthropological perspective, textile consumption reflects broader shifts in society, making it a critical lens for examining globalization, cultural change, and sustainability. This paper explores the cultural anthropology of textile consumption with a focus on the tension between fast fashion and sustainable alternatives. Fast fashion, defined by rapid production cycles, affordability, and trend-driven appeal, mirrors consumer cultures shaped by globalization, aspirational lifestyles, and instant gratification. While it democratizes fashion, its cultural consequences are significant—fostering disposability, homogenizing styles, eroding traditional textile knowledge, and weakening community-based craftsmanship. In contrast, sustainable alternatives—such as handloom weaving, slow fashion, and eco-friendly textiles—reassert cultural heritage, ethical labor, and environmental responsibility. These practices highlight continuity with tradition while addressing pressing global concerns of ecological balance and social equity. By examining consumer behavior, cultural values, and community practices, this study demonstrates how textiles act as powerful cultural symbols, shaping and reflecting identities. Case examples, including India's handloom sector, African wax prints, and global slow fashion movements, illustrate how fashion embodies tensions between modernity and tradition, convenience and responsibility, global uniformity and local distinctiveness. Ultimately, an anthropological lens underscores that fashion is not merely aesthetic but deeply cultural. Balancing fast fashion's accessibility with sustainability's ethical and ecological imperatives remains central to ensuring textiles contribute to cultural preservation and responsible global futures.

#### **Introduction**

Textiles transcend their material form to embody cultural values, social identities, and collective memory. They serve as powerful markers of tradition, community, and individual expression. Within cultural anthropology, the study of textile consumption provides insights into how societal shifts—driven by globalization, modernization, and sustainability concerns—affect cultural practices and values. This paper explores the cultural anthropology of textile consumption, focusing on the tension between fast fashion and sustainable alternatives, and examines their social, ethical, and environmental implications.

#### **Textiles as Cultural Symbols**

Textiles have long acted as repositories of cultural meaning, representing status, ethnicity, gender roles, and spiritual beliefs, making them integral to the social and cultural fabric of communities worldwide. Traditional fabrics, such as Indian handlooms, African kente cloth, Japanese kimonos, and Peruvian alpaca weaves, are not merely functional objects but carry symbolic significance, telling stories about a community's history, values, and worldview. Each motif, color, and weaving technique is imbued with meaning, often linked to local myths, religious practices, or social hierarchies. These textiles encapsulate generations of craftsmanship, demonstrating the skill, creativity, and labor invested by artisans, often within complex socio-economic and gendered structures. Beyond their aesthetic and utilitarian qualities, textiles serve as mediums for transmitting cultural knowledge, social norms, and collective memory across generations, reinforcing a sense of

belonging and identity within a community. For instance, ceremonial garments worn during weddings, religious rituals, or initiation ceremonies communicate social status and cultural affiliations, while everyday fabrics preserve local techniques and regional identities. In this sense, textiles function as social and cultural texts, offering insight into the interconnectedness of art, labor, tradition, and identity. They are living records of human experience, reflecting both continuity and change, and providing anthropologists with a tangible means to study the evolution of culture, heritage, and societal values over time.

### **Fast Fashion and Its Cultural Impacts**

Fast fashion, characterized by rapid production cycles, low-cost pricing, and trend-driven appeal, has transformed the global fashion landscape, making clothing more accessible to a wide consumer base. It mirrors consumer cultures shaped by globalization, mass media, social networking, and aspirational lifestyles, where the latest trends are quickly disseminated and eagerly adopted. While fast fashion democratizes access to style, it carries profound cultural and social implications. The emphasis on rapid turnover fosters a culture of disposability, where garments are worn only briefly before being discarded, eroding appreciation for craftsmanship and traditional techniques. Homogenized designs and mass-produced patterns diminish regional diversity and weaken the cultural uniqueness of local textile traditions. Artisans and community-based producers often struggle to compete with industrialized production, resulting in the decline of skills passed down through generations. From an anthropological perspective, fast fashion exemplifies broader societal shifts toward consumerism, instant gratification, and convenience, reflecting a globalized aesthetic that often prioritizes novelty over heritage. Moreover, it alters the relationship between individuals and clothing, transforming garments from cultural symbols into ephemeral commodities. The environmental and ethical costs—including excessive waste, exploitation of labor, and resource depletion—further highlight how fast fashion's cultural impact extends beyond aesthetics to influence social norms, economic structures, and ecological practices, challenging societies to reconcile modern consumption with the preservation of cultural identity.

### **Sustainable Alternatives and Cultural Preservation**

Sustainable textile practices, including handloom weaving, slow fashion, artisanal embroidery, and the use of eco-friendly materials, prioritize cultural heritage, ethical labor, and environmental stewardship. Handloom production, for instance, not only sustains local and community-based economies but also preserves intricate weaving techniques and indigenous knowledge systems that have been passed down through generations. These practices reinforce cultural identity, providing artisans with a sense of purpose and connection to their traditions. Slow fashion and eco-conscious textiles encourage consumers to move away from mass-produced, disposable garments and instead value quality, durability, and authenticity. By emphasizing thoughtful production, minimal waste, and careful sourcing of materials, sustainable fashion reconnects clothing with cultural and ecological responsibility. Moreover, sustainable textiles often incorporate storytelling through patterns, motifs, and techniques that reflect the history, rituals, and values of a community, allowing fashion to serve as a living record of heritage. These alternatives demonstrate that modern fashion does not need to be at odds with tradition; rather, it can integrate ethical and environmentally conscious practices while preserving the artistry and cultural narratives embedded in textiles. In doing so, sustainable fashion offers a pathway to address global challenges such as environmental degradation, labor exploitation, and the loss of cultural knowledge, illustrating how clothing can simultaneously meet contemporary consumer needs and honor the cultural legacies from which it emerges.

### **Conclusion**

Textiles are deeply cultural, serving as expressions of identity, heritage, and societal values. While fast fashion offers accessibility and novelty, it risks cultural homogenization and ethical compromises. Sustainable alternatives provide pathways for preserving cultural knowledge, supporting ethical labor, and promoting environmental responsibility. A cultural anthropological

approach underscores the importance of balancing modern fashion consumption with cultural preservation and ecological sustainability. Ultimately, understanding textiles through this lens reveals how fashion choices reflect and shape the values and priorities of contemporary society.

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## **34. PHILOSOPHY IN ENGLISH LITERATURE**

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### **Abstract**

Philosophy the "love of wisdom," is a rational, systematic, and critical inquiry into fundamental thoughts about existence, knowledge, values, reason, mind, and language. Using logical thought and reflection, Philosophy aims to deepen one's understanding and persuade wiser thought and action in all aspects of life. On the other hand, Literature is a form of human expression in a well – organized systematic writing in the form of novels, plays, and poems, which expresses complex ideas and emotions through creative and skillful use of language. Philosophy of Literature uses philosophical methods to study literature whereas, Philosophical for Literature uses literary forms to explore philosophical ideas. Both Philosophy and literature grapple with fundamental questions about morality, justice, knowledge, and the human condition, in different modes. Works of literature, through characters and plot, offer case studies for exploring complex ethical and rational issues that are the reflection of philosophical thought. This paper discusses on the influences of philosophy on literature from different countries and focuses on how the philosophical ideas guide readers to regain wisdom and eternal truth after reading any form of literature.

**Key Words:** Indian literature, Greek Literature, American Literature and English Literature and German Literature.

### **Philosophy in Indian Literature**

Indian literature has philosophical ideas in all forms of its literature. The great Indian epics Ramayana and Mahabharata speak on different paths of dharma, the meaning for our existence which suits not only for an individual alone but for the entire humanity. The ethical path and spiritual guidance in both the epics, through multiple characters in complicated situations help to attain wisdom and to retain peace and harmony in the society. Both the epics portray God as characters to glorify dharma and karmic duties of an individual. The whole text of Bhagavat Gita with its 700 slokas arranged under different yogas or chapters are the pathways for human beings to furnish a well nourished ethical world. Apart from these epics, the different writers like Dr. Radhakrishnan, Sri Aurobindo, Swami Vivekananda draws the whole western world to replenish their life in Indian dharmic system. The Indian philosophy goes to the extent of glorifying and regulating sexual pleasures in Kamasutra and materialistic gains through war fields in Arthashastra. The great Noble Prize winner Rabindranath Tagore's Gitanjali explores themes of Spirituality, Devotion to God, and the profound connection between the Divine and Human life.

India being a state of different culture and language has too many philosophical writers in literature and great philosophical writers in Tamil literature includes Thiruvalluvar, Subramania Bharathiar, Kannadasan Thirumoolar etc. These classic writers wrote on all facts of life with deep knowledge on psychology, Yoga practice, Politics, Economics, Theology and even on war tactics. The philosophical concepts in their writings give the readers a deep knowledge on the complications of life and guide them in their routine life, to face any situations. The literary forms also give pleasures of relishing life with inner satisfaction and peace. An ordinary man in India promptly understands his duties as a son, as a father, as a citizen and as a husband to pursue his life with entire satisfaction and happiness. Also simple narration and plots in a novel, short story also preach Philosophy to people. Tamil Novel writers like Asokamithran, Prabhanjan, Indira Sowndarajan, Balakumaran have special feature of writing philosophical novels.

### **Philosophical writings in Greek Literature**

Greek Literature has great Philosophers like Socrates, Plato, Aristotle, and their contribution to ancient Greek people are immense as it promotes democracy, liberation and growth of knowledge among the citizens. Socrates known as “the Father of Philosophy” propagates the idea that ‘an unexamined life is not worth living’ and advocated for self- reflection and critical enquiry to achieve virtue and happiness. The teaching of Socrates is written by Plato, his student, who started a school named “Academia” to teach skillful children. Plato’s Cave allegory is an example for effect of education and liberation for individuals to get better and secured life. It represents a world of Illusion and a world of truth and knowledge. The allegory of caves with picturesque representation make the readers to acknowledge and judge the true power of knowledge. Aristotle’s theory of Mimesis posts that art is an act of imitation of life actions. Aristotle also developed Logic, establishing the principles of Syllogism, which forms the basis for reasoning. He also proposed the Golden mean which is a mean point between two extreme vices. Epicurus preached the Epicurean philosophy of “Eat, drink and be happy” for acquiring entire tranquility and happiness of life.

### **Philosophy in English literature:**

English being a universal language has helped us to read different countries philosophical concepts in English and has helped in understanding the concepts clearly. The plays of Shakespeare exposed all human characters and focus on different philosophical theories. The crucial role of human life is expressed as follows

“As flies are to wanton boys are we to gods, they kill us for their sports” (King Lear- Act IV, Scene I).

“We are such stuff/As dreams are made on, and our little life is rounded with a sleep” (The Tempest Act IV, Scene I)

The works of Francis Bacon have the crux of life when it shared the quotes “Knowledge is Power”. He believed that Knowledge gained through observation and experimentation could empower Individuals and societies by enabling decision making, problem solving and control over natural calamities and make their life more secured. John Pilgrim’s The Pilgrim’s Progress marks the human progress in search of God through the refinement of soul and moral means. John Ruskin’s Utopia suggested for a better world with guild principles and social justice. The 18th century England witnessed an industrial revolution and shift in cultural behaviors of its citizens. Philosophers like John Locke, David Hume, Adam Smith influenced literature with their morals. Literature became a vehicle for moral instructions, social criticisms and rational thinking. Writers like Henry Fielding, Samuel Johnson and Jonathan Swift used poetry, essays and novels as philosophical instruments to explore the nature of Man. The Absurd plays highlights the absurdity and at the same time analyzed the entire meaning of life is to understand and guide others.

### **Philosophy in American Literature**

Philosophy in American Literature can be understood by reading Enlightenment writers like Benjamin Franklin, Thomas Paine, Jefferson, Emerson, David Thoreau and Nathaniel Hawthorne. Being a land of multi cultured society, the American writers questioned morality, destiny and Nihilism. But the Transcendentalism movement in America emphasized on Individualism, Self-reliance and the innate goodness of humanity and nature. The American great writers like Walt Whitman. Robert Frost reflects themes on Individualism, nature and the divine in everything around them. Its rise was a protest against the state of Intellectualism and spirituality at that time. The idea of intuitive thought and a direct knowledge of inner feelings was a superior form of knowledge. The concept of Existentialism, Post structuralism and Post modernism questioned the universal truth and the meaning of existence. The inherent value of the individual and a belief in interconnectedness of life are greatly portrayed in American Literature.

### **Philosophy in German Literature**

The prominent figures in German philosophers are Immanuel Kant, George Wilhelm Friedrich Hegel, Karl Marx, and Friedrich Nietzsche. The German thinkers contributed ideas on Transcendental Idealism, Absolute Idealism and dialectical process, Communism, *Übermensch* or Self-Creation to the humanity. Arthur Schopenhauer is noted for his noumenal and phenomenal world and his pessimism theory. Georg Wilhelm Friedrich Hegel extends widely from various topics like Epistemology, Ontology and Political Philosophy. His friend Karl Marx contributed The Communist Manifesto which became a great source to unite the world laborers and form Communism. It was a revolution in the lives of many poor laborers to overcome their ruling class and get united under one name as laborers. Marx is also celebrated as one of the principal architect of modern sociology for his heterodox theories of labour and capital. The Capitalist movement developed out of the intellectual currents of the enlightenment and the revolutionary politics of that era. Friedrich Nietzsche, Friedrich Engels are some other philosophers whose thoughts provoked rationalism and pessimism among people and help people to overcome their life with systematic approach of life.

Literature and Philosophy are two wings of human thought. Philosophy portrays truth through reasoning while Literature does the same through stories, characters and imagination. When Philosophical concepts find a place in Literature they give explicit knowledge and energy and boost the readers to understand it better. This fusion has guided mankind for centuries, teaching morals, values, making reforms and has strengthened the society far better than anything. The philosophical concepts like Existentialism, Nihilism, Stoicism, Epicureanism, Aesthetics, Marxism and Transcendentalism have their identity among the learning community of people, through various forms of literature, better than mere philosophical concepts. Literature has conveyed enduring wisdom and has become a bridge between thought process and its impact ensuring that Philosophical concepts benefits not only the mind but also the heart and action of the readers.

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## **35. SACRED SPARKLE: TRACING THE ORIGINS OF TEMPLE JEWELLERY IN TAMIL SANGAM LITERATURE AND TRADITION**

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### **Abstract**

Temple jewellery, celebrated for its exquisite craftsmanship and profound cultural symbolism, has been a defining element of South Indian ornamentation for centuries. With origins traced back to the Sangam period, temple jewellery flourished alongside the growth of Dravidian temple architecture, devotional traditions, and performing arts. Traditionally crafted in gold and adorned with motifs such as deities, flowers, birds, and geometric patterns, these ornaments not only served as adornments but also embodied spiritual and social values. This paper examines the historical evolution of temple jewellery through literary references, epigraphical records, and archaeological findings, shedding light on its role in reinforcing religious devotion and Tamil cultural identity. Special attention is given to its significance in Bharatanatyam and other classical dance forms, where jewellery serves as both an aesthetic enhancement and a medium of storytelling. Furthermore, the study explores its presence in temple rituals and community ceremonies, highlighting its role as a marker of tradition, status, and continuity. In contemporary contexts, temple jewellery has transcended its original ritualistic use to inspire modern accessory design, bridging heritage and fashion while retaining its symbolic essence. The preservation, revival, and adaptation of this heritage art form not only safeguard a vital aspect of South Indian culture but also demonstrate its enduring relevance in a globalized world.

### **Introduction**

Temple jewellery holds a unique place in the cultural and religious traditions of South India. More than mere ornaments, these pieces reflect the region's history, artistry, and spirituality. The Tamil Sangam period (c. 500 BCE–300 CE) marks the earliest references to jewellery in literature, inscriptions, and material culture. Temple jewellery evolved not only as adornment for human use but also as sacred offerings to deities, reinforcing the devotional bond between art and worship. This paper seeks to explore the origins, symbolism, and cultural role of temple jewellery in Sangam South India, while also highlighting its influence on classical dance, temple rituals, and modern fashion design.

### **Historical Origins**

The origins of temple jewellery can be traced to the Sangam era, which produced an extensive body of literature describing ornaments worn by kings, queens, dancers, and deities. Works such as the Akananuru and Purananuru vividly describe the splendour of gold, pearls, and precious stones that adorned people of the time. The Silappatikaram, one of the great Tamil epics, centers around the heroine Kannagi's anklet (silambu), illustrating the cultural importance of jewellery. Archaeological excavations at sites like Arikamedu and Keezhadi also reveal beads, bangles, and gold ornaments, confirming the literary references. Over time, temple jewellery evolved into a distinct style associated with Dravidian temple architecture and devotional practices, embodying both artistic finesse and religious significance.

### **Craftsmanship and Motifs**

Temple jewellery is traditionally handcrafted in gold, often embellished with semi-precious stones such as rubies, emeralds, and pearls. The intricate techniques of filigree, repoussé, and granulation highlight the exceptional skill of South Indian goldsmiths. The motifs frequently used in temple jewellery carry deep symbolic meanings: the lotus represents purity and spiritual awakening,

the peacock denotes beauty and immortality, while the makara (a mythical aquatic creature) symbolizes protection. Deity figures, such as Lakshmi and Krishna, are also common, signifying prosperity and devotion. These designs demonstrate how temple jewellery served not only as adornment but also as a medium of spiritual expression, linking the wearer to divine forces.

### **Religious and Ritual Importance**

Temple jewellery was deeply embedded in the religious life of the Sangam period and beyond. Ornaments were not only worn by devotees but also offered directly to deities as acts of devotion. Many temples commissioned elaborate ornaments for their presiding deities, which were used during festivals and processions. Gold crowns, waist belts (odiyanam), earrings (jimikki), and necklaces adorned idols of gods and goddesses, symbolizing wealth and reverence. Within communities, jewellery also played a role in life-cycle rituals such as marriages, where it was seen as both a sacred blessing and a marker of social status. Thus, temple jewellery functioned at the intersection of devotion, culture, and social identity.

### **Role in Performing Arts**

One of the most enduring legacies of temple jewellery is its connection to Bharatanatyam and other classical dance forms. Originating in temples as a form of devotional offering, Bharatanatyam dancers were adorned with ornaments from head to toe, creating a divine visual presence. Pieces such as the nettichutti (forehead ornament), vanki (armlet), nathaswaram (nose ring), and odiyanam (waist belt) became integral to the dance costume, enhancing not only the dancer's beauty but also the symbolic gestures (mudras) and storytelling of the performance. The jewellery thus served both functional and aesthetic purposes, bridging the realms of art, devotion, and identity.

### **Social and Cultural Value**

Beyond temples and performances, jewellery played a significant role in Sangam society as a marker of status, identity, and heritage. Kings and nobles displayed their wealth and authority through heavy gold ornaments, while women treasured jewellery as symbols of marital security and prosperity. Many ornaments were passed down as heirlooms, strengthening family and community ties. The references in Sangam poetry demonstrate how jewellery was intertwined with expressions of love, valor, and devotion, embedding it deeply into Tamil cultural identity.

### **Evidence from Literature and Archaeology**

The richness of temple jewellery traditions is evident in Sangam literature, which contains extensive descriptions of ornaments and their symbolism. Texts such as the Akananuru, Pattuppattu, and Silappatikaram provide invaluable insight into the role of jewellery in personal adornment, social status, and religious symbolism. Complementing these literary sources, archaeological excavations across Tamil Nadu reveal gold ornaments, terracotta beads, and decorated bangles, offering tangible evidence of the craftsmanship of early Tamil society. Epigraphical records from the Pallava, Chola, and Pandya dynasties further document donations of jewellery to temples, underscoring its religious significance.

### **Contemporary Relevance and Preservation**

In the modern era, temple jewellery continues to thrive, especially in South Indian weddings, Bharatanatyam performances, and fashion. Artisans from regions like Nagercoil and Chettinad still produce handcrafted pieces, maintaining traditional designs while adapting to contemporary tastes. These ornaments, now popular worldwide, symbolize a bridge between heritage and modernity. However, the tradition faces challenges from mass-produced, machine-made ornaments, which threaten the livelihood of skilled goldsmiths. Preservation efforts by cultural organizations, museums, and government bodies play a crucial role in safeguarding this art form for future generations.

### **Conclusion**

Temple jewellery is more than ornamentation; it is a sacred embodiment of devotion, artistry, and cultural identity. From its roots in the Sangam era to its flourishing role in temples, dances, and social ceremonies, this heritage continues to sparkle as a symbol of South Indian tradition. Its

enduring appeal in contemporary times underscores its adaptability and timeless relevance. As long as it is preserved and celebrated, temple jewellery will remain a shining jewel in the cultural history of Tamil Nadu and South India.

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## **36. FASHION ENTREPRENEURSHIP: BUILDING A SUCCESSFUL TEXTILE BUSINESS**

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### **Abstract**

The fashion and textile industry is one of the most dynamic sectors globally, combining creativity, culture, and commerce. Fashion entrepreneurship allows designers and innovators to transform creative ideas into viable businesses that impact the economy and society. This paper explores the fundamental aspects of starting and running a successful textile business. Key areas include market research, business planning, brand development, product strategy, marketing, financial management, and sustainable practices. The study also emphasizes the growing importance of sustainability, digital innovation, and ethical standards in modern fashion enterprises. By understanding these principles, aspiring entrepreneurs can create innovative, profitable, and socially responsible textile businesses.

### **Introduction**

Fashion is not only about clothing; it is a medium of self-expression, culture, and identity. In the contemporary market, fashion entrepreneurs must balance creativity with business acumen to succeed. The textile and fashion industry presents multiple opportunities for innovation, from traditional handloom textiles to modern smart fabrics. Fashion entrepreneurship involves identifying opportunities, understanding consumer needs, managing resources effectively, and maintaining ethical standards. It is about transforming ideas into marketable products while staying competitive in a global market.

Key aspects of fashion entrepreneurship include:

- Creativity and innovation in designing products
- Understanding market trends and consumer behavior
- Strategic planning and financial management
- Ethical and sustainable business practices

With the rise of conscious consumerism, the focus on sustainability and ethical fashion is increasing. Fashion entrepreneurs who prioritize eco-friendly fabrics and fair trade practices can not only attract loyal customers but also contribute to environmental and social well-being.

### **1. Market Research and Opportunity Identification**

Understanding the market is crucial for the success of any business.

#### **Fashion entrepreneurs must analyze:**

**Consumer Preferences:** Study what types of fabrics, designs, and clothing styles are in demand.

**Competitor Analysis:** Identify existing brands, their strengths, weaknesses, and market positioning.

**Market Gaps:** Spot niche opportunities such as organic fabrics, custom-made clothing, or tech-integrated garments.

#### **Tools for Market Research:**

- Surveys and questionnaires
- Focus group discussions
- Online analytics and fashion trend reports

- Participation in trade shows and fashion exhibitions

**Example:** Brands like FabIndia noticed a demand for traditional handloom fabrics and built a successful brand promoting heritage textiles.

## 2. Business Planning

A well-structured business plan is essential for long-term success. It includes:

**Objectives and Vision:** Define the purpose, target audience, and short-term and long-term goals.

**Business Model:** Decide whether the business will be a retail boutique, e-commerce store, textile manufacturing unit, or hybrid.

**Financial Forecast:** Estimate costs, revenues, and potential profits. Include expenses for production, marketing, staff, and operations.

**Risk Management:** Identify potential risks like market fluctuations, supply chain issues, and competition.

**Example:** Startups like Biba carefully planned their product lines, store locations, and pricing strategies to become a market leader.

## 3. Brand Development

A strong brand distinguishes a business in a competitive market. Elements of brand development include:

**Brand Identity:** Logo, color scheme, and design philosophy that reflect the company's mission.

**Brand Values:** Focus on sustainability, quality, authenticity, or social responsibility.

**Customer Loyalty:** Engaging storytelling and consistent quality build long-term trust.

**Example:** Stella McCartney emphasizes sustainable fashion, creating a brand identity based on eco-consciousness.

## 4. Product Strategy

Product strategy defines the type of products offered and how they meet customer needs. Considerations include:

**Fabric Selection:** Natural fabrics (cotton, silk, linen) are skin-friendly and eco-conscious; synthetic fabrics offer durability.

**Design Innovation:** Incorporate smart textiles, ergonomic clothing, or personalized garments.

**Quality Control:** Ensure durability, comfort, and aesthetic appeal.

**Sustainability:** Use recycled materials and natural dyes to appeal to environmentally conscious consumers.

**Example:** Sportswear brands like Lululemon focus on moisture-wicking fabrics and ergonomic designs for customer comfort and performance.

## 5. Marketing and Sales

Marketing and sales strategies determine the reach and growth of a business.

**Digital Marketing:** Leverage social media platforms (Instagram, Facebook, TikTok) to showcase collections.

**E-Commerce:** Online stores provide access to global markets.

**Collaborations:** Partner with influencers or designers to expand visibility.

**Fashion Events:** Participate in exhibitions, pop-up stores, and fashion weeks to increase brand recognition.

**Example:** Brands like Zara use digital marketing and fast-fashion strategies to respond quickly to trends and reach global customers.

## 6. Financial Management

Proper financial management is vital to sustainability and growth:

Track revenues, profits, and losses regularly.

Explore funding options such as bank loans, investors, or government schemes.

Manage costs for production, marketing, and staffing efficiently.

**Example:** Small textile startups often begin with seed funding or microloans and gradually expand to larger markets.

#### **7. Sustainability and Ethical Practices**

Modern consumers value brands that are environmentally responsible and socially ethical:

Eco-Friendly Fabrics: Organic cotton, bamboo, jute, and hemp reduce environmental impact.

Ethical Labor Practices: Ensure safe working conditions and fair wages.

Recycling and Upcycling: Transform waste fabrics into new garments, reducing landfill pollution.

Transparency: Brands that share sourcing and production practices build consumer trust.

Example: Patagonia and FabIndia focus on sustainable materials and ethical labor practices.

#### **Conclusion**

Fashion entrepreneurship is the intersection of creativity, strategy, and sustainability. Success in the textile business depends on understanding market trends, developing a strong brand, managing finances, and adopting ethical practices. Entrepreneurs who innovate while keeping consumer needs and environmental concerns in mind can create profitable and socially responsible businesses.

“Fashion is art, but entrepreneurship makes it timeless”

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## 37. CULTURAL REVIVAL IN MODERN FASHION

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### Abstract

Cultural revival in modern fashion reflects a growing appreciation for traditional textiles, techniques, and craftsmanship while adapting them to contemporary aesthetics. This movement seeks to bridge the gap between heritage and modernity by integrating indigenous fabrics, handloom techniques, and regional motifs into every day and high-fashion clothing. Designers worldwide are reinterpreting ethnic wear, such as ikat, khadi, and block-printed fabrics, in modern silhouettes, making heritage relevant for today's consumers. Beyond aesthetics, this trend supports artisan communities, promotes sustainable practices, and fosters cultural identity in a globalized fashion industry. The fusion of traditional and modern design not only preserves cultural heritage but also positions fashion as a medium for storytelling, social consciousness, and ethical consumption in the 21st century.

### Introduction

Fashion has always been a reflection of society, culture, and identity. In recent years, there has been a growing movement towards cultural revival in modern fashion, where designers and consumers are rediscovering the value of traditional textiles, artisanal techniques, and regional craftsmanship. This trend is a response to globalization and fast fashion, which often prioritize mass production over heritage and sustainability. By blending indigenous fabrics, handloom weaving, embroidery, and traditional motifs with contemporary styles, modern fashion not only celebrates cultural heritage but also makes it relevant to today's urban and global lifestyle. The revival of cultural elements in fashion serves multiple purposes: it preserves centuries-old techniques, provides economic opportunities for artisan communities, and encourages sustainable and ethical fashion practices.

### History of Cultural Revival in Modern Fashion

The revival of cultural elements in fashion has roots in the growing recognition of heritage, craftsmanship, and identity. Historically, clothing was deeply tied to culture, region, and social status, with traditional textiles, embroidery, and motifs reflecting local customs. For example, India's khadi, ikat, bandhani, and chikankari have been practiced for centuries, while Japan's kimono and West Africa's kente cloth similarly embodied cultural significance. With industrialization and globalization in the 19th and 20th centuries, mass production and Western-style garments began dominating fashion, causing many traditional practices to decline. However, movements like Mahatma Gandhi's promotion of khadi in the 1920s–1940s revived local handloom industries as symbols of cultural identity and self-reliance. In the late 20th and early 21st centuries, the global fashion industry witnessed a renewed interest in cultural revival.

### TRADITIONAL TEXTILES IN MODERN FASHION

**Khadi:** Hand-spun and handwoven fabric popularized by Mahatma Gandhi; symbolizes simplicity, self-reliance, and sustainability.

**Ikat:** A resist-dyeing technique creating blurred patterns; used in states like Odisha, Andhra Pradesh, and Gujarat.

**Bandhani:** Tie-and-dye technique from Gujarat and Rajasthan; known for intricate dots and patterns.

**Chikankari:** Traditional embroidery from Lucknow, involving delicate hand-stitching on fine fabrics like muslin and cotton.

**Patola& Kanchipuram Silk:** Iconic silk weaves with rich patterns and motifs used in sarees and ceremonial wear.

**Kimono Fabrics (Japan):** Silk fabrics with intricate weaving and dyeing techniques.

**Kente Cloth (Ghana):** Handwoven fabric with bold, symbolic patterns reflecting community and culture.

**Batik (Indonesia):** Wax-resist dyeing technique producing unique motifs and patterns.

**Tartan (Scotland):** Woven wool patterns representing clans and heritage.

#### TECHNIQUES IN CULTURAL REVIVAL IN MODERN FASHION

**Handloom Weaving:** Traditional hand-operated looms produce fabrics like **khadi**, **ikats**, and **Kanchipuram silk**. Modern designers incorporate these into western silhouettes, dresses, and fusion wear.

**Jacquard Weaving:** Creates intricate patterns and textures; used in modern couture, jackets, and accessories.

**Tie-and-Dye (Bandhani, Shibori):** Fabric is tied or folded before dyeing to create distinctive patterns; adapted for contemporary casual wear, scarves, and fusion outfits.

**Batik:** Wax-resist dyeing forms intricate motifs; modern designers use it in dresses, tops, and digital print inspirations.

**Natural Dyeing:** Plant-based dyes offer earthy tones and sustainable options, increasingly applied in eco-fashion lines.

**Chikankari:** Hand-stitch embroidery from Lucknow, applied in modern shirts, dresses, and fusion wear.

**Zardozi:** Metal thread embroidery for luxurious textures, often seen in bridal and evening wear.

**Kantha& Phulkari:** Regional running-stitch and floral embroidery techniques applied to jackets, skirts, and bags for a contemporary look.

**Block Printing:** Wooden blocks create repetitive patterns; adapted for modern tops, dresses, and accessories.

**Screen Printing:** Modern industrial adaptation of traditional motifs for mass production.

#### CRAFTSMANSHIP IN CULTURAL REVIVAL IN MODERN FASHION

**Handloom Weavers:** Artisans producing fabrics like **khadi**, **ikat**, and **Kanchipuram silk** contribute intricate patterns and textures that machines cannot replicate.

**Embroidery Specialists:** Skilled craftsmen create detailed work in **Chikankari**, **Zardozi**, **Kantha**, and **Phulkari**, enhancing garments with tactile beauty and cultural meaning.

**Dyeing Experts:** Mastery in **bandhani**, **shibori**, **batik**, and **natural dyeing** allows for vibrant, culturally resonant fabrics.

#### IMPACT OF CULTURAL REVIVAL IN MODERN FASHION

##### Preservation of Heritage and Craftsmanship

Traditional textiles, weaving, dyeing, and embroidery techniques are kept alive through modern reinterpretation. Ensures that age-old artisanal skills are passed to future generations. Example: Revival of handloom ikat, Kantha embroidery, and Chikankari in contemporary fashion collections.

##### Support for Artisan Communities

Cultural revival creates **economic opportunities** for local artisans and rural communities. Promotes sustainable livelihoods and encourages continuation of traditional crafts. Brands like FabIndia and Anavila showcase artisan-made collections globally, empowering local craftsmen.

### **Promotion of Sustainable and Ethical Fashion**

Handcrafted and slow fashion approaches reduce dependency on mass-produced fast fashion. Encourages eco-friendly materials, natural dyeing, and zero-waste production techniques. Consumers increasingly value sustainability alongside style.

### **Global Recognition of Cultural Textiles**

Traditional fabrics gain international visibility through fashion weeks, digital platforms, and influencer promotion. Heritage textiles like khadi, ikat, batik, and handloom cotton are appreciated on global fashion stages.

### **Enhancement of Cultural Identity and Storytelling**

Fashion becomes a **medium of cultural expression**, connecting wearers with their heritage. Personalized and artisanal garments reflect social, historical, and regional identity. Modern reinterpretation allows traditional motifs and techniques to resonate with contemporary lifestyles.

### **Innovation and Creativity**

Designers experiment with **fusion wear, mixed techniques, and modern silhouettes**. Inspires creative approaches to fabric, garment construction, and styling, pushing the boundaries of fashion design.

### **Conclusion**

Cultural revival in modern fashion is a harmonious blend of heritage and contemporary aesthetics, reflecting a growing appreciation for tradition, craftsmanship, and sustainability. By reintroducing traditional textiles, handcraft techniques, and artisanal skills into modern designs, the fashion industry not only preserves cultural identity but also empowers artisan communities and promotes ethical practices.

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## 38. IMPACT OF CHEMICAL DYES ON WATER ECO SYSTEMS AND ALTERNATIVES LIKE NATURAL DYES.

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### Abstract

The fashion and textile industry is one of the largest consumers of synthetic dyes, many of which contain toxic chemicals that pose serious threats to aquatic ecosystems. Discharge of untreated dye effluents into rivers and lakes reduces light penetration, disrupts photosynthesis, and leads to oxygen depletion, thereby harming aquatic flora and fauna. Persistent dye residues also bioaccumulate, causing long-term ecological imbalances and even health hazards in humans through contaminated water. In contrast, natural dyes derived from plants, minerals, and insects present an eco-friendly alternative. They are biodegradable, non-toxic, and require less harmful processing, thereby minimizing water pollution. However, challenges such as limited color range, lower fastness, and scalability hinder their large-scale adoption. This study highlights the ecological impacts of chemical dyes on water bodies and emphasizes the potential of natural dyes as sustainable substitutes, encouraging a shift towards greener dyeing practices in the fashion industry.

### Introduction

The fashion industry widely uses synthetic dyes for their bright colors and durability, but their discharge into water bodies causes serious ecological damage. Dye effluents contain toxic chemicals and heavy metals that reduce oxygen levels, harm aquatic life, and pollute ecosystems. Since most synthetic dyes are non-biodegradable, they persist in the environment and even affect human health through contaminated water.

Natural dyes from plants, minerals, and insects offer a safer, eco-friendly alternative. They are biodegradable and less harmful, though their use faces challenges like limited shades and lower fastness. This study focuses on the impact of chemical dyes on water ecosystems and highlights the potential of natural dyes as sustainable solutions for the fashion industry.

### History of Dyes

#### ➤ Natural Dyes

Natural dyes have been used for thousands of years. Ancient civilizations in India, Egypt, China, and Mesopotamia developed techniques to extract colors from plants (e.g., indigo, turmeric, madder), minerals, and insects (e.g., cochineal). These dyes were safe, biodegradable, and formed part of cultural traditions, often symbolizing status or religion.

#### ➤ Chemical Dyes

The discovery of synthetic dyes revolutionized the textile industry. In 1856, William Henry Perkin accidentally synthesized **mauveine**, the first chemical dye, from coal tar. Synthetic dyes quickly gained popularity due to their bright colors, consistency, durability, and lower production costs. By the late 19th and early 20th centuries, chemical dyes largely replaced natural dyes in industrial textile production.

#### ➤ Modern Trends

While synthetic dyes dominate today, their environmental impact has raised concerns. Water pollution, toxicity, and biodiversity loss have led to a revival of interest in natural dyes. Research focuses on improving colorfastness, developing eco-friendly mordants, and scaling up natural dye production for industrial use.

### Impact of Chemical Dyes on Water Ecosystems

- **Water Pollution** – Effluents from textile industries often contain non-biodegradable synthetic dyes that persist in water bodies.
- **Reduced Light Penetration** – Dye-colored wastewater blocks sunlight, reducing photosynthesis in aquatic plants.
- **Oxygen Depletion** – Decomposition of dye residues consumes dissolved oxygen, leading to fish kills and biodiversity loss.
- **Toxicity** – Many synthetic dyes release carcinogenic and mutagenic compounds, affecting aquatic life and human health.
- **Bioaccumulation** – Toxic chemicals enter the food chain, impacting higher organisms, including humans.

### Natural Dyes as Eco-Friendly Alternatives

#### ➤ Sources of Natural Dyes

- **Plants:** Indigo (blue), turmeric (yellow), madder (red)
- **Insects:** Cochineal (red), lac (deep red)
- **Minerals:** Ochre, malachite (earth tones)

#### ➤ Advantages of Natural Dyes

- Biodegradable and non-toxic
- Safe for water ecosystems
- Culturally and aesthetically significant
- Renewable and sustainable source

#### ➤ Limitations

- Limited shade range compared to synthetic dyes
- Lower colorfastness and durability
- More labor-intensive extraction and dyeing processes
- Difficult to scale for industrial production

### Future Potential

Innovations like eco-friendly mordants, bio-mordants, and advanced dyeing techniques can improve the efficiency, consistency, and fastness of natural dyes, making them viable for large-scale textile production.

### Alternatives: Natural Dyes

- **Sources** – Extracted from plants (indigo, turmeric, madder), animals (cochineal, lac), and minerals.
- **Eco-friendly Properties** – Biodegradable, non-toxic, and less harmful to aquatic ecosystems.
- **Cultural and Aesthetic Value** – Rich heritage use, adds uniqueness to textiles.
- **Limitations** – Limited shade range, lower colorfastness, and difficulty in mass production.
- **Future Potential** – With technological innovations (bio-mordants, advanced dyeing methods), natural dyes can become more efficient and commercially viable.

### Conclusion

Synthetic dyes have played a crucial role in modern textile production, but their negative impact on water ecosystems cannot be ignored. Toxic effluents damage aquatic life, reduce biodiversity, and pose health hazards to humans. Natural dyes present a sustainable alternative that aligns with ecological balance and green fashion initiatives. Although they face limitations in

scalability and fastness, research and innovation can enhance their performance. A transition toward eco-friendly dyeing practices is essential to protect water ecosystems and promote sustainable development in the fashion industry.

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### **39. MODELLING THE COMPETITION BETWEEN HEALTH-CONSCIOUS BEHAVIOURS AND INSTITUTIONALIZED STRESSORS USING NONLINEAR POPULATION DYNAMICS**

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#### **Abstract:**

This study presents a novel mathematical framework to analyse the dynamics of healthy lifestyle adoption under persistent corporate and sociocultural pressures. Drawing upon principles from ecological modelling, we developed a system of nonlinear ordinary differential equations that captures how socioeconomic stressors suppress healthy habits. The model incorporates a stress-induced behavioural suppression term and a Holling Type II functional response to model systemic influence. We obtained analytical solutions using perturbation techniques like HPM and NHPM, which were validated for accuracy through MATLAB simulations. Our mathematical analysis reveals the existence, local stability, and bifurcation behaviour of the coexistence equilibrium, identifying critical thresholds for behavioural sustainability. Sensitivity analysis of key parameters provides crucial insights into the system's dynamics. This quantitative framework can inform proactive policy interventions aimed at building healthier, more resilient communities in the face of modern systemic stressors.

**Keywords:** Nonlinear dynamical system, Mathematical modelling, Behavioural Dynamics, Numerical Simulations

#### **1. Introduction:**

The adoption of a healthy lifestyle is fundamental to disease prevention and enhanced well-being. It reduces the risk of chronic conditions such as type 2 diabetes, cardiovascular disease, respiratory illness, and cancer, while also improving life expectancy, psychological health, and life satisfaction. However, lifestyles are not static; they evolve in response to broader societal changes such as globalization of food systems, the decline of traditional diets, and the rapid digitalization of daily life. In today's globalized society, continuous learning and self-regulation are therefore essential for individuals to effectively adopt and sustain healthy behaviours.[1-3]

The concept of a "culture of health" envisions communities where well-being—encompassing aspects like quality sleep, effective stress management, meaningful social connections, and adequate leisure time. Stress emerges as a major obstacle, influencing this complexity. It directly impacts health through biological processes and activating autonomic, neuroendocrine, and inflammatory processes, and indirectly by shaping behaviours—reducing engagement in beneficial habits like exercise and healthy eating, while increasing reliance on harmful practices such as smoking, alcohol consumption, and fast-food intake. These relationships are further influenced by socioeconomic status (SES) and socio-cultural values, which mediate both stress levels and health behaviour patterns.[1-4]

To examine these complex dynamics associations between SES, cultural values, stress, and health behaviours a novel mathematical model has been developed. Drawing upon the principles from the socio-ecological model (SEM) and ecological population dynamics, this analyses how socioeconomic stressors suppress healthy habit persistence. The model's variables and parameters are carefully mapped to human behavioural dynamics, psychological stress responses, and systemic mechanisms of exploitation — offering a novel interdisciplinary lens through which to analyze public health challenges. Through modelling, we understand the intricate relationships between individual

choices and broader systemic pressures to identify and uncover the factors that either facilitate or impede the adoption of healthy lifestyles, providing a robust framework for public health interventions.

## 2. Model Description:

We present a complex nonlinear system of ordinary differential equations (ODEs) designed to capture the dynamics of healthy lifestyle adoption under stress-induced behavioural suppression, driven by sociocultural norms and corporate pressures. Built upon ecological population dynamics models [5,6], the framework incorporates a Holling Type II functional response and stress-effect terms to formalize a competitive dynamic: healthy dietary practices and healthy lifestyle behaviours compete for an individual's finite cognitive and volitional resources, while both are simultaneously undermined by external socioeconomic stressors.

Our proposed dynamical system comprises three state variables: At the instance time  $t$ ,  $X(t)$  represents the density of individuals actively adhering to healthy dietary practices (e.g., mindful eating, nutritional planning, avoidance of ultra-processed foods);  $Y(t)$  represents the density of individuals maintaining healthy lifestyle behaviours (e.g., regular physical exercise, mindfulness or meditation, regulated sleep patterns) and  $Z(t)$  is used to represent the intensity of prevailing sociocultural and corporate stressors, systemic pressures that suppress or erode healthy behavioural adherence (e.g., workplace overextension, algorithmic attention economies, social normalization of burnout, or fast-food culture).

The evolution of these variables is governed by the following system of equations:

$$\frac{dX}{dt} = X \left[ \frac{b_1}{1 + sZ} - d_1 - c_1X - \frac{a_1Z}{1 + a_1T_1X + a_2T_2Y} \right] \quad (1)$$

$$\frac{dY}{dt} = Y \left[ \frac{b_2}{1 + sZ} - d_2 - c_2Y - \frac{a_2Z}{1 + a_1T_1X + a_2T_2Y} \right] \quad (2)$$

$$\frac{dZ}{dt} = Z \left[ \frac{e_1a_1X + e_2a_2Y}{1 + a_1T_1X + a_2T_2Y} - d \right] \quad (3)$$

With  $X(0) = X_0 > 0$ ;  $Y(0) = Y_0 > 0$  and  $Z(0) = Z_0 > 0$ .

All parameters are assumed to be positive real constants, and have distinct socialbehavioural interpretation as follows: The intrinsic motivation to adopt healthy dietary or lifestyle practices is captured by  $b_1$  and  $b_2$ , reflecting baseline adherence driven by education, values, or health awareness. Attrition from these behaviours due to boredom, aging, or life disruptions is modelled via  $d_1$  and  $d_2$ . Self-limiting effects representing constraints of time, energy, or willpower are quantified by  $c_1$  and  $c_2$ . The stress-induced suppression coefficient  $s$  measures how sociocultural pressure ( $Z$ ) erodes behavioural capacity, even without direct coercion. Exposure rates  $a_1$  and  $a_2$  denote vulnerability to systemic influence, while  $T_1$  and  $T_2$  represent the temporal or cognitive effort required for behavioural conversion to socially normative patterns. The exploitation efficiencies  $e_1$  and  $e_2$  (both  $< 1$ ) reflect how corporate or cultural systems benefit from this erosion, and  $d$  captures the natural decay of such pressures due to societal resistance, awareness or systemic fatigue.

## 3. Analytic expressions using Perturbation techniques:

Perturbation methods have been efficiently employed in the study of nonlinear differential systems to obtain approximate analytical solutions [7,8,9]. In this work, we apply the Homotopy Perturbation Method (HPM) and the New Homotopy Perturbation Method (NHPM) to derive closed-form analytical expressions for our proposed system. These techniques provide systematic approximations that capture the essential dynamical behaviour of the model while facilitating both theoretical analysis and practical understanding.

The analytical approximation obtained using Homotopy Perturbation Method is

$$X(t) = X(0)e^{-d_1t} + \frac{b_1X(0)}{1+sZ(0)}t.e^{-d_1t} + \frac{a_1X(0)Z(0)}{d(1+a_1T_1X(0)+a_2T_2Y(0))}e^{-d_1t}(e^{-dt}-1) + \frac{c_1X(0)^2}{d_1}e^{-d_1t}(e^{-d_1t}-1) \quad (4)$$

$$Y(t) = Y(0)e^{-d_2t} + \frac{b_2X(0)}{1+sZ(0)}t.e^{-d_2t} + \frac{a_2X(0)Z(0)}{d(1+a_1T_1X(0)+a_2T_2Y(0))}e^{-d_2t}(e^{-dt}-1) + \frac{c_2Y(0)^2}{d_2}e^{-d_2t}(e^{-d_2t}-1) \quad (5)$$

$$Z(t) = Z(0)e^{-dt} + \frac{e_1a_1X(0)Z(0)}{d_1(1+a_1T_1X(0)+a_2T_2Y(0))}e^{-dt}(1-e^{-d_1t}) + \frac{e_2a_2Y(0)Z(0)}{d_2(1+a_1T_1X(0)+a_2T_2Y(0))}e^{-dt}(1-e^{-d_2t}) \quad (6)$$

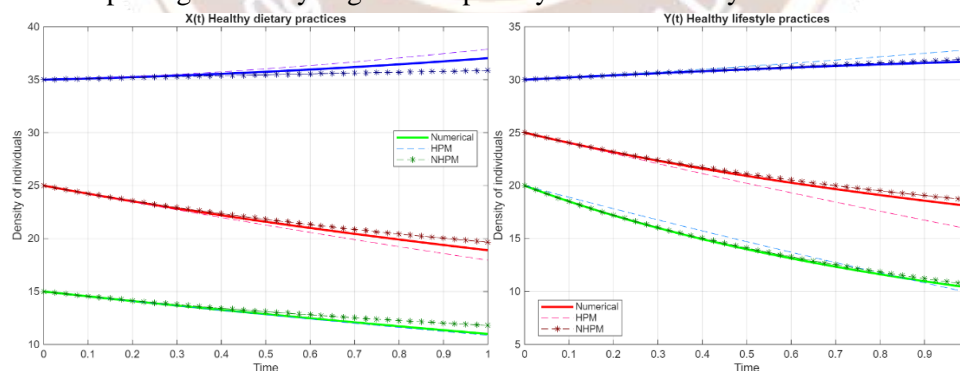
Applying the New Homotopy perturbation method, we get the analytic solution as

$$X(t) = \left[ \frac{c_1}{A} + \left( \frac{1}{X(0)} - \frac{c_1}{A} \right) \cdot e^{-At} \right]^{-1}, \text{ where } A = \frac{b_1}{1+sZ(0)} - d_1 - \frac{a_1Z(0)}{1+a_1T_1X(0)+a_2T_2Y(0)} \quad (7)$$

$$Y(t) = \left[ \frac{c_2}{B} + \left( \frac{1}{Y(0)} - \frac{c_2}{B} \right) \cdot e^{-Bt} \right]^{-1}, \text{ where } B = \frac{b_2}{1+sZ(0)} - d_2 - \frac{a_2Z(0)}{1+a_1T_1X(0)+a_2T_2Y(0)} \quad (8)$$

$$Z(t) = Z(0) \cdot e^{-Ct}, \text{ where } C = \frac{e_1a_1X(0) + e_2a_2Y(0)}{1+a_1T_1X(0)+a_2T_2Y(0)} - d \quad (9)$$

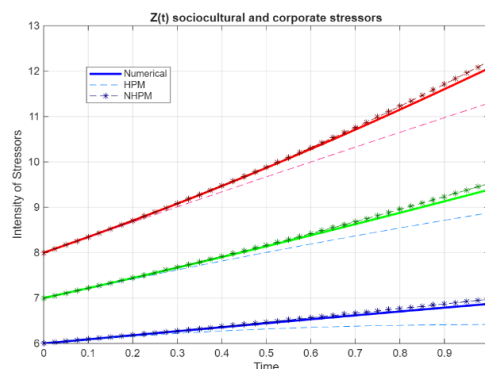
The following figures 1(a) to 1(c) simulated through MATLAB using ode45 solver illustrates the accuracy and robustness of the analytical approximation comparing the analytical solution derived through the HPM(dashed lines) and NHPM(\* marked lines) with the corresponding numerical solution(solid lines). This close agreement not only validates the method but also underscores its effectiveness in capturing and analyzing the complex dynamics of the system.



(a)

(b)





(c)

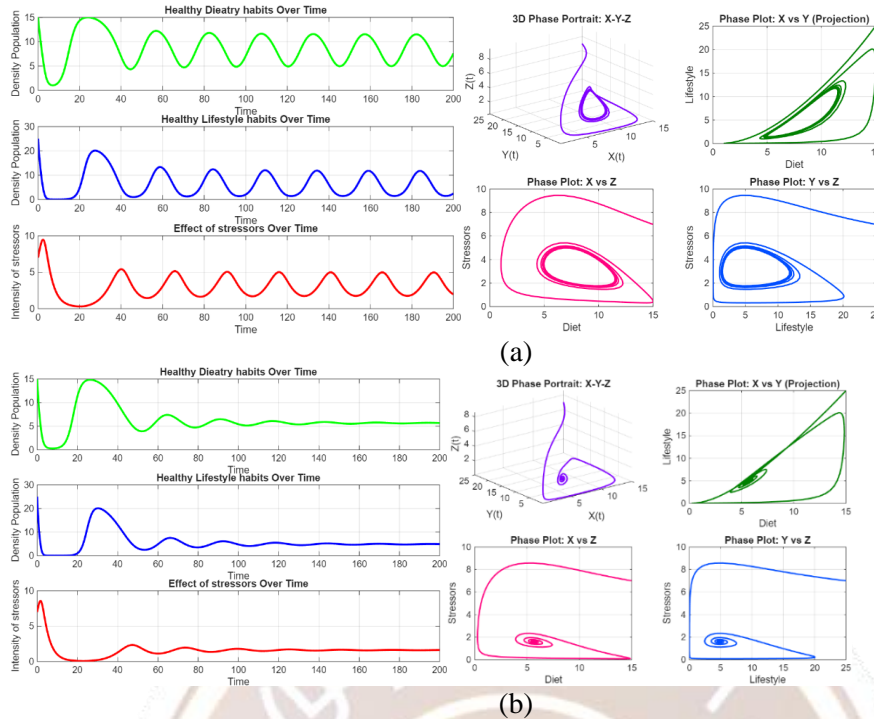
**Figure 1:** Comparison of numerical and derived analytic solution for different set of parameters in (a) X(t); (b) Y(t); (c) Z(t)

#### 4. Results and Discussions:

In this study, a nonlinear dynamical system was developed to investigate healthy lifestyle behaviours in the presence of corporate and cultural stressors. Adopting the fundamental structure of predator—prey model, a classical framework in ecology to elucidate population dynamics, we have analogously applied it interpreting the interplay between healthy dietary and lifestyle habits (prey) and institutionalized stressors (predator). Theoretical analysis confirms the existence of unique bounded positive solution for our system (1-3). The system's dynamics were found to possess seven steady states, including trivial solutions and those with zero states. In this section, we shall study the behaviour of the nontrivial positive coexistence Equilibrium point  $E^* = (X^*, Y^*, Z^*)$  which signifies a balanced coexistence where healthy living and modern sociocultural forces are in equilibrium, representing the maximum sustainable levels within the system dynamics.

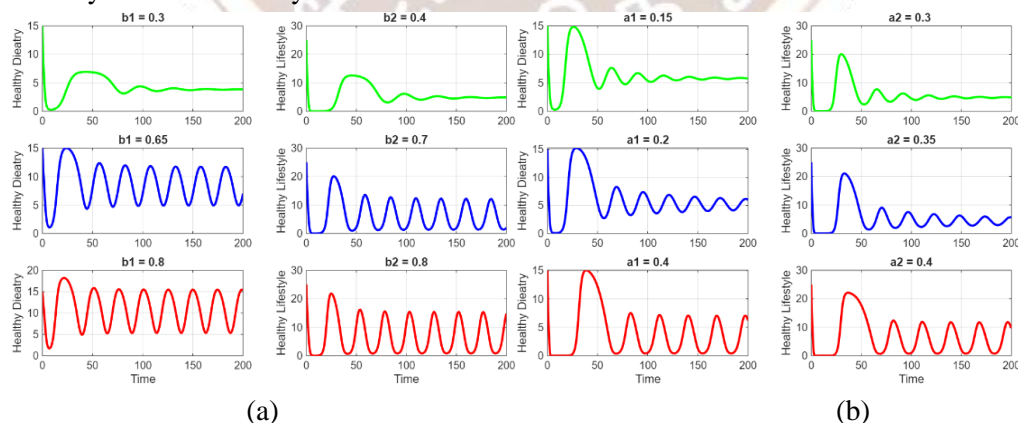
Stability analysis through Routh-Hurwitz criterion and Lyapunov function gives us the conditions for the existence of local and global stability of the point  $E^*$ . Bifurcation analysis revealed the occurrence of Hopf bifurcation for the parameter 's' (stress effect) where the system's stability changes, potentially giving rise to cyclical oscillations. Sensitivity analysis was conducted to understand the system's dynamic behaviour in response to changes in the critical parameter values. Now fixing the parameters such that they satisfy the conditions of global stability for the coexistence steady state  $E^*$ , we use MATLAB to simulate and explore the impact of the important parameters such as stress effect, intrinsic motivation and vulnerability to systemic influences. Figures 2 and 3 present graphical simulations that illustrate the temporal dynamics of the system.

Figure 2 shows the population density of individuals following healthy dietary, healthy lifestyle practices and the intensity of stressors, and their corresponding 2D and 3D phase portraits. Figures 2(a) and 2(b) specifically analyze the effect of varying the stress-induced suppression coefficient,  $s$ , for values of  $s = 0.05$  and  $s = 0.5$ , respectively. As depicted in Figure 2(a), a smaller value of  $s$  induces oscillations throughout the system, leading to the formation of limit cycles. Conversely, as the stress effect increases (Figure 2(b)), the oscillatory behaviour dampens, and the system moves toward a stable equilibrium. These simulations validate the existence of a Hopf bifurcation for the parameter  $s$ , providing key insights into the system's behavioral trends. This transition from a stable state—where a fixed population adheres to healthy routines—to an oscillatory state driven by a decrease in stress-induced suppression demonstrates how health-conscious populations and institutional stressors can co-evolve periodically continuously influencing one another. This finding provides a quantitative measure of the extent to which sociocultural or corporate pressure ( $Z$ ) can reduce the effective motivation to sustain healthy habits, even without direct coercion.



**Figure 2:** Simulations and Phase plane portraits with respect to variation in  $s$  (stress effect)  
(a)  $s = 0.05$ ; (b)  $s = 0.5$

Figure 3(a) illustrates how changes in intrinsic motivation affect the system under a low-stress condition ( $s = 0.045$ ). The simulations confirm that a higher level of health literacy, personal values, and preventive awareness leads to a greater proportion of the community periodically adopting healthy practices. Conversely, low motivation rates result in a smaller population adhering to healthy routines. Figure 3(b) further demonstrates the impact of increased susceptibility to stressors. With a constant stress effect ( $s = 0.45$ ) and adequate motivation levels ( $b_1 = 0.65$ ;  $b_2 = 0.7$ ), an increase in the power of influence from exposure to stressors can destabilize an otherwise stable system, causing it to exhibit oscillatory behaviour. This outcome suggests that even in a well-motivated population, increasing susceptibility to external pressures can dramatically reduce the number of individuals who can consistently maintain healthy routines.



**Figure 3:** Variations in  $X(t)$  and  $Y(t)$  with respect to changes in (a) intrinsic motivation rates for stress effect value  $s = 0.045$ ,  $a_1 = 0.2$ ,  $a_2=0.35$  and (b) systemic influences vulnerability for the stress effect value  $s = 0.45$ ,  $b_1=0.65$ ,  $b_2=0.7$ .

## 5. Conclusion:

In this study, we developed a nonlinear dynamical system to model the complex dynamics of healthy lifestyle adoption under the social, corporate, and cultural environment pressures. Analytical approximations were derived using HPM and NHPM techniques, and their accuracy was validated through numerical simulations in MATLAB. Through qualitative and stability analysis, we identified and examined the behaviour of the coexistence equilibrium point, which provided critical insights into the system's response to various parameters. Our findings elucidate the significant influence of factors including intrinsic motivation, the stress-induced suppression coefficient, and the systemic effects of vulnerability and exposure to stressors.

This work provides a robust theoretical foundation for understanding the persistence of healthy habits in the face of socioeconomic stressors. It offers a quantitative framework that can empower policymakers to design targeted, preventative strategies that not only mitigate the detrimental effects of socioeconomic pressures but also actively foster a foundation for healthier societies.

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## **40. PURSUING THE PERSONAL LEGEND: AN EXPLORATION OF DESTINY AND SELF-REALIZATION IN PAULO COELHO'S THE ALCHEMIST**

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### **Abstract**

Paulo Coelho's *The Alchemist* beautifully reflects on the idea of the "Personal Legend," a symbol of each person's unique destiny and higher purpose. This study looks at how the novel captures the journey of self-discovery, the strength required to persevere, and the role of faith in helping individuals realize their true potential. Following Santiago's path from the comfort of home to the vast deserts of Egypt, the research shows how both external trials and inner struggles shape one's pursuit of destiny. Coelho's narrative highlights the close connection between dreams, omens, and the choices people make, suggesting that fulfilment is not about material gain but about living in harmony with the deeper truths of life. In doing so, the novel reminds readers of the universal importance of courage, intuition, and self-belief, encouraging them to embrace their own journeys of growth and self-realization.

**Keywords:** Personal Legend, destiny, self-discovery, Paulo Coelho, *The Alchemist*, transformation, life journey

Paulo Coelho's *The Alchemist* has earned a unique place in contemporary world literature for its universal message about human aspiration and fulfilment. Since its publication in 1988, the novel has been read across cultures and languages, functioning both as a literary text and as a source of inspiration for millions of readers (Coelho 1993). At the heart of its appeal lies the concept of the "Personal Legend," which Coelho presents as an individual's true destiny or purpose in life. The novel tells the story of Santiago, an Andalusian shepherd boy whose journey toward his dream of discovering treasure near the Egyptian pyramids becomes an allegory of self-realization, courage, and spiritual awakening (Coelho 1993). While simple in its narrative style, the novel encapsulates profound philosophical, psychological, and spiritual dimensions, illustrating that the pursuit of one's Personal Legend is at once a journey outward into the world and inward into the self.

The notion of the Personal Legend is first introduced to Santiago by Melchizedek, the king of Salem, who explains that every individual is born with a purpose and that recognizing and pursuing it leads to fulfilment (Coelho 1993). Yet, as the king also warns, most people abandon their Personal Legend early in life due to fear, doubt, or conformity to societal expectations. Santiago's initial hesitation to leave behind the security of shepherding reflects this universal tension between comfort and calling (Coelho 1993). The dream of treasure compels him to embark on a quest that is both literal and symbolic. On the surface, it is a search for material wealth, but at a deeper level it becomes a metaphor for spiritual discovery and inner transformation. Coelho emphasizes that the Personal Legend is not an external achievement alone but an inner alignment with the universe's will, a path that requires openness to omens, persistence in adversity, and trust in the journey (Coelho 1993).

The idea of destiny in *The Alchemist* is complex, balancing determinism with free will. Santiago repeatedly encounters guides such as Melchizedek, the Englishman, and the alchemist himself, who provide wisdom but never force him to act. Their role is to illuminate possibilities, leaving Santiago to make his own decisions (Coelho 1993). In this sense, Coelho portrays destiny as a partnership between the individual and the universe: while the universe may "conspire" to help dreamers, the responsibility of action lies with the individual (Coelho 1993). Santiago's journey affirms that destiny is not a prewritten script but a potential that becomes reality through choice,

courage, and faith. By highlighting this interplay, Coelho engages with long-standing philosophical debates about fate and free will, ultimately suggesting that fulfillment lies in harmonizing divine purpose with human determination (Bloom 2000).

Alchemy itself becomes one of the central symbols of this journey. Traditionally concerned with transforming base metals into gold, alchemy in the novel is reinterpreted as the process of refining the human soul (Coelho 1993). Santiago learns that the true meaning of alchemy lies not in material transformation but in personal growth, resilience, and harmony with the world. The alchemist teaches him that “when we strive to become better than we are, everything around us becomes better too,” encapsulating the idea that the pursuit of one’s Personal Legend elevates not only the individual but also the broader community (Coelho 1993). The desert, another central symbol, functions as a space of testing, purification, and revelation. Its vastness and harshness challenge Santiago’s endurance, but it also offers him silence, clarity, and encounters with the divine (Coelho 1993). Just as gold must pass through fire to attain purity, Santiago must endure trials of faith, loss, and sacrifice to reach his treasure.

A recurring theme in Santiago’s journey is the role of fear as the greatest obstacle to achieving one’s destiny. At multiple points he nearly abandons his quest, overwhelmed by the possibility of failure or suffering. Yet Coelho underscores that fear itself is more paralyzing than the suffering it anticipates. The alchemist reminds Santiago that the fear of loss prevents many from realizing their dreams, a lesson that resonates deeply with modern readers (Coelho 1993). This insight aligns with psychological theories that identify fear of failure as a major barrier to self-actualization (Jung 1968). Santiago’s triumph demonstrates that courage is not the absence of fear but the determination to move forward despite it, suggesting that the path to one’s Personal Legend always requires confronting and overcoming inner doubts (Coelho 1993).

Love also plays a crucial role in shaping Santiago’s journey, particularly in his relationship with Fatima. Unlike many narratives where love distracts from ambition, Coelho portrays true love as something that supports and enriches the pursuit of personal destiny (Coelho 1993). Fatima’s willingness to let Santiago continue his quest without resentment affirms that genuine love does not confine but liberates. This perspective redefines love as complementary to personal growth rather than antagonistic to it (Coelho 1993). Santiago’s realization that he can both love Fatima and pursue his dream reflects Coelho’s larger message: personal fulfillment and relational harmony are not contradictory but deeply interconnected (Coelho 1993).

One of the reasons *The Alchemist* continues to hold universal appeal lies in the inclusiveness of the Personal Legend as a metaphor. Readers from diverse religious, cultural, and philosophical backgrounds can identify with Santiago’s quest. The novel incorporates motifs from Christianity, Islam, and mystical traditions, while also drawing upon classical and modern philosophies. Joseph Campbell’s framework of the Hero’s Journey provides a useful comparative lens: Santiago undergoes the call to adventure, trials and tests, encounters with mentors, transformation, and the eventual return with knowledge (Campbell 1949). Similarly, Carl Jung’s concept of individuation, the integration of conscious and unconscious elements of the self, can be seen in Santiago’s progression as he listens to omens, confronts fear, and learns to trust the “Soul of the World” (Jung 1968). These parallels show how Coelho’s narrative resonates with deep archetypal patterns in human storytelling.

Critics have often debated whether *The Alchemist* is primarily a work of literature or self-help in fictional form. Some, like Harold Bloom, argue that its simplicity and moral clarity reduce its literary depth, while others see its parable-like style as a strength, enabling it to function both as a novel and as a guide to personal reflection (Bloom 2000). Regardless of these debates, its global reception indicates that the novel fills a human need for stories that inspire courage and faith in one’s journey. Its enduring popularity suggests that readers find in Santiago’s story a mirror of their own struggles and aspirations, a reassurance that their dreams are not meaningless but connected to a larger order (Coelho 1993).

In conclusion, Paulo Coelho's *The Alchemist* dramatizes the pursuit of the Personal Legend as a timeless human quest for destiny and self-realization. Santiago's story illustrates that while the universe may align itself with dreamers, the responsibility to act with courage, resilience, and trust lies with the individual (Coelho 1993). Through its use of allegory, symbolism, and a deceptively simple narrative style, the novel conveys profound truths about fear, love, transformation, and purpose. Its success lies in articulating a universal human desire: to live a life of meaning by embracing one's true calling. By presenting the Personal Legend as both a metaphor for destiny and a practical guide to self-discovery, Coelho creates a narrative that continues to inspire readers across cultures (Coelho 1993). Ultimately, the novel reminds us that the real treasure is not only what we seek externally but also what we discover within ourselves when we dare to pursue our dreams.

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## 41. STRENGTH IN SUFFERING: A FEMINIST READING OF WOMEN IN

### CHEMMEEN

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#### Abstract

Thakazhi Sivasankara Pillai's *Chemmeen*, a landmark of Malayalam literature that blends tragic romance with social realism. While often celebrated for its depiction of coastal Kerala's fishing communities, the novel places women at the very heart of its narrative, portraying them as custodians of morality, agents of economic survival, and figures of tragic vulnerability. Through characters such as Karuthamma, Thakazhi explores the paradox of women who are simultaneously revered and repressed, endowed with symbolic significance yet denied personal agency. Read through feminist, socio-economic, and cultural lenses, the novel highlights women's "hidden labor," their subjection to patriarchal superstition, and their entrapment within honor codes that define their worth in relation to men. Yet, beyond suffering, *Chemmeen* foregrounds women's resilience the quiet endurance, solidarity, and everyday resistance that sustain life against adversity. The sea, feminized and maternal, becomes a metaphor for women's dual role as nurturers and potential disruptors, linking the narrative to ecofeminist readings. Ultimately, the women of *Chemmeen* emerge as archetypes of endurance whose lives mirror the ebb and flow of the sea, embodying strength, suffering, and resilience.

**Keywords:** Feminism, adversity, tragic romance, archetype, patriarchy

Women occupy a pivotal position in Thakazhi Sivasankara Pillai's novel *Chemmeen*, which remains a landmark in Malayalam literature and Indian regional writing. The narrative, while often read as a tragic romance, is equally a social document that captures the ethos of Kerala's coastal fishing communities. Within this world, women are not marginal but central: they embody the dialectic of strength and suffering, simultaneously sustaining the community and bearing its heaviest burdens. Their representation invites readings through multiple critical lenses—feminist, socio-economic, and cultural revealing how Thakazhi's realism invests ordinary women with symbolic weight. The significance of women in *Chemmeen* cannot be overstated, for they are at once custodians of cultural morality, agents of economic stability, and figures of tragic vulnerability whose lives mirror the rhythm of the sea itself.

Placed within the context of social realism, *Chemmeen* portrays women as indispensable agents of economic and cultural life. The men of the community risk their lives daily at sea, but the domestic and economic continuity of the society depends upon the women who remain on shore. They dry fish, trade in markets, manage scarce household finances, and perform ritual and cultural functions. These activities reflect what feminist critics often call the "hidden economy" of women's labor, which, though unpaid or undervalued, constitutes the backbone of subsistence communities. The novel's attention to these domestic and economic details situates it within the realist tradition of documenting everyday life, reminiscent of writers like Premchand in Hindi or Thomas Hardy in English literature, both of whom also depicted women as silent bearers of rural economies. Thakazhi's descriptive passages highlight the materiality of this work, offering a form of documentary realism that records women's contributions as integral to the community's survival. In this way, the novel resists the erasure of women's labor and instead foregrounds its necessity.

At the same time, these women are inscribed within an ideological framework dominated by patriarchy and superstition. The coastal community subscribes to the belief that the chastity and loyalty of women on shore determine the safety of men at sea. This cultural code is not simply a quaint superstition but a disciplinary mechanism that regulates female behavior and polices female

desire. In Foucauldian terms, it exemplifies how power operates through moral surveillance and communal discourse. Women thus become the bearers of moral capital: their bodies and conduct are seen as guarantors of collective fortune. Such a system simultaneously elevates and oppresses them, investing them with symbolic power while restricting their autonomy. Viewed through a feminist theoretical lens, this highlights the paradox of women as both revered and repressed, an ambivalence that runs throughout South Asian literary traditions. Much like the archetypal figure of Sita in the Ramayana, who is revered for her chastity but subjected to trials of purity, the women of Chemmeen are exalted symbolically while their actual agency is curtailed.

The figure of Karuthamma epitomizes this paradox. As the novel's tragic heroine, she is torn between her personal longing and the moral dictates of her community. Her story resonates with classical literary archetypes of the "doomed woman" whose desire challenges social codes, recalling both Greek tragedy and the tragic heroines of Indian epics. Karuthamma's love story with Pareekutty, for instance, may be read as a localized version of the eternal conflict between eros and social duty, akin to the dilemmas faced by tragic heroines like Hardy's Tess or Euripides' Phaedra. Yet Thakazhi does not present her as a passive victim. Karuthamma is endowed with psychological depth; her interiority, rendered through realist narration, allows readers to perceive her as an autonomous subject caught in structures beyond her control. Her strength lies in her emotional and moral endurance, her suffering in the impossibility of reconciling love with honor, and her resilience in the dignity with which she bears her fate. Critics have often noted that Karuthamma represents not only an individual but also the collective predicament of women in coastal Kerala, who are bound to a moral economy that both sustains and suffocates them. She emerges as a universal figure of tragic womanhood, embodying what Aristotle described in Poetics as the essence of tragedy: the downfall of a character both virtuous and flawed, shaped by forces greater than herself.

Other female characters, though less central, also embody the themes of strength, suffering, and resilience. The maternal figures, wives, and daughters of the fishing hamlet are sketched with ethnographic precision, illustrating how women form a community within a community. Their gossip, rituals, and networks of mutual aid create a sphere of female solidarity that mitigates but does not erase the oppressive structures around them. In Bakhtinian terms, these collective female voices function as a "dialogic counterpoint" to the male-centered narrative of fishing, danger, and the sea. Their laughter, gossip, and storytelling introduce moments of heteroglossia, allowing the text to register a multiplicity of perspectives. These women demonstrate that even within circumscribed social roles, agency is possible through everyday negotiation, resistance, and compromise. Their strength may not be dramatic or revolutionary, but it is grounded in the lived strategies of survival, which itself becomes a form of resistance to patriarchal oppression.

The suffering of women in Chemmeen is not merely personal but structural. Economically, they live with precariousness, for the caprice of the sea dictates their subsistence. Psychologically, they endure loneliness, grief, and the constant anxiety of waiting. Socially, they face the punitive mechanisms of gossip and honor codes, which reduce complex human emotions to simplistic binaries of purity and impurity. From a feminist critical standpoint, this reflects what Simone de Beauvoir identified as the condition of "the Other," where women are defined not on their own terms but in relation to male-centered narratives. In Chemmeen women's suffering is thus both an existential condition and a social construct. Furthermore, the novel also reveals the cruelty of social ostracism, showing how women bear disproportionate punishment for transgressions of desire. The sharp judgment of society, coupled with its dependence on women for stability, reveals the hypocrisy embedded in patriarchal structures. This irony forms one of the central critiques of the text, positioning Chemmeen as not merely a romantic tragedy but also a social critique of gender relations.

Yet what makes Thakazhi's portrayal enduring is not merely the emphasis on suffering but the recognition of resilience. The women of Chemmeen are resilient not because they escape their conditions but because they endure them with a tenacity that affirms life against adversity. Their resilience takes the form of practical improvisation, communal solidarity, and moral judgment. It aligns with what literary theorists identify as "everyday resistance"—quiet, non-dramatic acts that

sustain dignity within oppressive systems. In narratological terms, Thakazhi positions women as stabilizing agents in the plot, balancing the unpredictability of the sea and the rashness of men with patience, continuity, and moral gravity. One may also argue that their resilience constitutes a counter-narrative to the tragic arcs of the men who perish at sea; while men meet fate dramatically, women live through it, carrying the burdens of continuity.

The symbolic function of women in Chemmeen extends beyond the individual characters to the larger structure of the novel. The sea, often read as the primary metaphor, is feminized and maternal—nurturing but also destructive. The parallel between the sea and women suggests an ecofeminist reading, where both nature and women are subjected to control yet embody immense, uncontrollable power. Just as the sea cannot be fully mastered, women's desires and resilience elude complete regulation by social codes. The novel thus participates in a larger literary tradition that links female identity with elemental forces, underscoring both creative and destructive potential. Critics have noted how the sea's dual role as provider and destroyer mirrors the dual expectations of women as nurturers and guardians of morality, yet also as scapegoats when misfortune strikes. This symbolic doubling enhances the novel's tragic power, placing women at the center of its metaphorical universe.

In conclusion, Chemmeen represents women not as peripheral figures but as central to the life, morality, and survival of the community. Their strength is manifest in their economic labor, emotional endurance, and moral integrity; their suffering arises from patriarchy, superstition, and economic precarity; their resilience is found in their capacity to adapt, to endure, and to preserve dignity amid hardship. Through Karuthamma and the women around her, ThakazhiSivasankaraPillai crafts a narrative that is at once realist ethnography, social critique, and tragic romance.

The women of Chemmeen stand as archetypes of endurance, whose lives mirror the ebb and flow of the sea itself. By employing the techniques of social realism, symbolic metaphor, and psychological depth, Thakazhi not only immortalizes a particular community but also universalizes the struggles and resilience of women everywhere. The novel, therefore, may be read as both a love story and a feminist text *avant la lettre*, one that foregrounds women's centrality to cultural survival even as it exposes the injustices they endure.



## **42. WRATH AND REDEMPTION: A COMPARATIVE STUDY OF KANNAKI AND MEDEA AS ICONS OF FEMALE JUSTICE.**

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### **Abstract**

Throughout history and across cultures, stories of women who suffer betrayal and injustice have captured the human imagination. Two such figures Kannaki from the Tamil epic Cilappatikaram and Medea from Greek mythology stand out as powerful examples of women who become victims but refuse to be silent or powerless. Both face deep personal betrayals by the men they love, and their responses are marked by intense emotion and strong actions. Though separated by geography and culture, Kannaki and Medea highlight the struggles women face in patriarchal societies and explore themes of pain, revenge, and the search for justice.

Literary traditions across time and civilizations have consistently grappled with the themes of betrayal, suffering, vengeance, and justice, often through the portrayal of iconic female figures. Among these figures, two women stand apart not only because of the power of their stories, but also because of the complex emotional and moral landscapes they navigate: Kannaki, the central figure in the Tamil epic Cilappatikaram, and Medea, the tragic heroine of Euripides' renowned Greek play. Despite arising from vastly different cultural backdrops ancient South Indian Tamil society and classical Greece both Kannaki and Medea are remembered for their uncompromising responses to betrayal and injustice. They are women who wield their suffering like a weapon, challenging not only the men who wronged them but also the broader systems that allowed such wrongs to occur. Their stories offer compelling explorations of gender, power, agency, and moral authority, and they continue to resonate across cultures and generations.

Kannaki, as portrayed in Cilappatikaram, is introduced as the ideal Tamil woman: loyal, virtuous, patient, and pure. She is married to Kovalan, a prosperous merchant who, despite her devotion, abandons her for a courtesan named Madhavi. Kannaki remains faithful throughout, enduring this abandonment without retaliation or malice. She embodies the Tamil concept of karpu, or chastity, which was seen not merely as sexual purity, but as a moral and spiritual force that granted women power through virtue. When Kovalan returns to her in disgrace and poverty after squandering all his wealth, Kannaki forgives him without reproach. Her forgiveness is not a sign of weakness but of a deep inner strength that defines her character. She agrees to accompany him to the city of Madurai in the hope of rebuilding their lives. There, however, a tragic turn of events unfolds: Kovalan attempts to sell one of Kannaki's anklets to regain financial stability, but is falsely accused of theft, as the queen's anklet had recently been stolen. Without a proper investigation, the king orders Kovalan's execution.

Kannaki's transformation from a quiet, virtuous wife to a powerful avenger of injustice is both shocking and awe-inspiring. Upon discovering Kovalan's death, she rushes to the court, anklet in hand, and proves her husband's innocence by showing that her anklet contains rubies, whereas the stolen royal anklet contained pearls. The revelation exposes the hasty, unjust, and authoritarian decision of the king, who is devastated by guilt and dies on the spot. Kannaki, in a rage not born of personal vengeance but of cosmic injustice, curses the city of Madurai. Her curse is not merely symbolic it results in the physical destruction of the city by divine fire. Her grief and anger are channeled through a spiritual and moral force, aligning her with divine will. Ultimately, she is assumed into heaven and deified as Pattini (the chaste woman) or Kannaki Amman in various South Indian and Sri Lankan traditions, where she is worshipped as a symbol of virtue, moral strength, and justice.

Medea, on the other hand, presents a very different narrative arc, one that is steeped in psychological tension and moral ambiguity. A princess from Colchis and a powerful sorceress, she defies her family and homeland out of love for Jason, aiding him in obtaining the Golden Fleece by using her magical powers and even committing fratricide. She sacrifices everything—family, homeland, and identity—for her husband. Initially, she is a romantic figure: passionate, loyal, and willing to risk it all. However, unlike Kannaki's world, Medea's world is not one of clearly defined moral values upheld by divine justice. When Jason, years later, betrays her by marrying Glauce, the daughter of King Creon of Corinth, for political gain, Medea is cast aside. In response, her love turns to hatred, and her loyalty curdles into a deep, destructive rage.

Medea's revenge is elaborate, brutal, and calculated. She sends Glauce a poisoned robe and crown, which leads to the princess's horrific death and that of her father, Creon. But the most devastating act comes when she murders her own two children, not out of hatred for them, but to inflict unbearable pain on Jason and deny him any legacy or comfort. Medea's actions cross all traditional boundaries of morality and womanhood—especially motherhood. In Greek society, a mother's love was sacrosanct; to kill one's own children was an unthinkable horror. And yet, Euripides gives Medea powerful, reasoned monologues where she debates her decision with herself, acknowledging the agony of the choice even as she resolves to carry it out. She is not portrayed as mad or possessed but fully aware, intellectually sharp, and in command of her decisions. The audience is left grappling with her moral complexity: is she a monster, or is she a product of a society that leaves women no power except through destruction?

The parallelism between Kannaki and Medea lies in the origins of their respective descents into fury and vengeance. Both women are betrayed by the men they love, both are exiled from their secure lives, and both suffer tremendous personal loss. Yet their responses, though equally fierce, differ in purpose and cultural interpretation. Kannaki's fury is rooted in dharma—a righteous sense of justice that seeks not personal retribution but cosmic balance. Her actions are ultimately restorative. Medea's vengeance, however, is retributive and deeply personal. She does not seek societal change or divine justice but aims to destroy her betrayer's life, even at the cost of her own humanity. This makes her a deeply tragic figure—one whose pain turns inward and becomes self-destructive.

The differing receptions of these two characters also highlight cultural values and ideologies. Kannaki is sanctified. Her image adorns temples, and her story is invoked as a model of righteous womanhood. She becomes a protector deity, especially for women, and her tale is integrated into religious and moral teaching. Her story offers reassurance that virtue and truth will prevail, even against kings. She becomes a symbol of justice against the tyranny of power, and her chastity is seen as the source of her divine strength. Medea, by contrast, is feared and reviled, though also admired for her strength and intellect. She becomes a symbol of female rage and agency, challenging patriarchal assumptions and asserting control in a world that denies women any power. Her story offers no moral comfort; instead, it forces audiences to confront the extremes of human emotion, the fragility of social norms, and the devastating consequences of betrayal.

It is important to consider the symbolic and literary functions these women serve. Kannaki, while powerful, remains within the moral boundaries defined by her society. Her chastity, her role as a faithful wife, and her righteous wrath are all culturally sanctioned. Even her act of destruction is morally justified and divinely approved. She represents a force that restores order when justice is miscarried. Medea, on the other hand, operates outside of and against the boundaries of acceptable behavior. Her power is threatening because it is not confined by social norms. She is the 'other'—a foreigner, a sorceress, an intellectual, and an autonomous woman. Her story is not about restoring order but about laying bare the consequences of societal failure, gender inequality, and emotional abandonment. She is both victim and villain, a paradoxical figure who refuses to be reduced to a single role.

In reflecting on both Kannaki and Medea, one finds two towering figures of female strength and resistance. They differ in their motivations, their methods, and the cultural meanings attached to their stories, but both articulate a profound challenge to the systems of power that wronged them.

Kannaki's story comforts with its assurance of divine justice; Medea's story disturbs with its refusal to grant such closure. Kannaki is vindicated by the gods; Medea defies both gods and men. In Kannaki, we find moral clarity and divine order; in Medea, we find psychological complexity and moral ambiguity. Yet both women, in their own ways, assert their voices in a world determined to silence them, forcing that world to witness the power of their pain.

These characters continue to endure not only because of the dramatic power of their stories but because they tap into fundamental questions about the human condition: What is justice? What does it mean to be wronged? How far will someone go to reclaim their dignity or assert their voice? Kannaki and Medea provide two very different answers, but both speak with a timeless resonance. Through them, literature gives us not only unforgettable stories, but enduring mirrors through which we examine society, morality, and the possibilities of feminine power.

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### **43. BEHIND CLOSED DOORS: THE UNSEEN STRUGGLES OF WOMEN IN SHOBHAA DE'S SNAPSHOTS**

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#### **Abstract**

Shobhaa De's *Snapshots* presents a penetrating study of the hidden dimensions of women's lives in contemporary Indian society. Structured as a series of interconnected vignettes, the novel mirrors the fragmented realities of its characters, capturing fleeting yet powerful moments of self-reflection, repression, and emotional intensity. Behind the polished exteriors of wives, mothers, professionals, and socialites lie unspoken struggles that reveal the tensions between personal desire and cultural expectation. This paper examines *Snapshots* through feminist and psychoanalytic frameworks to explore how women negotiate identity, love, and societal duty. De's characters wrestle with conflicting roles: while they seek autonomy and fulfillment, they are simultaneously constrained by patriarchal norms that demand silence, sacrifice, and conformity. Love and desire are depicted not as purely liberating forces but as ambivalent experiences that often reinforce emotional captivity. At the same time, De emphasizes the invisible burden of emotional labor, showing how women internalize societal pressures at the cost of psychological well-being. Yet, within these struggles lie subtle forms of resistance—moments of awareness, rebellion, and self-assertion that reflect women's resilience. By portraying both oppression and agency, De transforms the private realm into a space of critique, exposing the unseen battles waged behind closed doors.

**Keywords:** Feminism, Psychoanalysis, Women's Identity, Societal Expectations, Patriarchy

#### **Introduction**

Shobhaa De, an acclaimed Indian author, is known for her bold representation of women and her critique of societal norms. In *Snapshots* (1995), De presents a collection of interconnected vignettes that explore the emotional and psychological struggles of urban Indian women. Far from mere portrayals of victimhood, these stories delve into the hidden layers of women's experiences, offering a rich exploration of their inner lives. The title *Snapshots* suggests fleeting glimpses into private moments, but each vignette reveals deeper psychological realities. Through the lens of feminism and psychoanalysis, this article examines how De articulates the inner tensions faced by women as they navigate roles imposed by culture, tradition, and personal desires.

#### **Fragmented Narratives, Fragmented Selves**

Shobhaa De's use of a fragmented narrative form mirrors the fractured experiences of women whose lives are shaped by multiple, often conflicting roles. Each "snapshot" in the novel captures a moment of emotional intensity—confession, realization, or repression—highlighting the compartmentalization of women's lives. The six central female characters—Aparna, Reema, Rashmi, Surekha, Noor, and Dolly—appear at a reunion, but the narrative quickly splinters into flashbacks and individual stories that reveal their secrets.

For example, Reema, who outwardly appears as a perfect hostess, is burdened by her disintegrating marriage and emotional emptiness. Similarly, Dolly hides her suppressed lesbian orientation while maintaining her social identity as a dutiful wife. These incomplete, episodic revelations function less as linear biographies and more as psychological case studies, emphasizing that a woman's identity is not monolithic but rather layered, fluid, and constantly negotiated against societal demands. The lack of narrative continuity thus mirrors the lack of coherence many women feel in their lived realities—split between duty and desire, public roles and private selves.

#### **The Struggle for Identity**

One of the most central conflicts in *Snapshots* is the tension between self-identity and societal expectation. De's female characters often grapple with roles as daughters, wives, mothers, and professionals, even as they yearn for autonomy and self-definition. Aparna, a successful advertising executive, exemplifies this tension: while she holds professional authority and financial independence, her personal life is stifled by a husband who expects traditional subservience.

This identity conflict reflects Simone de Beauvoir's assertion in *The Second Sex* that "one is not born, but rather becomes, a woman"—social roles shape women into identities that often suppress individuality. Similarly, Nancy Chodorow's theories on the reproduction of mothering resonate in characters like Surekha, who struggles with the emotional burdens of her maternal role while suppressing her authentic desires. These inner struggles often manifest in psychological conflicts—depression, anxiety, guilt—when women oscillate between compliance and rebellion. Thus, De's characters resist being reduced to passive victims; instead, they embody the painful but active process of self-assertion.

### **Love and Desire: Liberation or Captivity?**

Love and sexual desire play complex roles in *Snapshots*. De refuses to romanticize love; instead, she portrays it as a double-edged sword. On one hand, relationships offer fleeting moments of passion and escape from loneliness. On the other, they reinforce patriarchal control through emotional dependency and marital obligation. The women's affairs and hidden desires expose the contradictions between personal yearning and social duty. Noor, an actress, experiences both the thrill of love and its suffocating demand for loyalty, while Dolly's unspoken lesbian love reveals the emotional captivity imposed by heteronormative marriage. Desire becomes both liberating and entrapping—a psychological battleground where women experience longing and resentment simultaneously. This aligns with psychoanalytic readings of desire as a site of conflict between the unconscious self and external societal restrictions.

### **The Invisible Burden of Societal Expectations**

A dominant theme in *Snapshots* is the unseen burden placed on women by cultural norms. The pressures to be perfect wives, dutiful mothers, successful professionals, and graceful socialites rarely receive acknowledgment or validation. Yet these demands extract a deep emotional and psychological toll. For example, Rashmi projects an image of a glamorous, confident woman, yet she silently bears the weight of betrayal and disillusionment in her marriage. Reema, too, conforms outwardly to the ideal of a hospitable hostess while inwardly grappling with alienation. Their silent suffering highlights the feminist argument that "the personal is political"—women's emotional labor, too often dismissed as private or natural, is a structural issue embedded within patriarchal systems. De's stories expose how women internalize societal expectations until they lead to breakdowns, silent rage, or existential emptiness.

### **Psychological Rebellion and Self-Realization**

Despite the overwhelming pressure to conform, many characters in *Snapshots* show moments of self-awareness and psychological rebellion. These acts are subtle rather than dramatic—quiet shifts in perspective, small acts of resistance. Aparna begins to assert her independence by rejecting the guilt surrounding her sexual desires, while Reema questions the worth of her marriage. Surekha rethinks her position as a silent sufferer.

Though these gestures may not culminate in radical social transformation, they represent crucial steps toward reclaiming agency. These glimpses of rebellion underscore the power of introspection in the journey toward self-realization. De portrays her characters as fractured but resilient women, engaged in an ongoing negotiation of identity against societal currents. Such portrayals resonate with contemporary feminist psychoanalytic readings, which see resistance not only in overt defiance but also in the subtler assertion of inner voice.

### Conclusion

Shobhaa De's *Snapshots* is a powerful exploration of the unseen emotional and psychological battles women fight in their everyday lives. Through a fragmented structure and richly drawn characters, De reveals how societal roles and expectations often conflict with personal desires and identity. The women in *Snapshots* are not mere victims—they are individuals navigating complex emotional terrains, attempting to find coherence in the face of fragmentation. Analyzed through feminist and psychoanalytic frameworks, the novel illustrates how women's inner lives are deeply shaped by external social forces. In offering a voice to these invisible struggles, De not only critiques societal norms but also reclaims the inner world of women as a space of power, pain, and potential.

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#### **44. BEYOND THE HUMAN GAZE: A COMPARATIVE ECOCRITICAL STUDY OF HARDY'S WESSEX AND VANDERMEER'S AREA X**

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#### **Abstract**

This paper explores how the fictional settings in literature can act as an important driving force that shapes the plot of the novel. It compares two very different fictional geographies, Thomas Hardy's Wessex and Jeff VanderMeer's Area X, to understand how nature is represented in each. While Hardy's Wessex is based on real places in Southwest England, it reflects the characters' emotions, inner turmoil, societal problems and the slow decline of rural life in the Victorian era. In contrast, VanderMeer's Area X is a mysterious place which decentres the human, transforms people and challenges their identity, science and nature itself. By comparing Wessex and Area X, this paper highlights how literature reflects changing attitudes towards nature and the environment. These fictional landscapes encourage readers to move beyond a human centered view of the world and to see nature as something active, alive, and interconnected with human life.

**Keywords:** Settings, Narrative agent, Social problems, Ecocritical, Interconnectedness.

#### **Introduction**

Throughout history, literature has explored the intricate relationship between people and their environment, seeing the environment as more than just a place; it is a powerful force that shapes perception, identity, and fate. Thomas Hardy's fictional Wessex and Jeff VanderMeer's Area X, are two distinct settings but thematically related landscapes that transcend their physical characteristics to play important roles in the plot. Immersed in the Victorian era's rural realism, Hardy gives his imagined landscape agricultural cycles, seasonal changes, and moral significance to highlight the precarious position of human fate in relation to the natural world, either in harmony or conflict. VanderMeer, on the other hand, presents an ecocritical and posthuman viewpoint that reinterprets nature as a transformational, foreign force that transcends human comprehension and blurs the boundaries between the human and the environment. This comparative study explores how both writers produce fictional landscapes that speak to ecocritical concepts, looking at how location functions as a dynamic force that affects and overturns human existence in addition to providing a setting for action.

Thomas Hardy (1840–1928) was a prominent English novelist and poet during the Victorian era. Although Hardy had architectural training, he made literature his full-time career. Deep emotional conflicts, the impact of fate and the environment on human lives, and realistic portrayals of rural life are all hallmarks of his writings. *The Mayor of Casterbridge*, *Jude the Obscure*, *Far from the Madding Crowd*, and *Tess of the d'Urbervilles* are a few of his best-known works.

Jeff VanderMeer, born in 1968, is a contemporary American writer. He is recognized for his significant impact on speculative fiction, and eco-fiction. His series named *Southern Reach Trilogy*, explores themes of ecological transformation, mental unravelling, and the limits of human understanding, brought him widespread acclaim. His fiction questions traditional divides between the human and nonhuman, self and environment, as well as knowledge and ignorance, drawing heavily from Posthumanist and ecocritical perspectives. Some of his novels include *Veniss Underground*, *Shriek: An Afterword*, *Borne*, *Dead Astronauts* etc.

### **Imagined geography**

One of the first things the authors confront while writing a novel is where to set it. Is it better to set a story in a real place or a fictional one? According to M.H. Abrams, the setting refers to the location, time, and social context in which all the actions unfold. He noted that in theatrical productions, the setting, also referred to as decoration, establishes the stage to represent a specific place. The setting acts as the backdrop of an event in prose, encompassing elements such as place, time, or incidents that serve both physical and psychological purposes. Apart from a mere background, a setting could be perceived as a dynamic, constructed element of a narrative and sometimes a lead of the story. According to Edward Soja, setting is a vital force that gives a shape to the novel, which can even propel a plot forward. “Coleridge’s imagination is able to “create” rather than merely resemble, by dissolving the fixities and definites the mental pictures or images, received from the sense and unifying them into a new whole” (Abrams 123), according to Coleridge, imagination reshapes and transforms sensory experiences into new, unified creations, rather than just making a faithful copy of a reality. Many writers over the years have preferred to create an imaginary setting. Because they believe that it gives them a sense of freedom to express their thoughts, it is more akin to their creative output, where they could design their own country or town based on the novel's subject. The imaginative setting expands the limits of reality and invites the readers to explore the abstract, the symbolic, and the fantastical elements. One of the main advantages of an imaginative setting is that it provides a space where the conventional rules of time, space, and logic can be bent or broken. For instance, J.R.R. Tolkien’s Middle-earth, Lewis Carroll’s Wonderland, William Faulkner’s Yoknapatawpha, etc., all serve as the primary settings for all of their novels. Conversely, dystopian environments serve as a critique of authoritarian regimes and surveillance practices. For instance, George Orwell’s *1984* and Margaret Atwood’s *The Handmaid’s Tale* illustrate this point. The fictional worlds depicted in these works reveal the risks inherent in human society and the erosion of personal identity. This also heightens the emotional and psychological resonance of the story. Meanwhile, in Samuel Beckett’s *Waiting for Godot*, one can observe a desolate and timeless backdrop that reflects the futility and absurdity of human life. Therefore, imaginative settings enhance literature by offering unique contexts for storytelling and critical analysis. Whether they are magical, dystopian, surreal, or symbolic, they create a memorable impact and expand our comprehension of both imaginary realms and our own reality.

### **Ecocriticism**

The phrase “ecocriticism” is thought to have been first used by William Rueckert in 1978. It refers to the examination of the connection between literature and the environment through an interdisciplinary lens, which draws inspiration from American transcendentalism. In the UK, the analysis of literature and the environment is referred to as “green studies,” which is influenced by romanticism. Ecocriticism is closely linked to ecology. The term “ecology” was introduced by Joseph Meeker in his book *The Comedy of Survival: Studies in Literary Ecology*. Ecology studies the relationships among living organisms, including humans, and their physical surroundings. Joseph Meeker defined the literary ecology as, “the study of biological themes and relationships which appear in literary works. It is simultaneously an attempt to discover what roles have been played by literature in the ecology of the human species” (Meeker 9). Human beings rely on nature for essential needs such as air, food, and water, just as nature relies on them. Therefore, this mutually beneficial relationship between humans and the natural world, along with everything within it, thrives and is safeguarded when humans recognize environmental issues and work to resolve them for the benefit of nature. When ecocritics analyse a piece of literature, they explore how nature is portrayed and seek answers to questions like how the physical setting influences the representation of nature, how literature shapes human interactions with the environment, and whether the values present in that artistic work align with ecological principles.

In literature, often nature serves as a metaphor for human moods and themes. It symbolizes various concepts ranging from beauty to chaos. For instance, in Arnold’s “Dover Beach,” one could witness the sea’s significant role, like setting a mood, symbolizing human life and emotions, serving



as a metaphor for faith, and finally mirroring the dual nature of life that is peace and the reality of uncertainty. The writers of the Romantic era had used nature to underscore the individualism and self-reflection. Hence, the narratives set in nature provide how the characters in the novel are related to the environment by revealing aspects of their personality.

### **Wessex: A Realm of Memory, Loss and Sufferings**

Wessex was one of the kingdoms that comprised Anglo-Saxon England. The term “Wessex” is derived from the Old English version of “West Saxon.” This kingdom is believed to have been established around 494 AD by Saxon invaders in Britain. Today, it has evolved into what is known as the West Country, a loosely defined region in southwest England, typically including the counties of Cornwall, Devon, Dorset, Somerset, and Bristol, with some people considering it to encompass all or parts of Wiltshire, Gloucestershire, and Herefordshire. Thomas Hardy, who was born in Dorset, found inspiration in his local surroundings, and he crafted an imaginative Wessex filled with numerous rural characteristics.

Tess from Hardy’s *Tess of the d’Urbervilles* can be viewed as a representation of nature. Much like how nature selflessly safeguards humanity, Tess, as the eldest daughter in her family, also dedicates her life to caring for them. Her existence parallels the fluctuations of seasons, terrains, and the behaviour of animals. Considering how settings can influence the characters, Tess’s life can be categorized into two parts: first, her fortunes that align with the changing seasons, and second, the various locations that correspond with her different life phases. In this novel, Hardy employs seasonal changes not merely as a setting, but as a reflection and trigger for Tess’s emotional state. The structure of the novel aligns with the natural farming calendar, and each transition between seasons symbolizes a psychological shift within Tess. For instance, Tess goes to the d’Urbervilles in the spring, when a lot of people begin looking for new jobs and working hard to sustain themselves. Tess’s sorrowful journey starts in the spring, which marks the beginning of the full year. Alec abuses her sexually during the summer. Her decline continues into the fall of the year. After her distressing encounter with Alec, Tess departs from the d’Urberville residence with all she owns, and upon returning home, the approach of a dismal and bitter winter leaves her feeling deeply depressed. Tess gradually starts to recover, just as the environment around her. For most, Autumn is a season of harvest, when crops are ripening and harvests are plentiful, and people are busy collecting the products of their labour and celebrating a year of hard work. But autumn also brings with it a more subdued reality: brisk winds, bare trees, dropping temperatures, and the imminence of winter. The richness of the season is in stark contrast to Tess’s predicament. The stunning beauty of the season contrasts sharply with Tess’s difficulties. Even though she has some of her best times with Angel during this period, there is a harsh irony, her brief happiness is based on intense pain and ultimately brings to her demise. Winter, which represents both a beginning and an end, is the season she chooses for their wedding as well, that ultimately ends in tragic.

Hardy’s locations are more than just beautiful scenery; they are active elements of the narrative that shape and mirror Tess’s fate. These regions, which are located in his fictional Wessex, are equivalent to real locations in Dorset, Somerset, Wiltshire, and Devon; however, Hardy gives them symbolic meaning by giving them made-up names. Tess’s birthplace of Marlott, which is modelled after Marnhull in Dorset, is a remote that stands for her innocence and unadulterated rural roots. She first meets Alec in Trantridge, which becomes a source of moral danger and threat before she is assaulted. Inspired by the lush Frome valley close to Maiden Newton, Talbothays Dairy gives Tess her most hopeful and upbeat time, filled with the wonders of nature and the promise of love with Angel Clare. Conversely, Tess’s physical exhaustion, emotional dejection, and the unrelenting nature of agricultural labour are all reflected in Flint comb-Ash, a hard upland farming area that is probably close to Puddletown Heath. Lastly, Sandbourne, based on the coastal town of Bournemouth, offers a superficial, genteel ease appealing yet detached from the pastoral environment that moulded her acting as the backdrop for her final desperate act. Collectively, these varied landscapes create a symbolic geography that tracks Tess’s transformation from innocence to anguish and ultimately to



tragedy, intertwining her emotional and moral journey with the natural and social contexts of Hardy's Wessex.

### **Area X: The Living Landscape**

Jeff VanderMeer's Area X is an enigmatic, uninhabited territory filled with strange, unsettling landscapes and peculiar, often unclassifiable living creatures. When VanderMeer was inquired about the source of inspiration for the setting in *The Southern Reach*, has pointed to the marshes of North Florida, particularly the St. Marks Wildlife Refuge as the most similar real-world representation of Area X. Contrary to the typical perception of nature as vibrant, nurturing, and supportive of life, Area X depicts a version of the natural world that is alien, unpredictable, and transformative. In this manner, VanderMeer reconceptualizes nature as an independent, unfathomable force, one that pushes against the limits of what is known and what is not.

Jeff VanderMeer's *Annihilation* the first novel of *The Southern Reach Trilogy* narrates the journey of a biologist at the helm of an all-female team venturing into Area X, a bizarre and isolated wilderness. While they navigate ever-changing terrains and disturbing life forms, the fabric of reality begins to break down. The Area X is enclosed by an unseen boundary, where flora and fauna undergo mutations, and time operates irregularly. The members of the expedition are strictly prohibited from using modern gadgets, "We had no cell or satellite phones, no computers, no camcorders, no complex measuring instruments" (VanderMeer 7). They quickly realise they lack both the terminology and the tools necessary to grasp Area X. A crucial element of this lack of understanding is the issue of scale: the area's dimensions are unknown, and some of the beings within Area X are incomprehensibly massive.

The only individual who appears to have a unique outlook on Area X is 'the biologist'. Her deep interest in nature and her readiness to embrace the new surroundings ultimately prevent her from perishing. At the start of the narrative, she was put under hypnosis by her colleague, the psychologist. When the expedition team chose to venture into the enigmatic "tunnel," which was not marked on their maps, the biologist accidentally breathed in a spore that altered her body, "the spores until I could see what long-term effects they might have on" (VanderMeer 27). After a while, when the psychologist attempted to hypnotize her again, she showed no response because the spore made her immune to it. She transformed into a being of enlightenment. She refers to the mysterious tunnel as a "tower", "That night we talked about the tower, although the other three insisted on calling it a tunnel" (VanderMeer 12). Furthermore, she uncovered that the walls of the tower are alive and bear writings, "The words were composed of symbiotic fruiting bodies from a species unknown to me" (VanderMeer 26). For the biologist, Area X serves as a kind of sanctuary. In fact, she would happily choose to spend the rest of her life here. She is profoundly struck by the bizarre landscape of Area X. In her view, Area X represents land that is entirely pure and untarnished, filled with raw beauty. She observes, "The air was so clean, so fresh, while the world back beyond the border was what it had always been during the modern era: dirty, tired, imperfect, winding down, at war with itself" (VanderMeer 30). She has completely devoted herself to Area X.

The slow deterioration of human identity, beginning with deliberate institutional suppression and progressing to ecological unification, has also been shown by VanderMeer. Crucially, the impact of the environment is closely associated with this breakdown of self. Area X is a dynamic, changing force that affects the protagonists, erasing their sense of self and changing them into something other than human, rather than just serving as a static background for human behaviour. Before the team ever sets foot in Area X, this metamorphosis is already underway. All personal identities are eliminated by the Southern Reach organization, which instead gives its members functional titles: "They took away our names in the month, stripped them from us. The only names applied to things in Area X, only in terms of their most general label" (VanderMeer 67). By removing names, the narrative deprives readers of a conventional emotional bond, mirroring the expedition participants' experience of depersonalization.

The landscape itself threatens to undermine their identities as they enter Area X. The area is constantly changing; landmarks fade, paths vanish, and coastlines change, “The border is advancing...a little bit more every year,” the statement reads. (VanderMeer, 157). In normal settings, a sense of self and orientation are provided by stable geography; in these situations, instability causes uncertainty and weakens the mental frameworks that bind the self to known surroundings. Without trustworthy markers, the characters lose their psychological foundation in addition to their sense of direction.

Additionally, the ecosystem actively blends the lives of humans and nonhumans. interactions that are hybrid, such as “Then something more wrenching occurred. As they slid by, the nearest one rolled slightly to the side, and it stared at me with an eye that did not, in that brief flash, resemble a dolphin eye to me. It was painfully human, almost familiar” (VanderMeer 97), it diminishes the distinctions between species, implying that the human singularity is fading. The biological impact of the environment is demonstrated by the biologist's own transition, which was brought on by breathing in spores: “The brightness within me flared up” (VanderMeer 144). She is able to connect with the nonhuman rhythms of Area X because of her metamorphosis, which is more than just a physical alteration.

### Conclusion

The contrasting yet intertwined worlds of Hardy's Wessex and VanderMeer's Area X demonstrate how imagined landscapes serve as more than just literary settings; they are dynamic structures that embody philosophical inquiry, ecological consciousness, and cultural ideals. Hardy illustrates the mutually reinforcing relationship between human existence and the rural environment by grounding his characters in the cyclical rhythms of nature through his pastoral landscapes. VanderMeer's scary wilderness, on the other hand, subverts human identity by presenting a world in which the nonhuman dominates and modifies the essence of life. However, both writers challenge readers to reconsider the traditional anthropocentric viewpoint, encouraging an awareness of the important influence of the environment on stories and human experience. Their works highlight the enduring significance of ecocritical perspectives in literature's role in reflecting and modifying humanity's relationship with the natural world by depicting nature as an agent of change, whether in a balanced or unsettling manner.

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## **45. FEMALE DESIRE AND SOCIAL CONSTRAINTS: UNPACKING WOMEN'S EMOTIONAL AND PHYSICAL DESIRES IN THE VINE OF DESIRE**

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### **Abstract**

Chitra Banerjee Divakaruni's *The Vine of Desire* (2002) explores the entangled lives of Anju and Sudha, two cousins bound by sisterhood and tested by displacement, betrayal, and unspoken desires. As the novel progresses further from *Sister of My Heart*, it enters more profound psychological and emotional space, focusing on women's desires and the oppressing forces which hold them back. The paper analyzes female desire in two aspects - emotional and physical - in the context of patriarchal, diasporic, and cultural norms. Based on feminist literary theory, it contends that Divakaruni represents women's desire not just as individualistic but as socially subversive, undermining conventional constructs of womanhood. Desire is also the space of resistance and self-making, allowing women to reconquer agency in the context of repression.

**Keywords:** female desire, patriarchy, diaspora, emotional longing, sexuality, feminist criticism

Desire has long been a conflicted space in women's writing. While male lust has been, in some contexts, normalized and even valorized, female lust - emotional or carnal - has been repressed, stigmatized, or made invisible. South Asian fiction, in keeping with classical ideals of chastity and filial responsibility, tends to represent women as self-abnegating figures whose honor lies in renunciation, not in fulfillment. Chitra Banerjee Divakaruni defies this paradigm in *The Vine of Desire*, in which the inner lives of women are foregrounded.

Being a diasporic author, Divakaruni places her heroines in cross-cultural situations in which the clash between modernity and tradition heightens the women's conflicts. Anju and Sudha represent women torn between their private desires and communal realities - between their desire for love, closeness, and recognition, and the burdens of patriarchal definitions. Divakaruni critiques gendered double standards and challenges whether women are able to create spaces of freedom within oppressive cultural structures through these protagonists.

This essay aims to unpack the way that Divakaruni represents female desire both in its affective and physical aspects, how these desires conflict with patriarchal systems, and the way that desire becomes a vehicle for self-creation and transformation.

For women living in patriarchal cultures, affective desire tends to move beyond the strict roles of mother and wife. In *The Vine of Desire*, Anju's inability to conceive derails her sense of self. She admits:

“Sometimes I feel like my body has betrayed me, and along with it, my womanhood”  
(*The Vine of Desire*, 132).

This admission shows how cultural constructions of femininity are inextricably linked with emotional desire. Anju craves not just a child but recognition as a full woman within her society.

Sudha, also, feels emotional longing as a single mother deserted by Ashok. Her desire is not limited to sexual gratification but is her desire for companionship and acknowledgment. Her vulnerability highlights how women feel emotionally starved when defined only by maternal roles.



These emotional longings contradict the patriarchal belief that women's central emotional satisfaction should stem from their identities as wives and mothers. Divakaruni puts emphasis on the fact that women, as women, desire connection, intimacy, and affirmation as independent beings.

While emotional need is partially expressed, carnal desire is more rigorously policed. Divakaruni breaks in moments of tension between Sudha and Anju's husband, Sunil, revealing the forbidden sex of women. Sudha, however keenly sensitive to her desire, holds herself back:

“Her body, traitorous in its longings, had to be reined in, for she knew the price women paid for such desires” (The Vine of Desire, 178).

This sentence highlights the ways in which female sexuality is presented as betrayal - of family, of social reputation, of womanly virtue. By contrast, Sunil's desires are portrayed as only too natural, albeit morally reprehensible. This asymmetry demonstrates the gendered hypocrisy of patriarchal ideologies.

Anju also grapples with the suppression of her desires. Her marital life, strained because of infertile issues, leaves her both emotionally and physically dissatisfied. She thinks:

“Desire is a perilous thing for women. It needs to be contained, otherwise it will incinerate all we hold dear” (The Vine of Desire, 201).

This internalization of patriarchal rhetoric demonstrates how women are taught to fear their own sexuality. Desire is both threat and promise - perilous but potentially empowering.

In Divakaruni's narrative, female desire consistently collides with patriarchal structures. Anju's inability to bear children is seen not as a medical condition but as a moral and social failure. She internalizes cultural scripts that reduce women to biological reproduction. Similarly, Sudha's status as a single mother makes her an object of suspicion in her community.

The novel explicitly critiques these constraints:

“What kind of woman are you if you cannot be a wife, a mother, a keeper of tradition?” (The Vine of Desire, 145).

These rhetorical questions capture the essence of social judgment, highlighting how women's value hangs on patriarchal constructions of purity, chastity, and motherhood.

Divakaruni provides female solidarity as a counter-space where women can express the repressed desires in the public sphere. The privacy of Anju and Sudha beyond traditional roles provides them with emotional shelter.

“Only with Sudha could Anju speak her hunger, without shame” (The Vine of Desire, 223).

Their relationship indicates that erotic desire is not exclusive to heterosexual relationships but may be verified in women's solidarity. This refigures women's emotional economies, where friendship, sympathy, and mutual empathy furnish sustenance lacking in patriarchal systems.

Finally, The Vine of Desire offers desire not as debilitating but as remaking. The struggles of Anju and Sudha show the way desire becomes a route to redescribing selfhood. Through being attuned to their desires - fulfilled or unfulfilled - they defy patriarchal erasures.

Desire, in Divakaruni's vision, is not merely personal but political. It destabilizes cultural constructs of the “ideal woman” and reclaims women's right to be complex, desiring subjects rather than passive objects.

Divakaruni's The Vine of Desire interrogates the contradictions of female desire under patriarchal and diasporic constraints. By articulating the emotional and physical desires of Anju and Sudha, the novel deconstructs the silence around women's sexuality and authenticates their search for wholeness. Desire is both a field of conflict and a field of empowerment. By putting the women's desires in the foreground, Divakaruni redefines desire as a necessary component of female subjectivity and self-hood, not a menace to social order.

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## **46. RECLAIMING CHOLA – ERA FOOD WISDOM: FROM UDAIYAR TO CONTEMPORARY NUTRITION AND SUSTAINABILITY**

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### **1. Introduction**

In Tamil tradition, food has always been so much more than sustenance. It speaks of identity, attachment and a close connection to the natural world. The Chola age (9th–13th century CE) was characterized by vibrant agriculture, a temple-centric society, and urban-rural equilibrium, and serves as an example of the interconnections between diet, culture, and sustenance.

Udaiyar (1993–2006) is a Tamil language novel that narrates the life history of Raja Raja Chola I. The story is more than that of kings, wars and political alliances; it delves into daily meals served as offerings in the temples, at the royal banquet table and those eaten by ordinary people. Fictitious it may be, Udaiyar functions as a literary repository of Chola foodways. By analyzing food references, one can deduce diet and cooking practices, social customs and even think of some possible lessons that modern Tamil diets could learn from.

This paper examines foodways in Udaiyar according to occupation, social role, and preparation methods and discusses them in relation to modern Tamil dietary patterns. Their goal is to emphasize not only nutritional wisdom, but also sustainability and community principles embedded in Chola-period food ways. The study employs textual analysis of Balakumaran's Udaiyar (Vols. 1–6) alongside secondary historical and nutritional sources to interpret foodways through a sustainability framework.

### **2. Literature Review**

Tamil food history has long interested scholars, but there has been a greater emphasis on early literary and epigraphic sources. We find in Sangam literature references to millet-meals as well as the use of toddy and communal banquets.

Additional information about offerings, prasadam distribution, and granary management can be found in inscriptions from temples and palaces. Religious writings like the Periyapuram shed light on austerities, fasting, and moral eating habits. But as sources of food history, later historical narratives have gotten less attention. The representations of everyday food, cooking, and communal dining in Balakumaran's Udaiyar are often overlooked in favor of studying the work's portrayal of Chola architecture, politics, and religious life. We can resurrect the ecologically conscious, socially significant, and nutritionally balanced eating habits of the Chola era by reading the book as a nutritional-anthropological source. While earlier studies examined Chola architecture and political administration, few have explored Udaiyar as a nutritional-historical text, leaving a gap this paper seeks to address.

### **3. Classification of Foods in Udaiyar:**

In Udaiyar, foods are classified according to their type and culinary usage, reflecting traditional Tamil dietary practices. Cereals such as rice and ragi formed the staple diet, while pulses like green gram, black gram, and Bengal gram were used for protein-rich preparations. Vegetables including pumpkin, snake gourd, drumstick, and leafy greens were incorporated seasonally into meals, often in porridge, sambar, or stir-fries. Fruits like banana, jackfruit, and mango were consumed fresh or in specific dishes, while sesame oil, milk, and curd were essential for cooking and nutrition.



Food Category	Food Item	Traditional Preparation
Cereal / Grain	Rice	Staple food; used in daily meals and special dishes
Cereal / Grain	Ragi	Consumed as porridge or ground flour for rotis
Pulse / Legume	Green gram (Moong dal)	Used in soups, stews, and fermented preparations
Pulse / Legume	Black gram (Urad dal)	Used in dal, idli/dosa batter preparation
Pulse / Legume	Bengal gram (Chickpea / Kadala)	Used in cooked dishes and snacks
Vegetable	Pumpkin	Used in curries and porridge
Vegetable	Snake gourd	Used in stir-fries and curry preparations
Vegetable	Drumstick / Moringa	Used in sambar and other vegetable preparations
Vegetable	Leafy greens	Generic greens; used in soups, porridge, or stir-fries
Fruit	Banana	Eaten fresh; also used in offerings and desserts
Fruit	Jackfruit	Eaten ripe; tender fruit used in curries
Fruit	Mango	Eaten ripe or unripe in pickles
Oil / Fat	Sesame oil	Cooking medium; also used in tempering
Dairy	Milk	Consumed fresh or in preparations like curd
Dairy	Curd / Yogurt	Eaten directly or buttermilk
Spice/Condiment	Tamarind	Used for souring curries and chutneys
Spice / Condiment	Salt	Essential seasoning in all preparations
Spice / Condiment	Pepper (Black)	Used for flavoring and medicinal purposes
Sweetener / Other	Jaggery	Used in sweets, porridge, and medicinal preparations

Condiments and spices such as tamarind, salt, and black pepper were used for flavor and preservation, and jaggery served as the primary sweetener. This classification highlights the emphasis on locally available ingredients and their integration into a balanced, culturally rooted diet.

#### 4. Eating Patterns in Udaiyar

According to the novel, dietary choices were not uniform but shifted with one's role in society. Meals reflected occupation, status, and circumstance, ranging from simple gruel for farmers to lavish banquets for royalty.

- **Villagers:** The mainstays of daily diets were rice, millet, pulses, vegetables, curd, and buttermilk. Gruel, or kanji, was essential for maintaining long agricultural workdays.
- **Royalty:** Various types of rice, sweets dripping with ghee, and meat dishes were all served at lavish banquets. These dinners represented wealth, authority, and cultural sophistication.
- **Temples:** Fruits, coconuts, and pongal were offered; these were subsequently given out as prasadam. These customs strengthened social equality, communal sharing, and devotion.
- **Ascetics and Saints:** Their simple diets of gruel, fruits, roots, and greens demonstrated self-control, tapas, and spiritual discipline. Food thus served as a symbol of cultural values, devotion, and social role in addition to being a source of nourishment.

## 5. Occupation-Based Food Culture

During the Chola era, occupation and food were closely related. For hydration and endurance, farmers and laborers relied on millet gruel, buttermilk, and seasonal greens.

- **Traders and artisans:** preferred rice dishes with pulses or tamarind broth that are portable and long-lasting.
- **Priests:** Maintained ritual purity by consuming sattvic foods like fruits, curd rice, and pongal.
- **Ascetics:** Usually consumed only fruits, roots, or gruel.
- **Royalty:** Exhibited status and hospitality by enjoying a variety of rich, varied meals that included meat, rice, and sweets dripping with ghee.
- **Chola Soldiers/Warriors:** Consumed protein-rich foods like rice, lentils, meat, and ghee for strength and endurance; carried dried meat, rice balls, and jaggery as portable rations during campaigns.
- **Temple Artisans and laborers:** Ate millet gruel, buttermilk, onions, and greens for hydration and stamina; their simple, wholesome meals suited heavy labor and tropical conditions.

Food reflected both symbolic meanings and functional needs across groups, connecting diet to social role, occupation, and moral principles.

## 6. Festivals and Temple Offerings:

As a token of appreciation and reverence for the harvest and divine favors, the first banana crop (valai thar) was often presented to temples. In addition to bananas, coconuts were commonly offered as offerings and holy objects in religious ceremonies during temple rites. These contributions were seen as auspicious and were thought to benefit the community's well-being, wealth, and health.

These customs were closely related to agricultural festivities. Pongal, the harvest festival, celebrated the end of the harvest season, celebrated the abundance of crops, and paid homage to the Sun God. In Aadi 18, the Cauvery River was given special gratitude for its contribution to the deposition of fertile alluvium, which guaranteed land fertility and bountiful harvests in the future.

These festivals emphasize the practical and symbolic role that food plays in ceremonial and cultural life. Offerings made at these celebrations not only demonstrated devotion but also strengthened the community's ties to the land, the seasons, and agriculture.

## 7. Cooking Methods and Nutritional Relevance

A remarkable balance between practicality, health consciousness, and ecological awareness can be seen in the Chola period's culinary practices. Every cooking method was an expression of cultural values and environmental adaptation, not just a way to prepare food. The most popular techniques were steaming and boiling, especially for vegetables, rice, and lentils. These made meals lighter and more appropriate for daily consumption by ensuring easy digestibility and reducing the quantity of oils or fats used. These customs demonstrate how everyday cooking put efficiency and long-term health first, foreshadowing contemporary dietary guidelines for low-oil diets.

Another characteristic of the Chola kitchen was fermentation. Centuries before probiotics were discovered, foods like buttermilk, dosa, and idli were staples that promoted gut health. This demonstrates an intuitive grasp of how natural processes could improve shelf life, increase nutritional value, and add diversity to the diet. Whether for flours, spice pastes, or chutneys, stone-grinding was not only a practical decision but also a nutritional one. Stone-grinding preserved natural oils, antioxidants, and volatile flavors, in contrast to contemporary high-speed machines that produce heat and break down bioactive compounds. This preserved the food's flavor and therapeutic value. On the other hand, roasting and frying were only done during festivals and other special events. Their sporadic usage emphasizes the value placed on moderation in society. The Chola diet ingrained restraint into its very structure by limiting oil-rich or decadent foods to ceremonial or celebratory settings, thereby tying enjoyment to social and spiritual significance rather than to everyday excess.

Food security throughout the seasons was guaranteed by preservation techniques like sun-drying grains, vegetables, and fish. These techniques decreased reliance on artificial additives, utilized natural energy sources, and minimized waste. They essentially personified sustainability long before it was a contemporary issue. When combined, these customs demonstrate that the food system of the Chola era was both ecologically conscious and nutrient-dense. Cooking techniques maximized the use of natural resources, promoted gut and metabolic health, and reinforced moderation. Today, when convenience frequently takes precedence over sustainability and nutrition, this blending of health, culture, and environmental mindfulness offers important lessons.

## 8. Hospitality and Social Food Practices

Virundhombal, or hospitality, was a big part of Tamil culture. It was thought to be the right thing to do to serve guests freshly cooked meals. Festivals and temple kitchens helped people get closer by sharing prasadam. Royal banquets showed political generosity and brought people together across class lines. So, food was a way for people to be equal and show their morals. It was not on the edge of Chola society; it was at the center of it.

## 9. Comparative Insights: Chola vs. Modern Diets

### • Staples and Grain Choices

In the Chola period (9th–13th century CE), agriculture thrived under a sophisticated irrigation system (Kallanai, tanks, canals), and millets such as thinai (foxtail millet), varagu (kodo millet), samai (little millet), and kambu (pearl millet) formed the staple diet. These grains are nutrient-dense, rich in fiber, iron, and minerals, and possess a low glycemic index, making them ideal for sustained energy release.

Today, millets have been replaced by polished white rice due to colonial-era agrarian shifts, Green Revolution policies, and consumer preference for "soft, white grains." This transition resulted in:

- Decline in dietary fiber → constipation, gut dysbiosis
- Spike in simple carbohydrate intake → diabetes, obesity, metabolic syndrome
- Nutrient deficiencies → iron-deficiency anemia, vitamin B-complex loss

The Chola approach aligned with sustainable nutrition, while modern staples prioritize yield and consumer convenience over health.

### • Sweeteners and the Changing Face of Sugar

The Chola diet relied on natural sweeteners like palm jaggery (karuppatti), sugarcane juice, and honey. These provided trace minerals (iron, magnesium, potassium) along with slow-release energy. Sweet dishes (payasam, pongal) were festival-oriented, not daily indulgences.

With the advent of industrialization, refined white sugar became widespread. Nutritionally "empty," refined sugar strips away fiber, minerals, and antioxidants. Its rise correlates with diabetes prevalence in South India, obesity and fatty liver disease, addictive eating behaviors, as sugar impacts dopamine pathways. The Chola philosophy viewed sweetness as occasional, medicinal, and balanced, while the modern diet normalizes refined sugar as an everyday additive.

### • Fermented Foods: Gut-Friendly vs. Convenience-Oriented

Fermentation was a hallmark of the Chola diet:

- Idli, dosa, appam, kali, porridge → improved digestibility, enhanced bioavailability of B-vitamins, probiotics for gut health.
- Buttermilk, curd, toddy → maintained microbial diversity, hydration, and digestive balance.

Today, processed convenience foods dominate—instant noodles, packaged bread, frozen snacks loaded with preservatives, sodium, and unhealthy fats. The microbial richness of the traditional diet has given way to sterile, shelf-stable products that compromise gut flora, immunity, and mental well-being.



Chola food was inherently synbiotic (fiber + probiotics), whereas modern food is sterile and gut-damaging.

### • Community Dining and Social Fabric

In Chola temples, annadhanam (communal feeding) was integral, with prasadam offered in temples and gatherings during festivals. Village feasts encouraged shared meals, reinforcing social bonding, cultural transmission, and equitable food distribution.

Modern food culture has shifted to individualized eating—fast food, packaged snacks, office desk meals—weakening community cohesion. Families increasingly eat apart due to work schedules, urban migration, and the prevalence of "delivery culture." Food in the Chola period was a social glue; in modern times, it often reflects isolation and consumerism.

### 10. Ecological Footprint and Seasonality

The Chola diet was local, seasonal, and minimally processed. Grains, vegetables, and fruits were consumed in their natural cycle (mangoes in summer, millets in drought seasons). Farming was aligned with ecology, crop rotation, and water conservation.

In contrast, modern diets are ecologically taxing:

- High reliance on polished rice, wheat, and cash crops → soil depletion, monocropping.
- Demand for all-season produce → cold storage, chemical ripening, carbon emissions from transport.
- Processed foods → plastic packaging, chemical waste, fossil fuel use.

Chola diets fostered food sovereignty and ecological balance, while modern diets escalate climate change and ecological imbalance.

The Chola diet was a symphony of nutrition, culture, sustainability, and community, offering holistic health. In contrast, the modern diet, while convenient, has fostered nutritional imbalances, lifestyle diseases, ecological strain, and social fragmentation.

A revival of Chola principles—millet-based staples, natural sweeteners, fermented foods, and community eating—may be crucial in addressing contemporary challenges such as diabetes, obesity, and climate change.

### 11. Discussion

The Chola food system was based on practical design, moral principles, and environmental sustainability. Millet-based meals for farmers helped them last longer, sattvic diets for priests kept rituals proper, and minimal diets for ascetics showed restraint. Royal banquets showed wealth and power, while temple food brought people together. Fermentation improved digestion, boiling kept things simple, stone-grinding kept nutrients intact, and preservation cut down on waste. In contrast, modern diets put convenience ahead of balance, which can cause nutrient deficiencies and diseases related to lifestyle. Tamil society can get health benefits back by bringing back Chola food traditions like millets, fermented foods, seasonal produce, and communal dining. This will also help the environment.

### 12. Conclusion

Beyond merely recounting historical events, Balakumaran's Udaiyar portrays the Chola-era as a time of remarkable culinary wisdom that intertwined sustainability, culture, ritual, and nourishment. Ascetics practiced restraint, temples distributed prasadam as a social equalizer, kings celebrated abundance, and villagers thrived on simple yet balanced meals. Cooking practices emphasized ecological balance, nutrient preservation, and digestibility — principles deeply rooted in environmental harmony.

Before the arrival of the Portuguese, Tamil cuisine relied primarily on indigenous varieties of grains, pulses, and fruits, sustaining a self-sufficient food ecosystem. Later introductions such as chili, tomato, and potato, brought through colonial exchange, gradually replaced native ingredients

(ipasapduradhu), transforming the local palate. These shifts contributed to the loss of several traditional crops and preparations that once defined the region's food identity.

When compared to contemporary diets, the replacement of millets with refined rice, jaggery with refined sugar, fermentation with processed foods, and communal dining with solitary eating marks a decline in both nutritional quality and social connectedness. Reclaiming Chola-era culinary practices offers meaningful solutions to modern challenges — reviving seasonal and millet-based diets, reinstating fermented foods, reintroducing natural sweeteners, and restoring the sense of community through temple-based food sharing.

The declaration of 2023 as the International Year of Millets by the FAO reaffirms the global recognition of these traditional grains' value for both nutrition and sustainability — a testament to the timeless wisdom already embedded in Tamil civilization's food heritage. Integrating Chola-era food wisdom into Tamil Nadu's nutrition education and millet promotion programs could bridge traditional knowledge with modern sustainability goals.

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## **47. STRUCTURAL SIGNIFICANCE OF BAMA'S SANGATI**

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### **Abstract**

Literature is a dynamic arena that evolves continuously, reflecting the writer's mode of expression. The essence of a literary genre cannot be confined to mere imagination or generalized themes, as every work bears the author's personal reflections. Fiction, in particular, serves as a platform for portraying diverse perspectives and social realities. When a work addresses social themes, it must balance personal experience with collective context, thereby representing reality with authenticity and permanence.

Bama's Sangati stands as a remarkable example of such representation. Since its publication, the text has continued to evoke multiple interpretations and critical readings. This paper explores the multifaceted perspectives in Sangati, examining how it questions social practices from the outset and gradually offers constructive resolutions. The study employs a questionnaire-based analytical approach to highlight how Sangati functions as a multipurpose work—depicting social structures, advocating for women's rights, and serving as a popular literary text.

Furthermore, the paper discusses the unchanging socio-cultural conditions that Bama portrays and the limited transformation experienced by marginalized communities despite ongoing discourse. Bama asserts that true change is possible only through genuine education, which can alter the lived realities of the oppressed. Hence, Sangati not only documents the struggles of Dalit women but also becomes an instrument of awareness and empowerment.

**Keywords:** Dalit Literature; Women; Gender; Caste; Subaltern.

Bama's Sangati has gained wide recognition for the powerful social themes it presents. Before delving into the text, one is compelled to pause and reflect on the real conditions of the Dalit community. Despite numerous discussions and conferences, the status of Dalits remains largely unchanged, and no permanent solution has been achieved. At times, discussions on Dalit issues appear to serve the purpose of gaining attention or publicity rather than bringing about genuine transformation. While countless incidents of injustice continue to occur daily, mere sympathy or empathy cannot put an end to this oppression.

Rationalist writers such as Bama, Arundhati Roy, and Meena Kandasamy have used literature as a medium to question the illusion of freedom and the failure of humanism in contemporary society. In this context, Sangati offers a vivid portrayal of the atrocities faced by Dalits, interrogating their fundamental rights and the true nature of democracy. The text itself could inspire a new slogan for Dalit consciousness: "Distress of the people, by the people, and for the people."

This paper examines the distinctive qualities of Sangati in terms of both pattern and theme. Structurally, it defies conventional novelistic form, which contributes to its originality and popularity. Thematically, it serves as a bold narrative of resistance, identity, and empowerment, presenting an unflinching account of Dalit women's lived realities.

### **Introduction: Literature as a Reflection of Reality**

Literature serves as a unique platform where perspectives can be portrayed, reflecting both personal contact and the general context of societal themes. When literature depicts reality as it is, it holds enduring relevance. Bama's Sangati is recognized as one such work, initiating multiple perspectives for every reading. It stands as a multipurpose work, not only depicting society and culture but also specifically addressing women's rights. The ongoing societal condition, however,

remains largely unchanged despite the "ripple" effect created by such a work; the status of the people is often confined merely to discussion.

The paper notes that the theme of Dalits often goes to places, but conferences and discussions have yet to yield a permanent solution. Speaking about Dalit issues is often seen as being "merely for attention seeking and publicity," suggesting that discussion alone does not benefit these marginalized people. Rationalist writers like Bama, alongside Arundathi Roy and Meena Kandasamy, register their views through their works, which question the existing concept of freedom and humanism.

### **Structure, Pattern, and Critique of Dalit Life**

Sangati is distinguished by its unique pattern that prevents it from being easily categorized as a traditional novel, which is one factor contributing to its popularity. The work is structured as a conversation between a grandmother and granddaughter, specifically Bama and her grandmother, Vellaiyamma. Though the book starts with a positive proverb—"if the third is a girl to behold; your courtyard will fill with gold" (3)—the depiction of Dalit life is often a "heart throbbing experience".

Vellaiyamma is depicted as a great person who takes care of deliveries in her village, Permulpatti, though she was restricted from working with upper-caste people. Through Vellaiyamma, the work sketches the lifestyle of the Paraya community. The work details instances of the community going for jobs voluntarily, which paradoxically leads to their enslavement.

A significant issue highlighted is the impact of religion conversion. The source notes that conversion to Christianity happened only among the Paraiyas, unlike other communities such as Pallar, Koravar, or Chakkiliyar, who remained Hindu. Due to this conversion, the Paraiyas now receive "no concession from the government whatsoever". The poor often seek shelter elsewhere, but the consequence is that they are utilized by groups to showcase "merit count". Dalit people are often compelled into an unnatural way of life, where they may enjoy basic needs only once a week.

Concerning democratic rights, Sangati sketches a clear view of how Dalits face atrocity and questions their basic rights. A new democratic slogan is proposed for Dalits: "distress of the people, by the people and for the people".

### **The Discrimination and Oppression of Dalit Women**

The major part of Sangati depicts the discrimination and oppression of women, and the specific culture of the particular community. Gender discrimination is universal, but Bama quotes incidents from the southern part of Tamil Nadu using a high usage of vernacular element.

#### **Gender Preference and Labor Inequality**

Within the community itself, there is a preference for boys. This is illustrated by examples like breastfeeding—a boy is breastfed longer, while girls are quickly weaned. When a boy catches an illness, he is nursed with the "greatest care," but if it is a girl, the care is administered "half-heartedly".

Dalit women face intense labour burdens:

- ❖ They must labour in the fields as hard as men.
- ❖ On top of field work, they struggle to bear and raise children.
- ❖ Men's work ends when they finish in the fields, while women toil both in the field and in the home until their "very vaginas shrivel".
- ❖ The benefits of their labor are "entirely restricted" from them. The paper draws a comparison, noting that even a cow working in the field is provided with food and shelter so it can yield, but for women, that basic concern is not shown.

### **Restrictions and Vulnerability**

Dalit women are denied independence and adequate healthcare. The restriction of natural processes, such as reaching puberty (coming of age), is noted. If a girl does not have a "proper supply of blood in her badly," she cannot come of age. Furthermore, they are often confined to the house and not allowed to move around. Madathi's statement reveals their dependence: her father would not take her anywhere, saying "young girl must not wander here and there".

Dalit women are doubly ill-treated by the society. They are forced to worship men and must "bow their head in order to evade eye contact with man". They are constantly in search of identity and survival, working for the family's welfare but having no rights to possess any goods for themselves. They are not allowed to enjoy what they need, even at a young age; one instance shows a girl being beaten by her father for spending "a rupee out of my wages". They face brutal physical abuse, being beaten by both factory overseers (maistri-annachi) and their own fathers.

The source highlights the plight of Mariyamma, who had to lose her virtues, self-respect, and dignity after a rape attempt was tried on her by a village boss. She was compelled to "fall down and bed forgiveness" and pay a small fine to be forgiven by the village. Their childhood is often curtailed; girls are required to behave like young women, taking care of housework, babies, and going out to work for daily wages before they can "sprout three tender leaves".

### **Superstition and Marital Distress**

Extreme inability has led to the rise of superstitious beliefs among Dalits. These practices, such as seeking a pujaari to say a mantram over a lucky charm for barren women to conceive or for girls to start menstruating, can consciously disable poor women. Girls are even compelled to carry an iron rod for sixteen days to ward off ghosts while moving out, unaware that they will eventually be restricted from going outside once they come of age.

Marriage for Dalit women is described as pitiful, forcing them to tolerate men who humiliate them constantly. While upper-caste women also face difficulties when abandoned, the source notes that Dalit women cannot decide to lead an independent life rather than staying with such an "animal". Village elders often intervene to maintain the oppressive status quo, ordering the woman's father or brother to "give the girl a couple of slaps and tell her she must go and live with her husband".

### **The Path to Change**

Despite the pervasive oppression, a "ray of positivity" strikes through characters like Sammuga Kilzhavi, whose defiant guts are noted. Bama registers her autobiographical views in Sangati, stating her identity clearly: "I am a paraichi; yes I am a paraichi." She refuses to hide her caste and questions why she should live a false life. She contrasts her situation with women of other castes, who "can more where they choose take a house, setup a livelihood," while Dalits are denied the basic right to pay money and rent a house.

Bama proposes a solution, giving a "right solution" through education:

We should educate boys and girls alike, showing no difference between them as they grow into adults. We should give our girls the freedom we give our boys. She believes that rearing children in this manner will reveal women's strength, leading to a day when men and women live as one, with equal rights, and "injustices, violence, and inequalities will come to an end".

### **Conclusion: The Limitations of External Change**

While education is posited as the solution, the source questions whether it alone can bring about change in perspective. It is suggested that when Dalits become educated, they may choose temporary comfort by accepting the situation rather than confronting it, because "the persons those who dare to face are murdered and loss their life somehow". Examples such as Rohit Vemula are cited as lives ended in injustice.

The paper concludes that the representation of Dalits, whether in art or practical life, is frequently "only for the sake of discussion and popularity," even within education, politics, and activism. The ultimate solution, the source asserts, is that change must come from within, through real education and self-motivation, rather than relying solely on external systems.

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## **48. IMPACT OF PRIME MINISTERS EMPLOYMENT GENERATION PROGRAMME (PMEGP) ON ENTREPRENEURSHIP INCITATION AMONG YOUNG GENERATION**

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### **Abstract**

The Prime Minister's Employment Generation Programme (PMEGP) is a flagship initiative by the Government of India aimed at stimulating self-employment through micro-enterprises in both rural and urban India. This research paper examines the impact of PMEGP on inciting entrepreneurship among the youth, based solely on a thorough review of existing literature, case studies, government reports, and academic journals. The paper discusses the objectives of the scheme, methodological approaches in prior studies, and presents synthesized findings that highlight the scheme's influence on entrepreneurial motivation, skill development, socio-economic inclusion, and employment generation among young Indians. It also outlines existing gaps and provides recommendations for policy strengthening.

**Keywords:** PMEGP, youth entrepreneurship India, MSME schemes, employment generation schemes, and entrepreneurial motivation.

### **1. INTRODUCTION**

The Honorable Prime Minister of India, Dr. Narendra Modi, made an announcement on August 15, 2015 titled "Start Up India, Stand Up India" with the intention of promoting bank financing for startups and offering incentives to boost entrepreneurship and job creation. Startup India is a Government of India flagship initiative to build startups and nurture innovation. Through this initiative, the Government plans to empower startup ventures to boost entrepreneurship, economic growth and employment across India. To become an entrepreneur, people take a risk to invest starts and manage their business on their own and work towards making it successful. In India, most of the entrepreneur runs micro units engaged in manufacturing, processing, trading and services sector. There are numerous government and semi-governmental initiatives to assist startups. PMEGP and PMMY through this schemes, startups get loans from the banks to set up, grow and stabilize their businesses. The Indian government is increasingly showing greater enthusiasm to increase the GDP rate of growth from grass root levels with introduction of liberal policies and initiatives for entrepreneurs like 'Make in India', 'Startup India', MUDRA etc.

India, with over 65% of its population below the age of 35, is uniquely positioned to leverage its demographic dividend. However, this advantage is undermined by high youth unemployment and a shortage of sustainable livelihood options. Entrepreneurship offers a viable solution, particularly when supported by public schemes like PMEGP.

Launched in 2008 under the Ministry of Micro, Small and Medium Enterprises (MSME), PMEGP aims to generate employment opportunities by assisting individuals in establishing new micro-enterprises. With a focus on marginalized communities and rural areas, the program provides financial assistance through bank credit and government subsidies. This paper explores how effective PMEGP has been in encouraging young individuals to pursue entrepreneurship, based on findings and interpretations from various scholarly sources and government data.

### **1.1 PRIME MINISTER EMPLOYMENT GENERATION PROGRAM (PMEGP)**

It has been approved as a new credit linked subsidy plan by the Government of India on August 15, 2008, by merging two existing schemes (PMRY and REGP) that had been in operation

until March 31, 2008, to create employment opportunities through the creation of micro-enterprises in rural and urban areas. "Ministry of Micro, Small and Medium Enterprises (MSME)" and "Khadi and Village Industries Commission (KVIC)" oversee the PMEGP, which is a central sector initiative for micro, small, and medium enterprises. The state's KVIC Directorates have given their approval to the framework. State KVIC Directorates, State Khadi and Village Industries Boards (KVIBs), and District Industries Centers (DICs) and banks implement the scheme at the state level. KVIC is in charge of channeling the government funding for this project through reputable banks so that it can reach the intended recipients as quickly as possible and have the greatest impact on their personal finances. When it comes to putting the plan into action, the organizations KVIC, KVIBs, and DICs partner with reputable "Non-Government Organizations (NGOs), Self Help Groups (SHGs), National Small Industries Corporation (NSIC), and other relevant bodies," particularly when it comes to identifying beneficiaries and providing entrepreneurship training.

### **1.2 PMEGP SCHEME PERFORMANCE IN INDIA**

#### **Prime Minister Employment Generation Programme (Bank Loans Sanctioned)**

Sl.No.	Financial year	Bank Loans sanctioned	
		No of Projects	Amount (Rs. Cr)
1	2021-22	1,09,127	9,260.16
2	2022-23	1,49,090	14,661.34
3	2023-24	1,65,725	17,759.22
4	2024-25*	1,08,923	12,315.94
Total		5,32,865	44,736.5

**\*FY 2024-25 data up to 31-03-2025**

**Source:** <https://dashboard.msme.gov.in/dashboard.aspx>

### **1.3 OBJECTIVES OF THE SCHEME**

- To generate employment opportunities in rural as well as urban areas of the country through setting up of new self-employment ventures/ projects/micro enterprises.
- To bring together widely dispersed traditional artisans/ rural and urban unemployed youth and give them self-employment opportunities to the extent possible, at their place.
- To provide continuous and sustainable employment to a large segment of traditional and prospective artisans and rural and urban unemployed youth in the country, so as to help arrest migration of rural youth to urban areas.
- To increase the wage earning capacity of artisans and contribute to increase in the growth rate of rural and urban employment.

### **1.4 Eligibility Conditions of Beneficiaries**

- Any individual, above 18 years of age
- There is no income ceiling for assistance for setting up projects under PMEGP.
- For setting up of project costing above Rs.10 lakh in the manufacturing sector and above Rs. 5 lakh in the business/service sector, the beneficiaries should possess at least VIII standard pass educational qualification.
- Assistance under the Scheme is available only for new projects sanctioned specifically under the PMEGP.
- Self Help Groups (including those belonging to BPL provided that they have not availed benefits under any other Scheme) are also eligible for assistance under PMEGP.
- Institutions registered under Societies Registration Act, 1860;
- Production Co-operative Societies, and



(viii)Charitable Trusts.

(ix) Existing Units (under PMRY, REGP or any other scheme of Government of India or State Government) and the units that have already availed Government Subsidy under any other scheme of Government of India or State Government are not eligible.

The central government has sanctioned a loan amount of around **Rs.3093.88 crores** to **89,118 beneficiaries** under the Prime Minister Employment Generation Programme (PMEGP) scheme in 2023-2024.

The Government of Tamil Nadu sanctioned a total subsidy of **Rs.159.76 crores** received under the Prime Minister's Employment Generation Programme (PMEGP), benefiting **1,389** entrepreneurs.

## 2. OBJECTIVES OF THE STUDY

The primary objectives of this research paper are:

1. To review and synthesize existing literature on the implementation and outcomes of PMEGP with a focus on youth entrepreneurship.
2. To evaluate the impact of PMEGP on entrepreneurial motivation among young individuals.
3. To analyze the role of PMEGP in skill development, employment generation, and socio-economic empowerment.
4. To identify the challenges and limitations of PMEGP in reaching and supporting the young generation.
5. To suggest policy recommendations based on the literature review findings.

## 3. METHODOLOGY

This research follows a qualitative, descriptive, and analytical methodology relying on secondary data sources. The approach is designed to conduct an in-depth literature review and thematic analysis to extract relevant findings.

### 3.1 Data Sources

- Government reports (e.g., Ministry of MSME, KVIC annual reports)
- Peer-reviewed journals
- Conference papers
- Case studies
- News articles and official websites

### 3.2 DATA COLLECTION

Literature was selected based on relevance to PMEGP and youth entrepreneurship.

### 3.3 LIMITATION OF THE STUDY

This paper is based solely on secondary data and may lack real-time field data from current beneficiaries. Also, literature availability from remote regions is limited.

## 4. RESEARCH DESIGN

- **Descriptive analysis** of policies and implementation procedures of PMEGP.
- **Exploratory review** of impact on youth demographics using case-based insights.
- **Comparative analysis** between projected vs. achieved outcomes in various regions.

## 5. REVIEW OF LITERATURE

The overview of the some literature has been relevant to this study. The study related to importance of Prime Ministers Employment Generation Programme and Startup India for development of nation.

**Narendra Modi (2016)** stated that, the Startup India is a revolutionary scheme that has been started to help the people who wish to start their own business. These people have ideas and

capability, so the government will give them support to make sure they can implement their ideas and grow. Success of this scheme will eventually make India, a better economy and a strong nation.

**Institute for Business Value (IBV) (2018)**, India is booming with young entrepreneurs and start-ups but more than 90 per cent of start-ups in the country are failed because of, lack of innovation, non-availability of skilled workforce and insufficient funding are the main reasons for the high rate of failure.

**Meetei and Deepakkumar (2012)** review the activities of Khadi and Village industry of the nine districts of Manipur under the PMEGP scheme. Data is collected from primary as well as secondary sources and it is concluded that KVI products have good demand but lack adequate supplies. The Manipuri women have unique artistic quality promoting textile industry but the states lack youth participating in paper industry in spite of having adequate raw materials

**Agarwal M. & Diwedi R. (2017)** in the research paper “Pradhan Mantri Mudra Yojna: A Critical Review”, highlighted the concept of financial inclusion. Its main objective was to distribute the funds to the micro and small enterprises for fulfill the requirement of funds. This paper was based on secondary data in which different types of analysis were done on the basis of state, category and caste performance over different years. Through the analysis, it is concluded that the initiative taken by the government is valuable for all the states and also helps to encourage the women entrepreneurs to start up their business by providing sufficient funds.

**Rudrawar and Uttarwar (2016)** has stated that Mudra Loan can act as a game-changer in the Indian economy. It will help in achieving the desired changes in the economy like easy loan proceedings with less documentation which in turn will play a major role in entrepreneurship development and resulting in an increase in employment as well as GDP.

**Roy (2016)** in his study has stated the role of Mudra Bank in supporting the micro, medium, and small businesses in the economy. Mudra is acting as a crucial tool across the country and will make a tremendous change in the growth of small business units and turn help is making India a developed country.

**Singh (2018)** focused on PMMY Scheme, present status of scheme and relevant suggestions. The researcher explained that the major problem in the growth of Non- Corporate Small Business Sector is the dearth of financial support from organized sector.

**Odhiambo (2013)** investigate the factors that affect the performance of youth owned micro, small and medium enterprises (MSMEs) in Kenya. According to the study managerial skills is realized to be the most significant variable followed by networking and entrepreneurial training. The study was conducted using a simple random sampling method.

**Vijayakumar and Naresh (2013)** in their study, “Women entrepreneurship in India - Role of women in small and medium enterprises” covers various factors influencing entrepreneurship among women. They also studied the problems faced by women entrepreneurs. The study was based on secondary data collected from published reports of RBI, NABARD, Census survey, SSI reports etc. The study shows that factors influencing the women entrepreneurs are equal status in society, establishing own ideas, economic independence and risk taking ability. However from the study it can be seen that women entrepreneurs faced marketing problems when competing with the male counterparts. They also faced financial problems and management problems as well.

**Daizova and Sharma (2014)** have analyzed the performance of Mizoram Khadi and Village Industry Board (MKVIB) under PMEGP scheme. The study showed that MKVIB plays a vital role in the economic development of the poor rural and unemployed youth by giving financial assistance to 1137 enterprises during the period of study i.e. 2009 to 2014. The study also reviewed the pattern of financial assistance under PMEGP in Mizoram. The study also focuses on the sales turnover of Khadi Village Industry Board PMEGP in Mizoram.

**Ajithan (2014)** in his study, “Perception of the Beneficiaries of PMEGP: A Micro Level Study” income earned problems faced by PMEGP beneficiaries didn't differ. The study was

conducted in Coimbatore district with a sample size of 277 beneficiaries of PMEGP beneficiaries. The study have also found that family members, friends, relatives, neighbours were the motivating agents that make them apply for the scheme. In manufacturing sector from women beneficiary group family member's role was given the highest motivating force constituting 95.7 percent followed by friends, which is only 1.07 percent. Service sector has also has shown a similar trend where role of family member was the highest motivating factor which is 96.6 percent.

**Sarkar and Panday (2014)** recommended about PMEGP as the beneficiaries are facing problem to purchase advance equipments for their products or services, hence provision may be made for separate assistance to purchase equipments only and time bound policy should be followed for sanction of loans.

**Waseem Hassan Khan in 2016** has suggested that PMEGP has registered an impressive performance in J&K over the recent years. It has not only enabled the first-generation entrepreneurs to set up their own units but also created an entrepreneurial wave in every nook and corner of the state especially rural areas. As per the physical performance of the scheme, against the set target of projects to be financed under PMEGP, there was full achievement of the target most of the time.

**Parimala Ramesh (2016)**, the study focuses on the fact that Micro finance extends financial services to small borrowers which later on was taken a step further by the government under the name Mudra Loan. The business domain of Mudra consists of income generating micro enterprises engaged in manufacturing, trading and services sector for loans up to 10 lakh. From the year 2016-17 other allied sectors such as agriculture have been brought under the scheme. The Shishu scheme and SC/ST/OBC have tremendously benefitted from Mudra Bank finds.

**Deepak Gupta & Jyothi Sharma (2017)**, the study emphasizes the fact that Small and micro business units have contributed immensely to the progress of the economy by employment also adding to the GDP of the nation. But the major limitation was the availability of funds for establishing new businesses and their growth.

Mudra loan has been a great initiative by the government of India in the year 2015 for uplifting the SME'S in the country and to fund the unfunded. The Mudra scheme provides loan amounts up to 10 lakh.

**C. Vijai (2018)**, has published an article in the Journal of Banking, Finance and Insurance Management, titled "A Study on the performance of MUDRA yojana in Tamilnadu". The paper discusses the opportunity, benefits and performance of PMMY in India, particularly in Tamilnadu. The author opines that this most recent scheme boosts the small and micro business units in India. This scheme has been taken to focus exclusively on entrepreneurs. The author also has observed that this scheme has added to the well-being of the individuals engaged in small-scale industries which will positively shape the progress of the economy as a whole.

**Gupta (2018)**, studies the impact of PMEGP in Sikkim by considering employment generation, project sanctioned and margin money released in a decade of 2008-2017. It's found that the rural poor's or uneducated youth's income increased but the industries covered were limited.

**Vishal Rajendra Sandanshive (2019)**, financial inclusion means providing financial services to the weaker sections of the society. The study reveals that the Public and Private sector banks have performed really well in the sanctioning of these loans to various small enterprises. The researcher has also analysed that the states of Gujarat, Rajasthan and Odisha have presented a major growth. The researcher concludes that Mudra scheme has definitely helped the micro entrepreneurs who were otherwise excluded from the banking system where the problem of funding the unfunded has been resolved.

**Sonika Gupta and Dainik Sanghvi (2020)**, in their Research Article titled "A Study on Socio-Economic Impact of Mudra Scheme" have focused on interpreting the socio-economic impact of the MUDRA Scheme which was introduced in the year 2015. Authors have collected secondary information from the official website of Pradhan Mantri MUDRA Yojana starting from the year 2015



to 2019 and have analysed the patterns of loans given to female borrowers as well as loans given to backward communities like scheduled castes and scheduled tribes.

**Gurudatt Raikar and Mallikarjun Naik (2021)**, in their paper titled “Brief Case Study of PMMY Scheme in Karnataka”, opined that small industries and start-ups play a vital role in raising the standard of living of the people of India, particularly in rural India. In this paper, they have highlighted small industries related to MUDRA and have depicted how MUDRA has helped them increase their performance over the past three years in Karnataka. They conclude in this paper that the “Make in India” initiative has contributed immensely to the growth of MSMEs in Karnataka. This has significantly increased the confidence of the youth, educated and skilled workers to get into the first generation of business and have become entrepreneurs. Existing small businesses have expanded and increased their performances.

#### **4. FINDINGS OF THE STUDY BASED ON THE REVIEW OF LITERATURE**

PMEGP helps to solve the problems of operational and seed capital. Only productive engagement and proper direction/motivation of unemployment youth toward undertaking some business venture will get a positive result towards eradication of poverty. PMEGP is found to be an effective livelihood measure to remove poverty and unemployment and reduce social and economic disparity among the beneficiaries.

PMEGP is playing an important role in reducing unemployment among youths. It is also providing scope for further development of women entrepreneurs in India, which will help improve their economic growth in a developing country like India. PMEGP showed a positive influence on socio-economic factors like age, educational qualification, income, employment generation, etc. and significantly contributed to the economy of India. The gradual increase in income, profitability, asset acquisition, revenue, and employment throughout the considered years shows positive progress of PMEGP.

The performance of the PMEGP is satisfactory but can be enhanced by implementing a grievance handling mechanism to clear pending cases for sanction by banks. The training has shown a positive impact on the skill enhancement of beneficiaries, and the effectiveness of the trainee has been evaluated on the basis of trained candidates. If this present study enlightens problems of budding entrepreneurs under PMEGP and suggestions offered here are considered by the promoting and implementing agencies, the researcher will feel gratified that his several years of hard work have served its purpose.

PMEGP plays a catalytic role in fostering youth-led micro-enterprises.

- A significant number of enterprises have been initiated by youth in the age group 21–35, particularly in rural areas.
- Entrepreneurial motivation improves when government support is visible and accessible.
- Training through EDPs is beneficial but needs customization.
- Financial literacy and post-establishment support are critical yet under-addressed components.
- Youth from SC/ST/OBC communities have shown high participation but still face social and logistical hurdles.

#### **5. CHALLENGES HIGHLIGHTED IN LITERATURE**

- **Low awareness levels** among youth about PMEGP procedures and benefits.
- **Delays in subsidy disbursement** and project appraisals discourage participation.
- **Lack of market linkage**, leading to unsold inventory and poor sustainability.
- **Gender disparities**, where female entrepreneurs often face dual burdens and fewer approvals.
- **Insufficient mentoring** and post-launch support mechanisms, unlike private incubation centers

## 6. CONCLUSION

The PMEGP has emerged as a key instrument in India's endeavor to cultivate a culture of entrepreneurship among the youth. While the scheme has made significant strides in employment generation and socio-economic upliftment, gaps remain in implementation and support mechanisms. Literature strongly supports PMEGP's potential, provided the scheme is dynamically adapted to current economic realities and youth expectations. Empowering young entrepreneurs through responsive policies, robust support infrastructure, and continuous evaluation will ensure that PMEGP becomes not just a funding tool but a nation-building platform.

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