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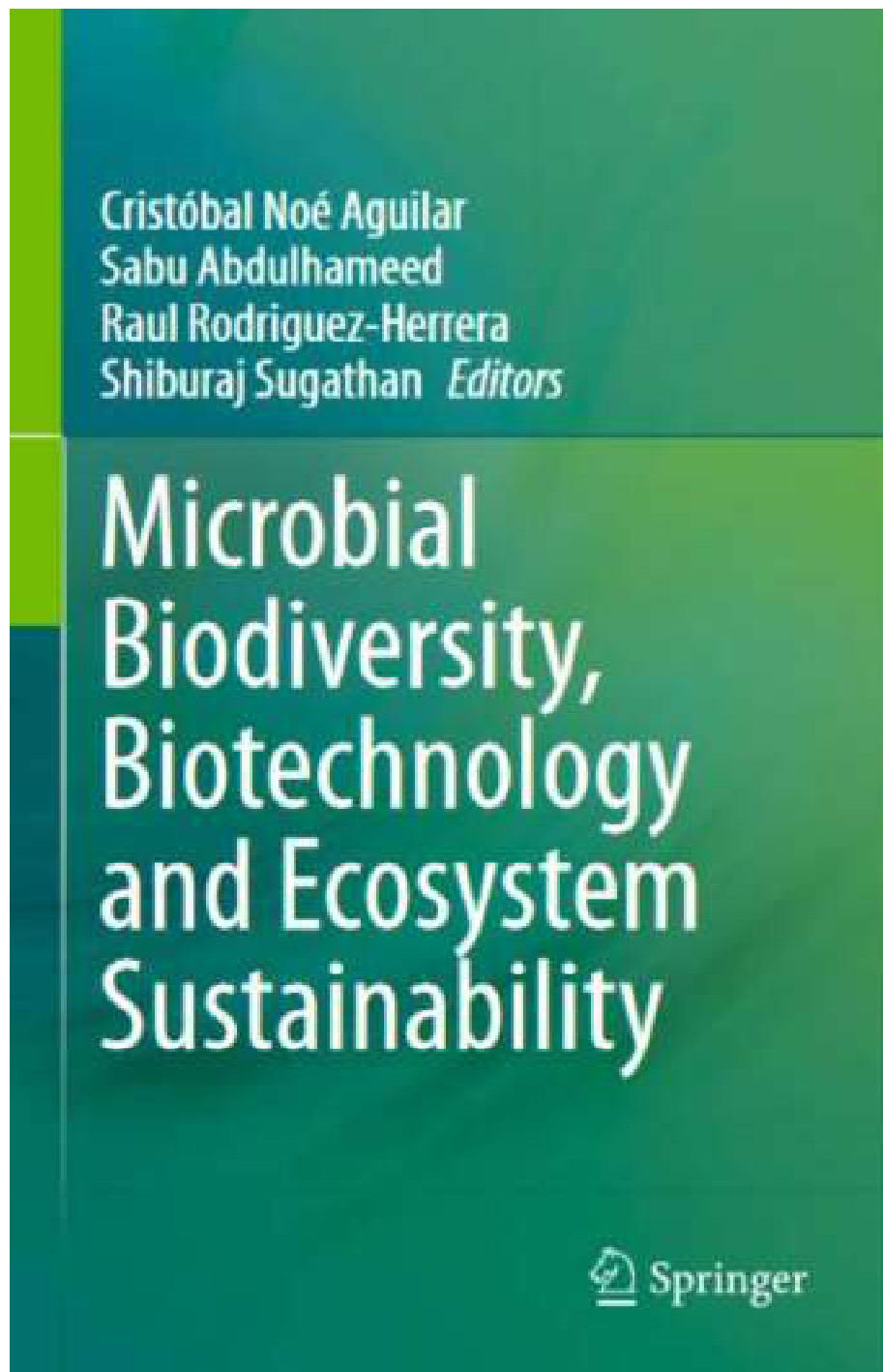
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### Origin and Evolution of Peninsular India, Western Ghats, and its Diverse Life Forms



Pankajakshan P and Richard Scaria

#### 1 Introduction

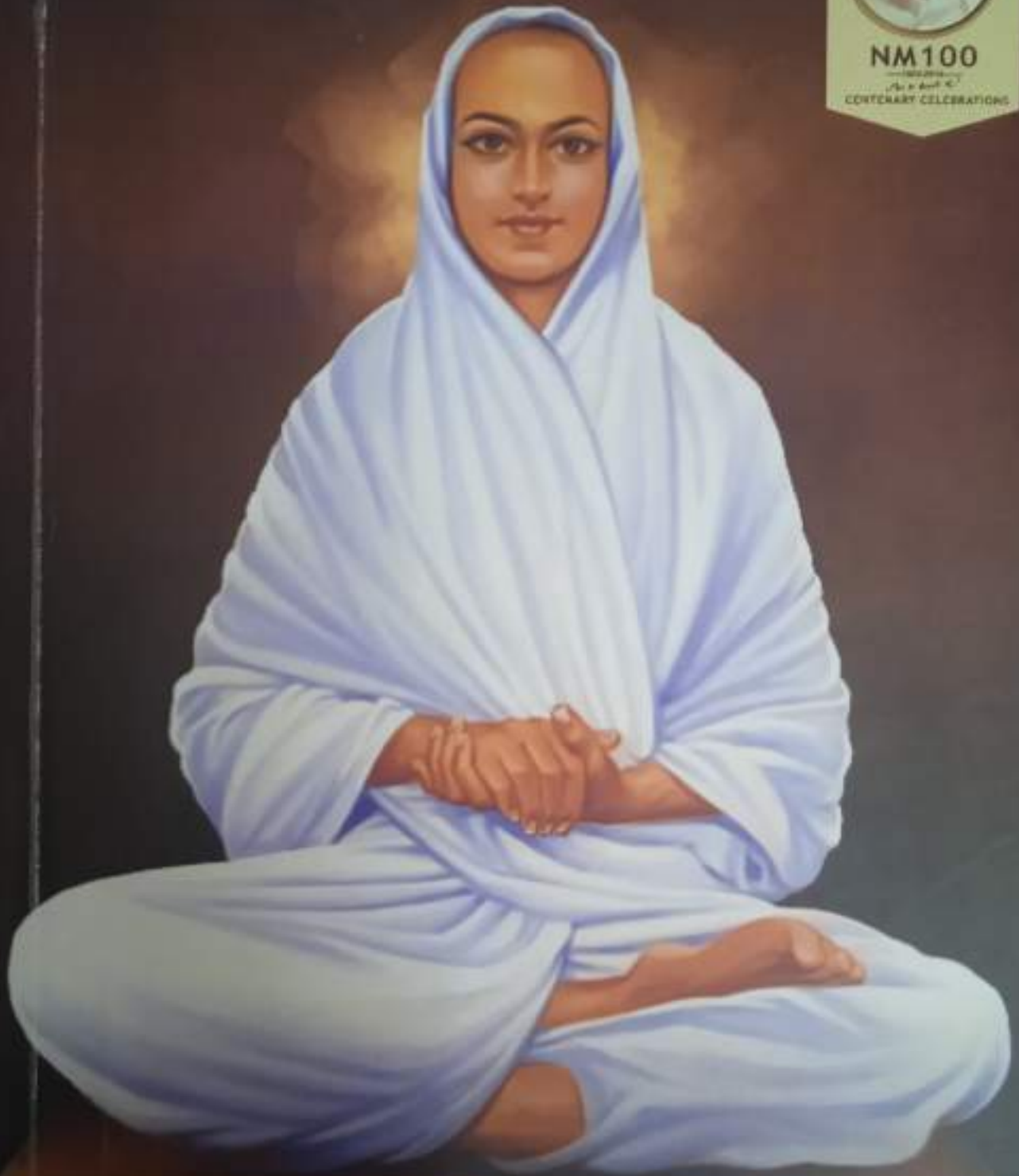
Western ghats is a chain of precipitous mountain range lying parallel to the western coast of India for a length of 1600 km and is a biodiversity hotspot with high endemism. The ghats running North to South through the states of Gujarat, Maharashtra, Goa, Karnataka, Tamil Nadu, and Kerala cut across the Deccan Basalts and the Precambrian Peninsular shield. It is interrupted only by a gap stretching for a length of the 32 km, known as the Palghat Gap at 10° 45' North latitude. It is the home to the largest population of tigers and Asian elephants and host a variety of endemic species such as Lion-tailed macaque and Nilgiri Tahr. Apart from the significant diversity in fauna and flora, the ghats also harbours human population, often living adjacent to the forest areas.

The Western Ghats, the source of all peninsular rivers of India, play a crucial role in determining the regional climate. They are oriented perpendicular to the South-west monsoon winds forcing them to precipitate their moisture on its windward slopes. The copious rainfall thus received, together with the variation in climate due to the altitudinal gradation and its nearness to the equator transformed the Western Ghats into a unique biophysical region. Yet the significance of geology as a determinant of biodiversity cannot be overlooked.

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## Abstract

The invention of metamaterials or artificial materials with engineered electromagnetic responses and exotic material properties finds applications in a wide range of electromagnetic radiating systems. This chapter summarizes different techniques used to enhance the radiation performance of antennas using metamaterials. Here we discuss the four quadrants representing double positive (DPS), double negative (DNG), single negative (SNG), and near-zero-index regions of metamaterials and their corresponding applications in radiation performance of electrically small and standard radiating systems.

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# എസ്.പി. ബാലസുബ്രഹ്മണ്യം എന്ന സംഗീത സംവിധായകൻ

ശ്രീജ. കെ.ടി

സംഗീത അഭ്യസനത്തിന് പ്രധാനമായും രണ്ടു മാർഗങ്ങളാണുള്ളത്. ഒന്ന് ഒരു ഗുരുവിന്റെ കീഴിലുള്ള ചിട്ടയായ പഠനം. രണ്ട് കണ്ടും കേട്ടും കൊടുത്തും വളർന്നു വരുന്നതിലൂടെ ആർജിക്കുന്നത്. ഇതിൽ ആദ്യത്തെ സമ്പ്രദായത്തിൽ നിന്നും 25%വും, അടുത്ത സമ്പ്രദായത്തിൽ നിന്നും 75%വും നേടുന്നു എന്നാണ് പൊതുവെ പറയപ്പെടുന്നത്. എന്നാൽ ജന്മസിദ്ധമായ സംഗീതജ്ഞാനത്തെ അദ്ദേഹമായ സംഗീത വാഞ്ചരയാൽ ജീവിതാനുഭവങ്ങളുടെ ഉരകല്ലിലൂടെ മുർച്ചകൂട്ടി മിനുക്കി എടുത്ത ഒരപൂർവ്വ പ്രതിഭയാണ് ഈ മഹാമാരികാലത്ത് നിനച്ചിരിക്കാതെ നമ്മെ വിട്ടുപോയ ബഹുമുഖപ്രതിഭയായ എസ്.പി.ബാലസുബ്രഹ്മണ്യം. മറ്റു സംഗീതജ്ഞരുമായുള്ള സഹവർത്തിത്വവും സംവാദങ്ങളും തന്നെയാണ് അദ്ദേഹം തന്റെ സംഗീത സർവകലാശാലയാക്കി മാറ്റിയത്. ഗായകൻ, സംഗീത സംവിധായകൻ, അഭിനേതാവ്, ഡബ്ബിങ്ങ് ആർട്ടിസ്റ്റ് എന്നീ മേഖലകൾ കൂടാതെ ശബ്ദാനുകരണ രംഗത്തും അദ്ദേഹം തന്റേതായ വ്യക്തിമുദ്ര പതിപ്പിച്ചിട്ടുണ്ട്. ഇതിൽ സംഗീത സംവിധായകനെന്ന നിലയിലുള്ള അദ്ദേഹത്തിന്റെ സംഭാവനകളെ ഓർമ്മപ്പെടുത്തുകയാണ് ഈ ഉദ്യമത്തിലൂടെ.

കച്ചേരി സമ്പ്രദായം നിലവിൽ വരുന്നതിനു മുൻപ് കർണാടക സംഗീതം വളർന്നു വന്നത് പ്രധാനമായും ഹരികഥാകാലക്ഷേപത്തിലൂടെയായിരുന്നു. ജീവിത ഗന്ധികളായ പുരാണകഥകൾ പ്രേക്ഷകർക്ക് അനുഭവവേദ്യമാകുംവിധം ഭാവ തീവ്രതയോടെ അവതരിപ്പിച്ചിരുന്നു ആ കലാകാരന്മാർ. പഴയകാല വാഗ്ഗേയകാരന്മാരുടെ പല കൃതികൾക്കും പ്രചാരം സിദ്ധിച്ചത് ഹരികഥാകാലക്ഷേപങ്ങളിലൂടെയായിരുന്നു. എസ്.പി.ബിയുടെ പിതാവായ



Proceedings of National Seminar on

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*of*  
**Biological Resources**  
*of*  
**Western Ghats**

5-6<sup>th</sup> DECEMBER 2019

Edited by

**Dr. Sojan Jose** • Mr. Suresh Kumar K A • Dr. Prajith T M





**Proceedings of National Seminar on  
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**2019 December 5-6**

**Edited by**

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**Proceedings of National Seminar on Conservation of Biological resources of  
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## PREFACE

Biological resources have been nurturing the mankind from the beginning. As civilization grew, man started to exploit the resources of nature. The magnitude of exploitation crossed the limits of sustainability in the last few decades. Many among the biological resources have become extinct and many are facing threats of extinction. Conservation of biological resources has gained momentum in this context. Globally there are attempts at local level to conserve these resources. Western Ghats being one of the hottest hotspots of biodiversity deserves prime consideration in conservation efforts. This book is a compendium of various research works carried out at local level to conserve the biological diversity of Western Ghats. Hopefully, the book may help researchers and students of nature to get better insights on the conservation of the biological resources Western Ghats.

Dr. Sojan Jose

Mr. Suresh Kumar K A

Dr. Prajith T M

**Editors**

## FOREWORD

I was really delighted to read this compendium publication on the National Seminar on Conservation of the Biological Resources of the Western Ghats. The articles published are really very informative with empirical evidences and systematic assessments. The abstract on each paper is very precise on the topic of study and its objective. The comprehension of each report is lucid with critical analysis on the research areas and will certainly be of academic interest to students and to research interest in researchers.

The fast depleting biological resources of Western Ghats and its consequences have profound impact on the unpredictability of climate changes and natural disasters as any such loss is irreversible.

The dimensions between community engagements, Governance / conservation management, planning and its executions by Central and State Governments, various institutions/ Development agencies and NGO's; along with systematic scientific research findings and data's collected play key role for improved conservation management of the biodiversity ecosystems and its resources.

The articles of this book illustrates the need of further research efforts for managing this crisis discipline of biodiversity conservation and requirement of state control on land tenures all along the 160,000 km<sup>2</sup> of Western Ghats area.

Each full length paper with its crisp abstract is like a beautiful blossomed flower which will take all of us especially the researchers, students to the wonderful world of knowledge about the Biodiversity of Western Ghats, the needs and the necessity of its conservation, protection, maintenance and the sustainable utilization & judicious utilization of its resources without damaging the ecological balance of ecosystem of Western Ghats. The Governments, at all times need to engage participation of the society including the native tribes to find equitable solutions for successful conservation of these endangered and rarest ecosystems and the endemism, as the rising population and their survival requirements are also major concerns.

Words of appreciation would not be sufficient to applaud to each contributor to this publication considering their rigors and challenges in undertaking multiple field studies and data collection processes across this mountain range, we dearly call as “Sahyadri”, traversing five western states from Satpura Range in Gujarat to Kanyakumari District in Tamil Nadu.

The growing awareness of adverse climate changes and many natural disasters over the past few decades have shown signs of a resurgence back to the traditional land- use methods and its trajectories in preserving the ecosystems is slowly gaining ground like the canopy architected Agro forestry having potential to turn as “Carbon Forests” of Western Ghats.

This publication also has the potential for expansion to new areas of research and further strengthening the causes of conservation of Biological resources and the Biodiversity conservation of Western Ghats.

This book leads to make a solemn declaration and commitment by each and every individual to manage the balance and restoration of ecosystem around his surroundings.

The environment is a major issue, which not only affects the well-being of the people but also hampers economic development throughout the world. The theme of World Environment Day 2021 is "Ecosystem Restoration". Hence, a creative feedback from the participants of the seminar and the learned seminar organizers realizes the need of publication of these seminar papers into a book form, because this type of publications are need of the hour.

My heartfelt appreciation and best wishes to each member of the team for the successful launching of this publication.

With regards,

**Adv. (Dr.) Elsamma Joseph Arackal ` Ph D**

Deputy Director of Collegiate Education (Retd.)



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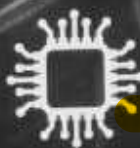
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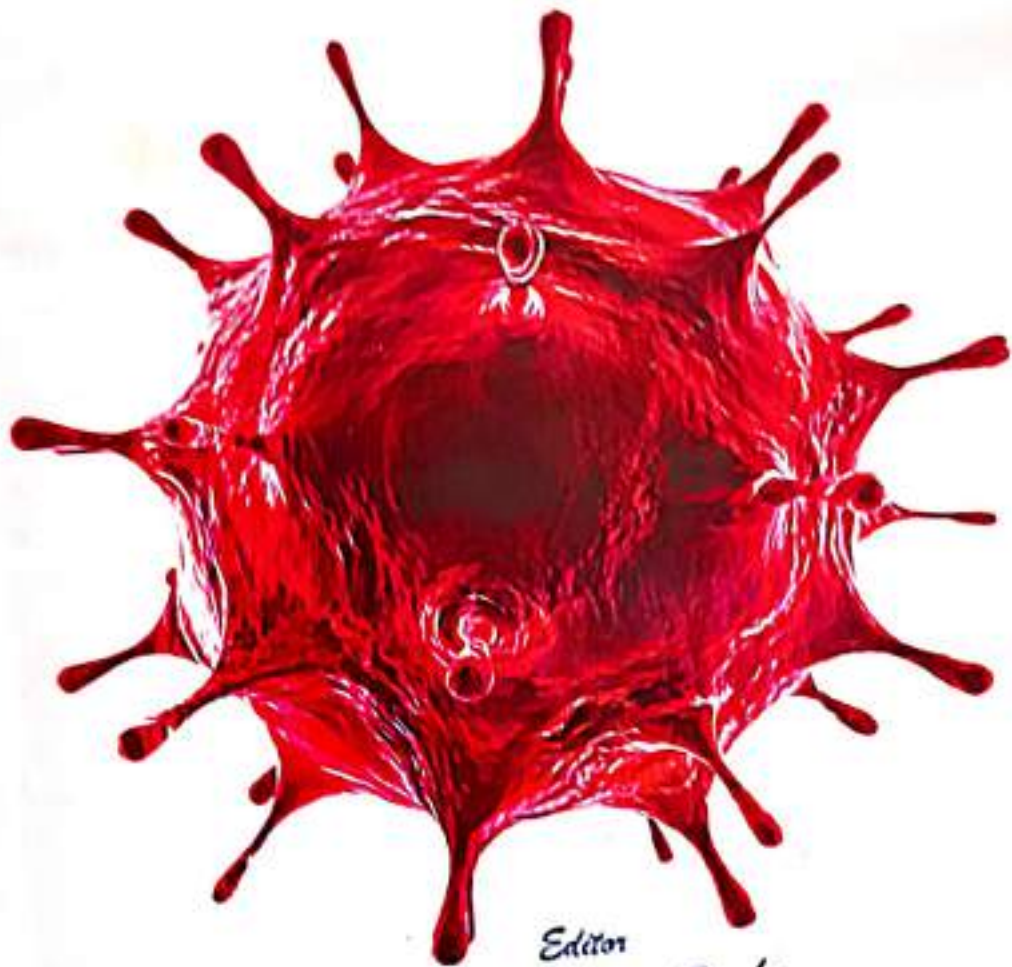


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Some Issues & Insights



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3. **English Language, Learning & Literature  
in the Age of Digital Divide: Concerns  
during the COVID Era**

---

*Arathy Asok*

We stand here wherewith the onset of the Covid pandemic, the Pandora's Box has been left open without giving it a respite. When the worst-hit areas include everything from everyday life to the professional and the political, the effect's stratified division goes even minimal. While the nation saw many people walking back to their home towns in what could be described as one of the most significant internal migrations in the country, their children trudged along with them; some lifted on their parents' shoulders or the handle of a tiring cycle. While it remains to be seen what the total toll of this movement has been on the lives and the living of the economically marginalized, education, one of the most important rights guaranteed to us by the constitution, stands in the midst of a large number of challenges. Not only are the concerns in the situation real, but it has also started manifesting itself in all its minute details while we look at the many dares that have risen along with it. The shutting down of schools and colleges all over the country was one of the strategies to protect those who

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# I

Twenty-eight authors select the story  
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# One Surviving Story

*Twenty-eight writers select the one story they would like to survive them*



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## Fish Wounds

Arathy Asok

Arathy Asok's debut collection **Lady Jesus and Other Poems** is described by *Journal of Commonwealth Literature* as "Resistance poetry with a sharp edge" (2019, Vol. 54(4)). Her most recent work was the poetry installation titled **Word Me Out** that was showcased at the fifth edition of the South Indian Poetry Carnival at Pattambi, Kerala. She is a bilingual writer and was featured poet at *The Blue Nib Magazine* (Issue 37, Ireland). Her poems have appeared in national and international journals, in print and online (in *Samyukta*, *Poetry Chain*, *anti heroin chic*, *Poets in Nigeria*, *Blue Nib Magazine*, *Door is Ajar*, *Womaword Press* and *Culture Cult*). They are included in an Anthology called *Native Petals, Nocturne and Iliyali* (USA). Her short stories in Malayalam have appeared in *Madhyamam Weekly* and English short stories in *Rupture* (Pakistan), *Credo Espire* (USA) and have been translated to her mother tongue and published in *Indian Express Malayalam Online*.

## Fish Wounds

I was named Scarlett.

I am dark oil and gnarled fingers.

I wait with the fishes in the morning heat rising to afternoon  
drowsiness.

The fish stink of me.

Touching the slippery body on the ice-cold wood, I touch again  
the flakes of his skin riding beneath my arm. I hear his hissing  
sound before he plunges into my silvery depths bursting night  
stars.

When I saw him first walking in with his hair afloat, I thought  
about the mischief in the curled lashes, the lips wanting to smile  
away the afternoon sun. I saw him talking to Gabrielle and  
Veronica and then shaking his head. I was sitting in the dark  
corner of the market. My fishes were almost sold. I thought he  
would not come around to me. He would not look at my fishes. He  
would not look at me. Inside me, deep inside me I willed him to  
turn and I willed him to turn. There was something molten  
gushing through my veins, slipping through my thighs. My sagging  
old thighs. And when he turned around to catch my eyes in the  
dim corner of the fish market, he must have seen the glint in them,  
for he stood looking into my eyes from the distance and for a  
second he stopped the sun from descending. The whole market  
was stunned to pink as the sun loomed down. His hair floated  
around him and his slender form swayed as he walked. Past all of  
them whose hands dropped out to call him, he walked towards me  
and I did not realize when he stood there, so very near, that his  
broken nose was seen in its brokenness. When he smiled, fresh  
green waters parted to clutch with force all the weeds that had  
gone astray.

"What do you have?" he said before he hunched before me. I  
could see the matted hair on his hand, the perfect hand.

"Sardines," I said.

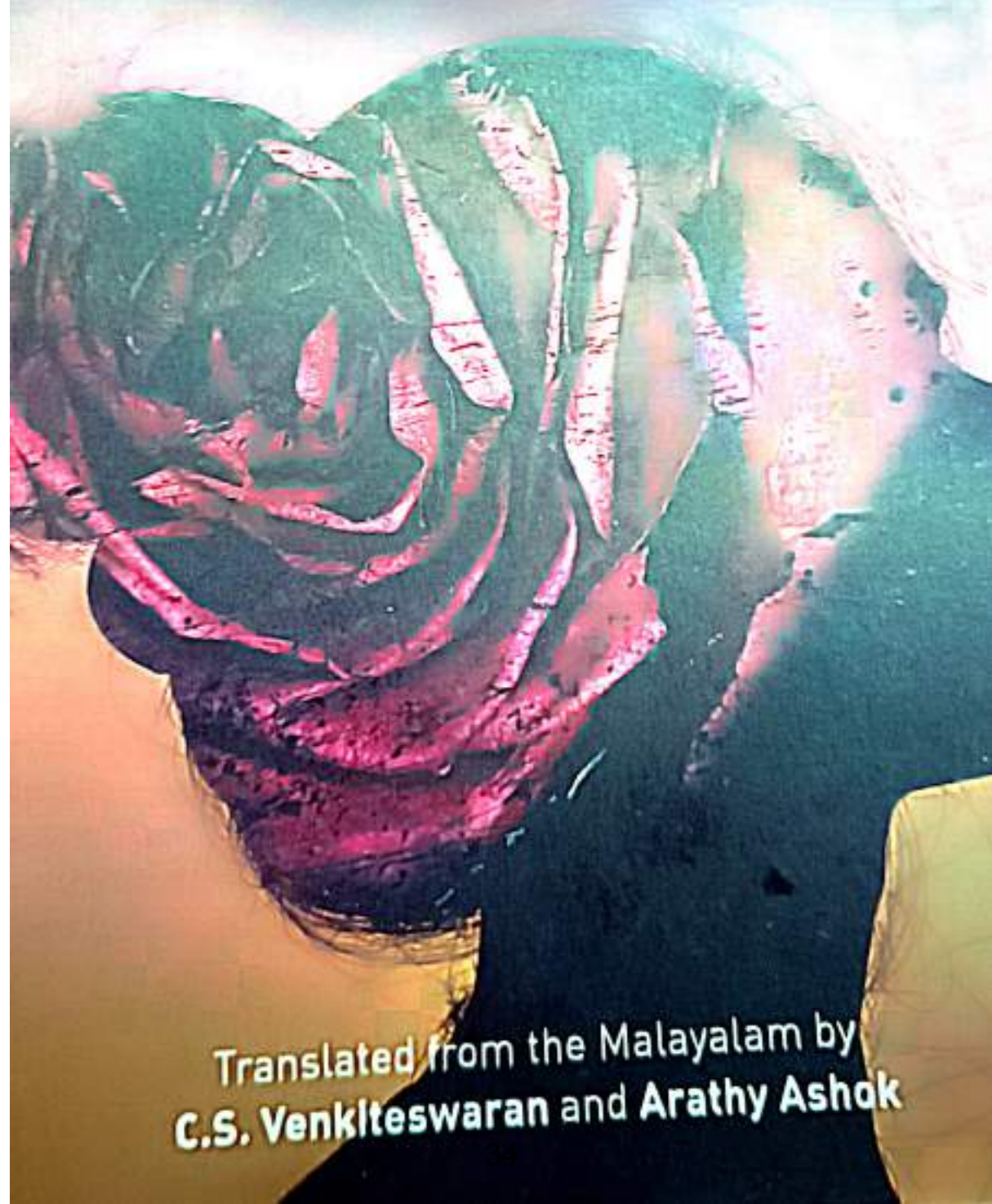
"Oh but I can see prawns... what about them?"

BASED ON THE TRUE STORY OF THE HEROINE  
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# The Lost Heroine

*A Novel*



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# Education and Upward Social Mobility: A Study of Malayalam Novel Saraswativijayam by Potheri Kunhambu

Manu Madhav

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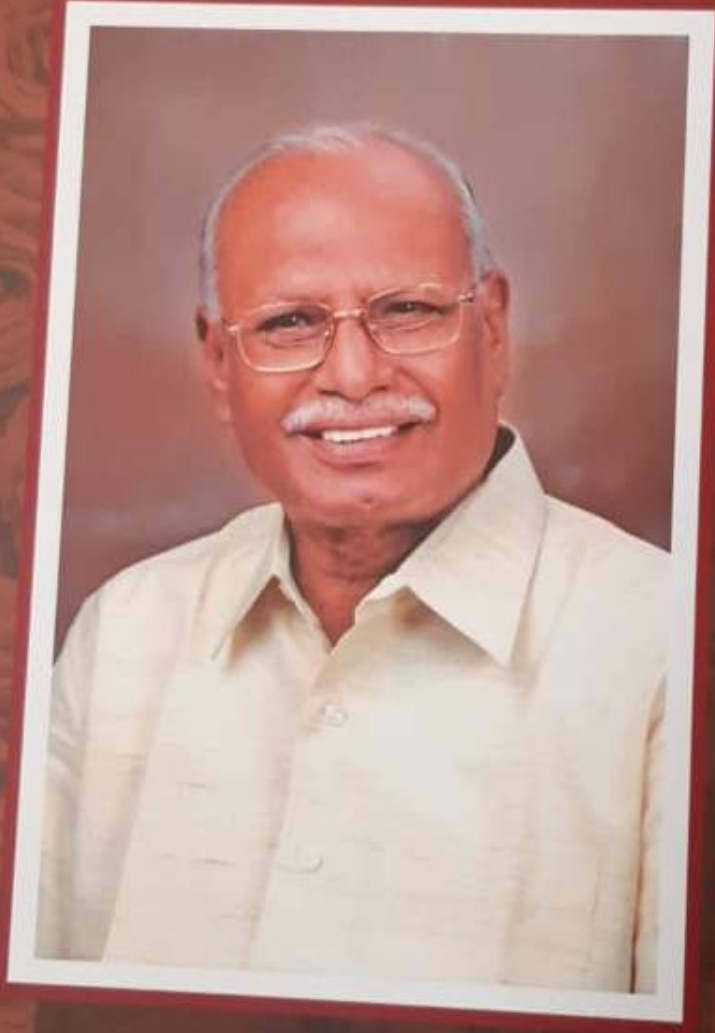
## Abstract

In a caste-ridden society like India, social reformers often stressed the need for education for the uplifting the depressed classes and for getting rid of superstitious beliefs and other social evils. In Kerala, social reformers and renaissance leaders like Sree Narayana Guru and Ayyankali recognised the role of education to free the lower caste people and untouchables from the shackles of caste system. Potheri Kunhambu (1857 - 1919) was a social reformer and novelist who belonged to the Malabar region of Kerala. This paper attempts to analyse the role of education in upward social mobility as portrayed in the Malayalam Novel Saraswativijayam (1892) written by Potheri Kunhambu. The novel was written at a time when the Kerala Society was reeling under the curse of untouchability. The novelist advocates western education as a means of emancipating the 'untouchables'. The novel was a critique of the



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## English Education and the Empowerment of Women: A Critique of O.Chandu Menon's *Indulekha*

Manu Madhav\*

### Abstract

O. Chandu Menon (1847-1899) was a writer from Kerala who held progressive ideals in the matters of religion, society, customs and the liberation of women. The novel *Indulekha* (1889) written by O. Chandu Menon is considered as the first proper novel in Malayalam language. The novel narrates the incidents which occur in an aristocratic Nair family in the Malabar region of Kerala. The paper attempts to analyse O. Chandu Menon's advocacy of English education for the empowerment of women in *Indulekha* (1889), the first proper novel in Malayalam language. It also attempts to highlight the affinity between the viewpoints of O. Chandu Menon and the advocates of women's rights like Mary Wollstonecraft and Margaret Fuller, who advocated education for the emancipation of women. In O. Chandu Menon's novel, the heroine Indulekha becomes a liberated and modern woman under the influence of western education. The novel *Indulekha* appeared at a time when the Kerala society was undergoing rapid transformation under the influence of western education. Indulekha, the heroine of the novel belongs to an aristocratic Nair family. Indulekha, the protagonist of the novel, vehemently opposes her *sambandam* to the middle-aged and affluent Nambuthiri Brahmin called Surinambuthiripad. O. Chandu Menon didn't mince words, when he asserted in the preface and in the final chapter of the novel, the role played by English or western education in making Indulekha, an empowered woman.

**Keywords:** O. Chandu Menon – *Indulekha* - Nair community – Kerala - the practice of *sambandam* - women empowerment

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\* Assistant Professor, Department of English, Government College, Chittur, Palakkad, Kerala - 678104



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#### I. Introduction

The practical realization of invisibility cloaking is an exciting and challenging research topic for electromagnetic engineers. The invention of metamaterials has boosted the research on this topic due to its exotic material parameters, which are not available in nature. Metamaterials are



constructed using artificial inclusions of arrays of metallic rods and Split Ring Resonators (SRR) and could achieve diverse material parameters depending upon the type of inclusions used to construct the unit cell [1]. The practical realization of the negative refractive index, first envisioned by Vaselago [2] in 1968, became true by combining an artificial dielectric plasma behavior of arrays of rods and resonant magnetic plasma nature of arrays of SRR [3]. J.B Pendry showed the first practical realization of electromagnetic cloaking using a cylindrically arranged SRR array [4]. Another robust approach is using plasmonic covers over the dielectric target [5]–[6]. Plasmonic cloaking uses the negative dielectric constant of the cover to cancel scattering from the dielectric cylinder. However, as the target size increases, there are chances of scattering from higher-order multipoles, and hence mantle cloaking is an efficient cloaking scheme in this scenario. In this method, we could adjust the cloaking layer’s surface reactance and can tailor scattering from the target [7]–[8].

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# Extraordinary transmission analog for enhancing radiation from an electrically small radiator

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##### Abstract:

An extraordinary transmission analog for strongly enhancing radiation from an electrically small radiator in the microwave regime is proposed in this paper. The electrically small radiated used here is a chip inductor loaded open coplanar monopole type antenna. EOT is achieved by implementing evanescent amplification using mu negative metamaterial placed symmetrically on both sides of the antenna. Near-field and far-field probing reveal that the mu negative split ring resonator not only amplifies the evanescent high spatial spectrum existing in the near-field of the antenna but also responsible for evanescent to propagation conversion.

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### Contents

#### 1. Introduction

Extraordinary transmission (EOT) is a fascinating and rapidly growing hot research topic that inspires electromagnetic research community to develop novel devices for plasmonic applications.





Its origin dates back when H.A Bethe proposed a reliable theory of light transmission through a sub-wavelength hole[1]. He proved that the excitation of electric and magnetic dipoles on the metal screen is responsible for electromagnetic transmission through the hole. A variety of research has been carried out to date for enhancing transmission in the THz region beyond the Bethe limit [2]. In 1998, Ebbessen found that the transmission can be enhanced tremendously by perforating the surface with an array of holes and the resulting enhanced transmission phenomenon is named as EOT [3]. So many theories have been proposed to date to explain the reason behind this peculiar transmission phenomenon. At optical wavelengths, metals act as artificial plasma and support Surface Plasmon (SP) modes. SP's are collective electron oscillations and can be used for strong field confinement. SP mode excitation on the surface of the metal has been used to explain the enhanced transmission phenomenon [4]-[6]. It is well known that the electromagnetic field existing near the hole is evanescent in nature and these evanescent fields are characterized by high spatial wave number and hence are not matched to free space. In the plasmonic range, momentum matching between the evanescent field and SP modes results in enhanced transmission phenomenon. The same theory is also valid in EOT behavior offered by metallic slits [7]-[8]. Evanescent field enhancement on the exit face of the grating is used for enhancing transmission [9]-[10]. According to the leaky wave theory proposed by Oliner and Jackson, the periodic perturbations in the form of grooves are responsible for the generation of an infinite number of spatial harmonics in which the  $n=-1$  harmonic radiates along the broadside direction giving transmission enhancement [11].

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**January, 2020**

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## **ARIMA MODEL IN PREDICTING NSE NIFTY50 INDEX**

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### **Abstract**

The prediction of stock prices and related indices is of vital importance in the field of economics and business and many research works has been carried out over the years to develop predictive models. The historical data on index closing price was used to develop several ARIMA (Autoregressive Integrated Moving Average) models by using Box-Jenkins time series procedure and the adequate model was selected according to four performance criteria: Akaike Criterion, Schwarz Bayesian Criterion, Maximum Likelihood and Standard Error. The paper presents the process of building stock price predictive model using ARIMA Model. Published stock data obtained from NSE (National Stock Exchange) is used with stock predictive model developed. Therefore, Monthly data from January 2001 up to December 2019( 228 observations) is used for this study. The results obtained revealed that ARIMA model has high potential in short run prediction and will be helpful to investors in stock market.

**Key Words:** Time series, ARIMA Model, Stock/Index Price Prediction, Short term Prediction.

### **INTRODUCTION**

Prediction of stock/index prices are always an interesting area of research because of its peculiar characteristics like volatility distinct from other financial products in financial market. In the information and technology era, individuals and institutions are highly empowered to make investment decisions and design effective strategies as to their daily and future financial requirements. The prediction of stock/index prices is one of the most

difficult task in financial forecasting due to varied reasons especially its complex nature, high amount of volatility, influence of global market forces etc. Any investor will try to depend on a forecasting method that could guarantee easy profiting and minimize investment risk from the stock market. This stands as major motivating factor for researchers in evolving and developing new predictive models. The Nifty 50 is an indicator of the top 50 major companies on the NSE. A large number of methods have been used for



NSE including AR (Autoregressive model), ARMA (Autoregressive Moving Average Model), ARIMA (Autoregressive Integrated Moving Average Model) and so on. But ARIMA is most widely used on among them. Stock market price may be of opening price, lowest price, highest price, adjusted closing price and volume. The study takes into account closing stock price (in Rs). The analysis of stock data has been done using SPSS 20 Software and Gretl and E Views 8

#### **LITERATURE REVIEW**

The major works using ARIMA model in the study of stock market data are reviewed .Banerjee, D. (2014) applied ARIMA model to forecast in Indian Stock Exchange the future stock indices. Paulo Rotela Ju-nior et al. (2014) described ARIMA model to obtain short-term forecasts to minimize prediction errors for the Bovespa Stock Index. Renhao Jin et al. (2015) used ARIMA model to predict in Shanghai Composite Stock Price Index . All the studies were based on closing stock price.

#### **OBJECTIVE OF THE STUDY**

To forecast the closing stock price of NSE NIFTY50 using time series ARIMA Model

#### **DATA & METHODOLOGY**

An ARIMA Model is a generalisation of an ARMA model in time series analysis. These models are used in time series data to predict

future points in the series. Such models are applied in cases where data is non-stationary wherein differencing can be done to reduce the non-stationarity. Non-seasonal ARIMA models are generally denoted ARIMA (p, d, q) where parameters are non-negative integers then p, d, q refer to the autoregressive, differencing, and moving average terms for the non-seasonal component of the ARIMA model. Seasonal ARIMA models are usually denoted ARIMA (p, d, q) (P, D, Q)<sub>m</sub>, where m refers to the number of periods in each season, and P,D,Q refer to the autoregressive, differencing, and moving average terms for the seasonal component of the ARIMA model.Box-Jenkins method./approach has been used for analysis and modeling the time series. This methodology comprises the following steps.

- (a) Identification of model: -This stage involves finding whether the time series data is stationary or not and compare the estimated Autocorrelation Function (ACF) and Partial Autocorrelation Function (PACF) to find a match.
- (b) Estimation of Parameters(coefficients): - Estimating the parameters for Box Jenkins models is a complicated nonlinear estimation problem. The main approaches for fitting Box

- Jenkins models are nonlinear least squares and maximum likelihood estimation. Parameter estimates are usually obtained by maximum likelihood which is fit for time series. Estimators are always sufficient, efficient, and consistent for Normal distribution.

(c) Diagnostic checking (verification): -The diagnostic checking is pre-requisite to ensure the appropriateness of the selected model. Selection of particular model can be done based on the values of certain criteria like log likelihood, Akaike Information Criteria (AIC)/ Bayesian Information Criteria (BIC)/ Schwarz-Bayesian Information Criteria (SBC). After model selection, its o be verified that whether estimated model is satisfactory or not by studying the pattern among the residuals if there any. The values of ACF may be checked to see that whether the series of residuals is white-noise. After fitting tentative model to data, diagnostic checks are done and overall adequacy of the model selected can be known by examining a quantity Q known as Ljung-Box statistic that follows chi-square distribution.

(d) Forecast. It means prediction of values of a variable based on identified past values of that variable or other associated variables.

Forecasting may also be based on expert judgments, which in turn are based on chronological data and experience. When model selected is found satisfactory during the analysis, it can be used for forecasting purpose.

ARIMA model uses the historic data and decomposes it into AR ( Auto Regressive) – indicates weighted moving average over past observations, Integrated (I) –indicates linear trends or polynomial trend and moving average (MA) –Indicates weighted moving average over past errors. As such it has three model parameters AR (p), I(d) and MA(q) all combined to forming ARIMA (p,d,q) model where p represents order of auto correlation, d represents order of integration (differencing) and q represents order of moving averages.

### RESULTS & DISCUSSION

The descriptive statistics of the NSE Nifty Fifty data for the analysis period is tabled below.

Summary statistics, using the observations 2001:01 - 2019:12 for the variable 'Price' (228 valid observations)

N	Range	Moments			Std. Deviation	Skewness		Kurtosis	
		Stat1	Stat2	Stat3		Std. Stat	Std. Error	Stat	Std. Error
228	11754.6 000	Stat1 913.8 500	Stat2 13168 4100	Stat3 5364.76 5278	2118.25 36279	Stat -.363	Std. Error -.161	Stat -3.67	Std. Error .311

Figure (1) depicts the original pattern of the series to have general overview whether the

time series is stationary or not and it can be seen that time series is not stationary( i.e. has random walk pattern).



Figure (1) Graphical presenta on of the NSE Ni y 50 Price Index

X axis represents trading years and Y axis represents stock index price. Figure (2) is the correlogram of NSE Nifty 50 time series. The ACF the graph , it is seen that ACF dies down slowly which simply means that the time series is non-station to stationery. When series is not stationary, it is converted to a stationery series by differencing. After the first difference, the series Differenced PRICE of NSE Nifty 50 becomes stationery as given infigure3 and figure 4 of the line graph and correlogram respectively.

Figure (2) The correlogram of NSE Nifty 50 Stock Price Index

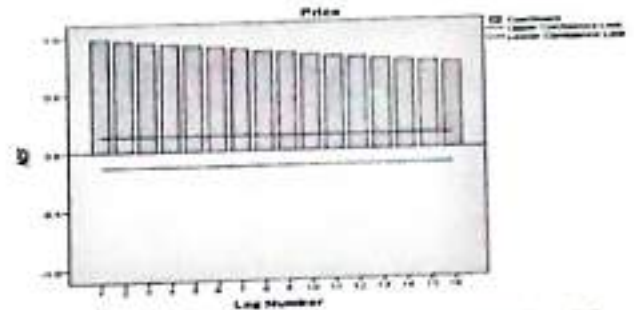


Figure (3) The ACF diagram of NSE Nifty 50 Stock Price Index

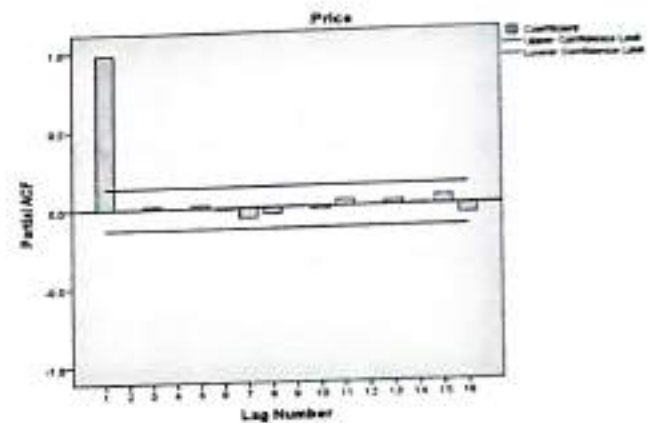


Figure (4) The PACF diagram of NSE Nifty 50 Stock Price Index

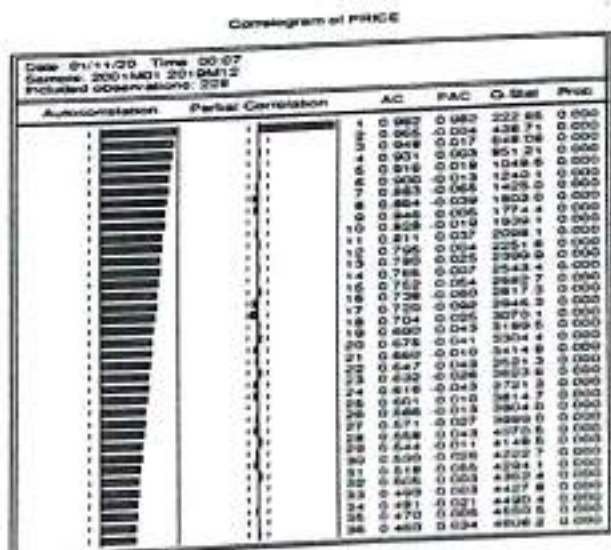


Figure 5 Graphical presentation of the NSE NIFTY 50 stock price index after first differencing.

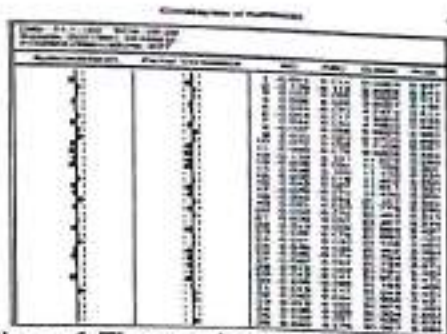


Figure 6 The correlogram of NSE Nifty 50 stock price index after first differencing.

Augmented Dickey-Fuller Unit Root Test on DIFF(Price)

Test Statistic	t-Statistic	Prob. >
Augmented Dickey-Fuller Test Statistic	-11.02306	0.0000
1% Critical Value	-3.420233	
5% Critical Value	-2.878143	
10% Critical Value	-2.338426	

Variable	Coefficient	Rob. Form	t-Statistic	Prob.
DIFF(Price)-1	-1.195782	0.000000	-11.02306	0.0000
DIFF(Price)-1,2	0.144736	0.000000	1.718820	0.0917
DIFF(Price)-1,200	0.341774	0.310000	1.000000	0.3170

Figure 7 ADF Unit root of NSE NIFTY 50 stock price index after first differencing

Figure 8 and figure 9 of modified series of correlation coefficients figures of ACF and PACF shows that there is stationarity in the data series and most of the values lie within the confidence interval which is validated by ADF Unit root test result as given in figure 7. The value of Durbin -Watson (DW) was 0.009075 for the sample data of NSE Nifty 50 and same was 2.026736 (for first difference). The data first differenced is having d value greater than Du (1.78) as such the null hypothesis is not rejected and assumed that there is no auto correlation.

The basic idea of ARIMA model is to view the data sequence as formed by a Stochastic Process on time. When the model has been identified, it model can be used to estimate the future value based on the past and present value of the time series. Based on the identification rules on time series, the corresponding model can be established. If a partial correlation function of a stationary sequence is truncated, and auto-correlation function is tailed, it can be concluded the sequences for AR model; if partial correlation function of a stationary sequence is tailed, and the auto-correlation function is truncated, it can be strong that the MA model can be fitted for the sequence. If the partial correlation function of a stationary sequence and the autocorrelation function are tailed, then the ARMA model is appropriate for the sequence.

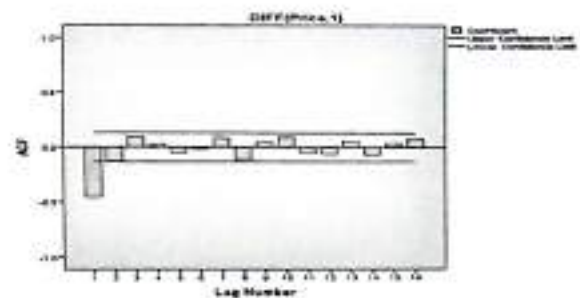


Figure 8 The ACF of NSE Nifty 50 stock price index after first differencing.

For the various correlations up to 24 lags are computed and the same along with their significance which is tested by Box-Ljung (Q) test are provided in Table 1 and 2.

Autocorrelations Series: DIFF(Price,1)					
Lag	Autocorrelation	Std. Error <sup>a</sup>	Box-Ljung Statistic		
			Value	df	Sig. <sup>b</sup>
1	-.453	.066	47.041	1	.000
2	-.129	.066	50.897	2	.000
3	.094	.066	52.960	3	.000
4	.026	.066	53.112	4	.000
5	-.049	.065	53.670	5	.000
6	-.019	.065	53.756	6	.000
7	.085	.065	55.465	7	.000
8	-.113	.065	58.467	8	.000
9	.046	.065	58.980	9	.000
10	.091	.065	60.965	10	.000
11	-.055	.065	61.688	11	.000
12	-.064	.064	62.678	12	.000
13	.058	.064	63.500	13	.000
14	-.069	.064	64.673	14	.000
15	.034	.064	64.950	15	.000
16	.077	.064	66.387	16	.000

Table 1 The ACF value of first order differencing of NSE Nifty 50 closing stock price

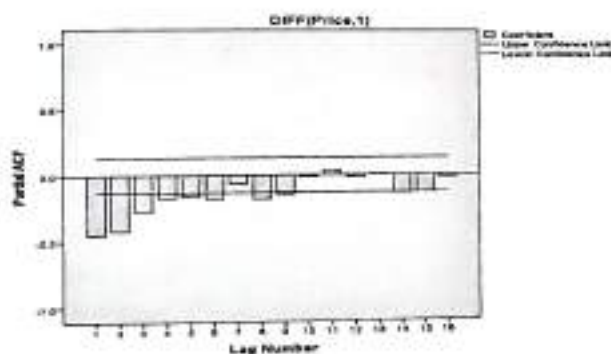


Figure 9 The PACF diagram of first order differencing of NSE Nifty 50 closing stock price

Partial Autocorrelations		
Series: DIFF(Price,1)		
Lag	Partial Autocorrelation	Std. Error
1	-.453	.067
2	-.421	.067

3	-.275	.067
4	-.174	.067
5	-.159	.067
6	-.180	.067
7	-.064	.067
8	-.179	.067
9	-.151	.067
10	-.014	.067
11	.032	.067
12	-.017	.067
13	.007	.067
14	-.138	.067
15	-.131	.067
16	-.024	.067

Table 2 The PACF value of first order differencing of NSE Nifty 50 closing stock price

Table 3 shows the different parameters of autoregressive (p) and moving average (q) among the several ARIMA Model experimented upon, ARIMA (0, 1,1) is considered the best for NSE Nifty 50 closing stock price. The model gives the smallest BIC 11.484.



Figure 10 Correlogram of Residuals of NSE Nifty 50 closing stock price

Figure 10 is the residual of the series. If the model is good, the residuals (difference between actual and predicted values) of the model are series of random errors. Since there are no significant spikes of ACFs and PACFs, it means that the residual of the selected ARIMA model are white noise, no other significant patterns left in the time series. Therefore, there is no need to consider any AR(p) and MA(q) further.

Table 3 Normalized BIC Values of Nifty 50 closing stock price

ARIMA (p,d,q)	Normalized BIC	ARIMA (p,d,q)	Normalized BIC
ARIMA(0,1,0)	12.161	ARIMA(3,1,0)	11.740
ARIMA(1,1,0)	11.959	ARIMA(4,1,0)	11.738
ARIMA(0,1,1)	11.484	ARIMA(4,1,1)	11.586
ARIMA(1,1,1)	11.516	ARIMA(5,1,0)	11.742
ARIMA(1,1,2)	11.539	ARIMA(5,1,1)	11.614
ARIMA(0,1,2)	11.564	ARIMA(6,1,0)	11.642
ARIMA(3,1,1)	11.558	ARIMA(6,1,0)	11.738

The model verification is done by checking the residuals of the model to observe whether they contain any systematic pattern which still can be removed to get better on the chosen ARIMA. This is done through examining the autocorrelations and partial autocorrelations of the residuals of various orders.

Table no 4 Model Statistics of Nifty 50 closing stock price

Model	Model Fit statistics	Ljung-Box Q(18)			Number of Outliers
		R-squared	Statistics	D F	
Price-Model_1	0.991	20.303	17	.259	0

Table no 5 ARIMA Model Parameters

	Estimate	SE	t	Sign.
Price-Model_1	47.5631	20.095	2.367	.019
Constant				
Non-Stationary Transformation				
Difference	1			

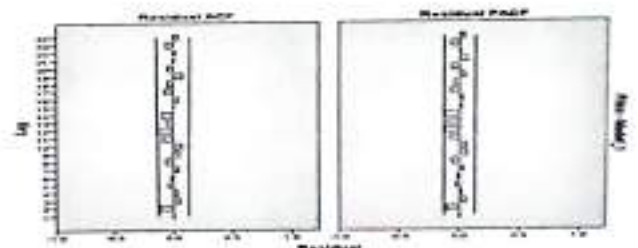


Figure 11 Residual ACF and PACF diagram of actual Nifty 50  
The ACF and PACF of the residuals (Figure 11) indicate 'good fit' of the model.

Table no 6 Forecast NSE Nifty 50 share price index January 2020 to July 2020

		Forecast						
Model		229	230	231	232	233	234	235
Price-Model_1	Forecast	122 16.0 1	122 63.5 8	123 11.1 4	123 58.7 0	124 06.2 6	124 53.8 3	125 01.3 9
	UCL	128 12.6 2	131 07.3 1	133 44.5 0	135 51.9 2	137 40.3 2	139 15.2 2	140 79.8 7
	LCL	116 19.4 0	114 19.8 4	112 77.7 8	111 65.4 8	110 72.2 0	109 92.4 4	109 22.9 1

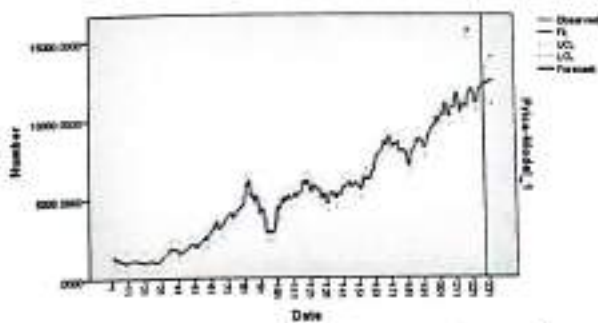


Figure 12 NSE Nifty 50 share price index, Fit, LCL, UCL and forecasting

Forecast : After defining the most appropriate model of share price , forecasting is to be done and to predict trends and develop forecast IBM SPSS Forecasting is used. Table 6 and Figure 12 present the results of the NSE Nifty 50 share price obtained by applying ARIMA Model (0,1,1) for the next 7 months from January 2020 to July 2020.

### CONCLUSION

Forecasting Share price index is of vital importance and utility to stock market investors. The investment decision depends on the future share prices. In this context , an ARIMA model to NIFTY 50 index is index is developed by using Box-Jenkins Time series

approach. The historical share price data were used to develop several models and the adequate one was selected according to performance criteria SBC,AIC, Standard Error and Maximum Likelihood. In the process of model building , the original Nifty 50 data is found to be Non stationary. But the first order differencing of Original Nifty 50 is stationery. In the study ARIMA (0,1,1) model is developed for analyzing and forecasting Nifty 50 closing stock price among all of various tentative models having lowest BIC values. The study highlights that influence R square is 99% high and mean absolute percentage error is very small for the fitted model. Thus it can be seen that the prediction accuracy is more in fitting of Nifty 50.

Acknowledgment: The author expresses heartfelt gratitude to the authors of articles cited in references(2,3,9,10) for depending to great extent on the literature and methodology framework in analyzing and forecasting the Nifty Fifty share price.

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**National Conference**

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## A STRUCTURAL EVALUATION ON LIFE INSURANCE INDUSTRY IN INDIA

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### ABSTRACT

*Life Insurance Industry in India plays vital role in shaping the economic profile of the nation. This sector contributes in terms of channelization of hard earned earnings to productive purpose along with ensuring realization of financial goals of investors and providing socio and economic security through the provision of risk coverage. Along with adding to Government exchequer in terms of Dividend and tax, the role of the sector in financing Infrastructural projects of Government has much depth and breadth in the financial sector. The study aims at examining the structure of Life Insurance industry in India in the three phases of its development to present stage based on selected financial and non-financial variables. The study also highlights the potential opportunities and challenges in the life insurance sector in India in the liberalised era of economy.*

*Keywords: structure of Life Insurance industry-financial and non-financial variables-opportunities and challenges-Liberalised era*

### Introduction:

Insurance in its modern form first arrived in India in 1818, when Oriental Life Insurance Company was started by Anita Bhavsar in Kolkata to cater the needs of European community. At the dawn of 20th century many insurance companies were founded. In 1912 life insurance act and provident act were passed. This act has given right to the government of India to get statistical information from the insurance companies operating in life as well as non-life insurance fields. In the year 1938 subsequent insurance act was passed. The objective of this act was to keep control over the insurance industry and to stop failures of unsound ventures. In the year 1944, a bill was presented in legislative assembly of India to nationalize the whole insurance industry. Life insurance sector has passed through three vital stages: pre LIC, LIC and LIC with private players (deregulated stage). On 1st September 1956, the Life Insurance Corporation of India came into force. LIC of India was created by nationalizing 245 private life insurance players and other entities which were involved in life insurance business. As a result of industrial policy resolution of 1956 the whole insurance industry was nationalized in India. The life insurance industry become stable and started growing rapidly after nationalization.

The Life insurance industry in India has come a long way since the time when businesses were tightly regulated and concentrated in the hands of a few public sector insurers. Following the passage of Insurance Regulatory and Development Authority Act in 1999, India abandoned public sector exclusively in the insurance industry in favor of market driven competition. This shift has brought about major changes to the industry. The inauguration of a new era of insurance development has seen the entry of international insurers, the proliferation of innovative products and distribution channels and the raising of supervisory standards. In the third stage, Life Insurance industry in India faced tremendous changes in its regulations, products and services control by regulator (i.e., IRDAI). With the arrival of private players, the market has become dynamic; there has been enormous increase in the grievances due to Mis-selling practices in marketing life insurance products and services. This necessitates the need of powerful regulator like IRDA in protecting the rights of potential investors in the Life Insurance industry. The study examines the evolution of Life Insurance industry, growth, hurdles encountered in its transition to the present stage.

### Significance of the study

The Life Insurance plays a pivotal role in offering insurance products which meet the requirements and expectations of the customers and at the same time are affordable. Huge untapped market, perception of insurable risks of Indian consumers, competitive pressures arising from integration of bank and insurance, impact of information technology and the role of insurance industry in financial service industry are some of the forces which shape the competitive structure of the insurance industry. Indian Life Insurance industry is one of the sectors that is still observing good growth. Life Insurance industry has modified itself with the passage of time by introducing customized products based on customers' needs, through innovative distribution channels, Indian Life Insurance industry searched its path to grow. Changing government policy and guideline of the regulatory authority IRDA have also played a vital role in the growth of this sector in meeting challenges and making the best of the opportunities for the future of the Indian insurance companies. The study

is a descriptive and analytical one that attempts to identify the growth and current state of development of life insurance industry in India. The study also intends to analyze selected variables as given in analysis and discussion.

**Objectives of the study**

1. To highlight the challenges and prospects of life Insurance industry in India.
2. To analyze the growth rate on selected performance variables of life insurers in India.
3. To explore the current state of developments in the Life Insurance market in India.

**Research Hypothesis**

There is significant difference in the mean score in the performance with respect to selected (10) financial and non-financial variables based on sector and year

**Research methodology**

The design of the present study is descriptive and analytical in nature. The study require Secondary data only. The secondary data were obtained from the Annual Reports and Hand Book of IRDA, Annual reports of LIC, Annual reports of Swiss Re. The data collected were coded, edited and analyzed using statistical package for social sciences (SPSS Version 17. The analytical tools used for establishing and analyzing the relation and dependence between variables is Two Way ANOVA.

**Review of Literature**

**Sinha and Tapan**(2005) in their research have stated that India is among the most promising emerging insurance markets in the world. But a lion's share of contribution (80 per cent) towards total insurance premium markets in India is from Life insurance sector. The article highlights the importance and effects of opening up of Insurance sector in India to private players.

**Manjit Singh and Rohit Kumar** (2008) in their study highlight that insurance penetration and density has witnessed an increasing trend in the post reform period but has a long way to go to even come close to the developed nations . The study also indicates huge unexplored and untapped market in India and shows huge opportunities for insurance companies to capture the business from competitive market , the survival of companies will depend on their strategies and efforts to increase their penetration levels and tap new business positions especially in rural India.

**Sonika Chaudhary ,Pritikiran**(2011) in their paper ' life insurance industry in India current scenario ' discussed that life insurance in India's trend from the year 2005- 2006 to 2010 – 2011. During this period , many new products like ULIPs , pension plans etc

Riders were provided by the life insurers to suit the requirements of various customers. The new business of such companies was more skewed in favor of selected States and union territories. This paper concludes that private life insurers used the new business channels of marketing to a great extent when compared with LIC.

**Life insurance industry in India-challenges and prospects:**

The challenges in the Indian life insurance industry is multidimensional that demands serious attention as highlighted below.

**1. Customer Motivation**

Insurance is long term promise which is realized on contingency. Motivating customer to buy and getting valid and useful information for is itself a unique in terms of collection of customers information regarding the product and to offer other required products accordingly.

**2. Insurance Awareness**

Though the number of insurers increased, financial literacy and awareness in terms of understanding of products and service by customers is huge challenge . The educative measures should be adequate at least to have right perception insurance investment, risk cover and management of financial requirements through Life insurance.

**3. Persistency**

A variety of distribution channels are being employed to acquire customer but persistency ratio which says customer staying with company to the end of expiry period as per contract remain as a challenge.

**4. Right selling**

Inadequate knowledge and unethical practices by some insurance advisors has portrayed a negative image in public that stood as greatest hurdle in attracting elite customers. The measures of insurance regulator (IRDA) to contain the mis-selling had positive impact in insurance industry.

**5. People Factor**

The people factor plays a pivotal role in the industry. Though eligible and skilled population is large , but dearth of right talent and attracting committed and quality talent for every level of management for this fast growing sector has been huge task. Availability of various jobs in different sectors and requirement of different mindset to self-motivate and perseverance for this industry is great challenge .

**6. Diverse Population**

Marketing insurance products to diverse populations with different life style is major

challenge. The customers mostly do not indulge in buying insurance voluntarily. An element of motivation set in financial terms can make change. The diversity in socio-economic profile, culture, investment profile and attitude push a big challenge.

#### 7. Information Era

People discuss products and services on social media reviews and comments about companies and their workings. Now companies have risk of single negative review can have huge effect on their brands reputation. As information is easily available at customer end, the company and its people have to be consistent and assure the customer all the way, this is a challenge to every insurance firm.

#### 8. Rating criteria

Any of the Indian life insurers is yet to be rated by rating agencies for the customer to pick one of them is a challenge. However, individually insurance firms are using reputed rating organizations to evaluate in different criteria. It may take some more time to give ratings on par with developed markets for this long term oriented industry.

#### 9. Advisors

Majority of advisors are mostly part timers, motivating them to become true professionals is a big challenge for this industry. Recent changes and freedom given to insurance firms in acquisition of advisors, the changing role of advisor from company and customer perspectives provide new hopes in the segment.

#### 10. Other than term covers

The basic purpose of insurance is for protection but even today most insurance sales happen with perception of tax planning and investment instrument. Indian insurance professionals have to redesign customer relationship strategies that helps to imbibe positive perception among of customers on insurance.

The major opportunities and potentials in Indian Life insurance industry are:

##### 1. Majority of young population

The majority of India will be of working population 795.5 million by 2025. Rise in number of professionals, emergence of prosperous middle class and increase in awareness leads to rise in demand for insurance. Increasing per capita GDP is a huge opportunity for insurers with their varied products in every segment.

##### 2. Lot of potential

Increasing urbanization of rural areas and growth in new bankable households are of great opportunity for insurers to offer customized life insurance products. Though there had been increase in number of insurers over last twenty years, the huge amount of yet to insure more than 50% of insurable population of India shows still there is lot to do.

##### 3. Different products to offer

Increase in life expectancy of individuals, favorable savings and employment opportunities in private sector gives greater demand for pension plans. Majority of employees have no formal pension system to choose from and thus providing greater opportunity to insurers in India.

##### 4. Rising income levels

Globalization and economic reforms in the country have raised people's income levels. Indians being naturally good at saving for future needs gives great opportunity to insurers. The insurers channelize the savings into innovative insurance products and annuity plans.

##### 5. Technology

Technology has been great boon for the insurance industry in boosting infrastructure for growth, scalability and reach in every sphere. The rating of products and services on social media reviews and comments about companies and their products offer much in designing production and marketing strategies.

##### 6. Customer expectation

Competition among various distribution channels leads to fall of premium and help to improve customer service standards economically. In terms of customer service there is a lot to do by insurance firms, as increase in channels, expectations of customers will increase in its all dimensions.

##### 7. Distribution channels

The spread and depth of various distribution channels help to great extent in expanding footprint of the life insurance industry. The traditional mode of selling insurance is slowly changing today. Most of the insurance firms are using data collected by distribution channels and exchanged with other financial service providers to provide customized products.

## 8. Innovative process

After 20 years of private life insurers in the field there is drastic change in terms of people perception regarding insurance firms and their services. Joint ventures with seasoned insurers will help to share their knowledge that will help to bridge the huge gap in insurance penetration.

## Data analysis and discussion

The analysis on the selected financial and non-financial variables related to structure and performance of Indian Life insurance industry is highlighted below. The Selected variables for analysis are number of life insurance offices, Life Insurance penetration and density in India, First year premium (including single premium) of life insurers, Total premium of the Life Insurance Industry, Number of New policies issued by the Life insurers, Market share of the Life Insurance industry based on total premium and policies, Claim settlement ratio of the Life Insurance industry, Status of grievances of the Life insurance industry, Profit and loss of the Life insurance industry and Contribution of LIC to Policy holders and Government.

The number of offices of LIC and Private Insurers are tabled below.

Table 1. Number of Offices LIC vs Private Insurers

Year	LIC	Private Insurers	Total	Per cent share-LIC	Cumulative Per cent growth-LIC	Cumulative Per cent growth-Private
2000-2001	2186	13	2199	99.4	100	100
2001-2002	2190	116	2306	95	100.183	892.3077
2002-2003	2191	254	2445	89.6	100.2287	1953.846
2003-2004	2196	416	2612	84.1	100.4575	3200
2004-2005	2197	804	3001	73.2	100.5032	6184.615
2005-2006	2220	1645	3865	57.4	101.5554	12653.85
2006-2007	2301	3072	5373	42.8	105.2508	23630.77
2007-2008	2522	6391	8913	28.3	115.3705	49161.54
2008-2009	3030	8785	11815	25.6	138.6093	67576.92
2009-2010	3250	8768	12018	27	148.6734	67446.15
2010-2011	3371	8175	11546	29.2	154.2086	62884.62
2011-2012	3455	7712	11167	30.9	158.0512	59323.08
2012-2013	3526	6759	10285	34.3	161.2992	51992.31
2013-2014	4839	6193	11032	43.9	221.3632	47638.46
2014-2015	4877	6156	11033	44.2	223.1016	47353.85
2015-2016	4892	6179	11071	44.2	223.7877	47530.77
2016-2017	4897	6057	10954	44.7	224.0165	46592.31
2017-2018	4908	6204	11112	44.2	224.5197	47723.08

Source: IRDA hand book (2000-2001 to 2017-2018) Note: Base year 2000-2001

The table shows outstanding performance in number of offices opened by Private players in relation to LIC in the 18 years.

Table 2 Insurance penetration and insurance density of life insurers

Year	Penetration (%)	Density (\$)
2000-2001	2.15	9.1
2001-2002	2.59	11.7
2002-2003	2.26	12.9
2003-2004	2.53	15.7
2004-2005	2.53	18.3
2005-2006	4.1	33.2
2006-2007	4	40.4
2007-2008	4	41.2
2008-2009	4.6	47.2
2009-2010	4.4	55.7
2010-2011	3.4	49
2011-2012	3.17	42.7
2012-2013	3.1	41
2013-2014	2.6	44
2014-2015	2.72	43.2
2015-2016	2.72	46.5
2016-2017	2.76	55
2017-2018		

Source: IRDA hand book (2000-2001 to 2017-2018)

The tabular presentation makes it clear that the performance of Indian Life insurance industry is not at all shining with respect to the vital parameters used in evaluation of performance of Industry. There has been steady decrease in the rate of penetration since 2011-2012. Even the number of Life insurance players has been increasing since 1999, the decline in the penetration shows weakness of strategies of life insurance players in designing policies suitable to the financial requirements of investing public. The performance with respect to Insurance density is promising, but with respect to international scenario, it is not at all promising.

#### First year premium (including single premium) of life insurers.

Premium income is the second major source of income of life insurance industry. An insurance premium is the amount of money an individual or business pays for an insurance policy. Insurance premiums are paid for policies that cover life, health care, auto, home and others. Once earned, the premium is the income for the insurance company. It also represents a liability as the insurer must provide coverage for the claims being made against the policy. Failure to pay premium may result in the cancellation of the policy. First year premium is the premium collected from the new policies sold in the given period from regular or limited premium paying policies. The premium amount belonging to first year of policy is reported as FYP. New business premium is the premium acquired for a particular year. It incorporates single premium for that year. Single premium policies are normally targeted at people who are in the higher income bracket or those who have idle money with them.

#### Two way ANOVA of first year premium (FYP) including single premium by Sector and Year.

Variations on the First year premium (including single premium) of life insurers are analyzed with the Two way ANOVA and the Output is presented in the following tables.

Table 3 Two Way ANOVA

Tests of Between-Subjects Effects					
Dependent Variable: FYP incl Single Premium					
Source	Type I Sum of Squares	df	Mean Square	F	Sig.
Sector	82164628414	2	41082314207	185.541	.000*
Year	26519208443	17	1559953438	7.045	.000*
Error	3764123892	17	221419052.5		
Total	1.124E+11	36			

Source: IRDA Hand Book Primary data\*Significant at 5 per cent level of significance

The mean variation of the scores for the first year premium among sectors and years is tested by Two way ANOVA, which shows that the sector wise variation of the mean scores is statistically significant at 5 percent level of significance (value of  $F$  185.541 Df2 with  $p=0.000<0.05$ ). Similarly year wise variation of the mean scores is statistically significant at 5 percent level of significance (value of  $F$  7.045 Df 17 with  $p=0.000<0.05$ ). As per the tables 4.4, 4.5, 4.6 the first year premium have significant difference among public and private sectors. In case of years, the difference is also significant. First year premium of public sector is very high compared to private sectors (mean score 62480.739) and shows an increasing trend from the year 2000-2001 to 2017-2018. With reference to the year, first year premium is very high in 2017-2018 (mean score 97076.955).

#### Total premium (TP) of the Life Insurance Industry

The total premium collected by insurers have been taken into account for analysis

#### Two way ANOVA of TP by Sector and Year.

Variations on the total premium of life insurers are analyzed with the Two way ANOVA and the Output is presented in the following tables.

Table 4 Two Way ANOVA

Tests of Between-Subjects Effects					
Dependent Variable: Total Premium					
Source	Type I Sum of Squares	df	Mean Square	F	Sig.
Sector	547516527608	2	2.738E+11	258.244	0.000*
Year	152319780657	17	8959987098	8.452	0.000*
Error	18021288075	17	1060075769		
Total	717857596342	36			

Source: IRDA Hand Book Primary data\*Significant at 5 per cent level of significance



The mean variation of the scores for the total premium among sectors and years is tested by Two way ANOVA, which shows that the sector wise variation of the mean scores is statistically significant at 5 percent level of significance (value of  $F 258.244$  Df 2 with  $p=0.000<0.05$ ). Similarly year wise variation of the mean scores is statistically significant at 5 percent level of significance (value of  $F 8.452$  Df 17 with  $p=0.000<0.05$ ). As per the tables 4.7, 4.8, 4.9 the total premium have significant difference among public and private sectors. In case of years, the difference is also significant. Total premium of public sector is very high compared to private sectors (mean score 164816.917) and shows an increasing trend from the year 2000-2001 to 2017-2018. With reference to years total premium is very high in 2017-2018 (mean score 229404.720).

#### Number of New policies (NP) issued by the life insurers.

The Policies issued to policyholders in the current year of analysis has been accounted for analysis.

#### Two way ANOVA of NP by Sector and Year.

Variations on the number of New policies issued by the life insurers are analyzed with the Two way ANOVA and the Output is presented in the following tables.

Table 5 Two way Anova

Tests of Between-Subjects Effects					
Dependent Variable: NP issued					
Source	Type I Sum of Squares	df	Mean Square	F	Sig.
Sector	15503535.738	2	775167.869	473.684	.000*
Year	85577.578	15	5705.172	3.486	.010*
Error	24546.998	15	1636.467		
Total	1660460.313	32			

Source: IRDA Hand Book Primary data\*Significant at 5 per cent level of significance

The mean variation of the scores for the number of new policies issued among sectors and years is tested by Two way ANOVA, which shows that the sector wise variation of the mean scores is statistically significant at 5 percent level of significance (value of  $F 473.684$  Df 2 with  $p=0.000<0.05$ ). Similarly year wise variation of the mean scores is statistically significant at 5 percent level of significance (value of  $F 3.486$  Df 15 with  $p=0.010<0.05$ ). As per the tables 4.10, 4.11, 4.12 the number of new policies issued have significant difference among public and private sectors. In case of years, the difference is also significant. The number of new policies issued by the public sector is very high compared to private sectors (mean score 302.483). Number of new policies issued in the year 2009-2010 (mean score 266.125) is very high compared to other years. Mean score reveals high fluctuation in issuing policy.

#### Market share (MS) of the Life insurance company based on total premium and policies.

#### Two way ANOVA of the MS based on total premium by Sector and Year.

Variations on the market share based on total premium of the life insurers are analyzed with the Two way ANOVA and the Output is presented in the following tables.

Table 6 Two way Anova

Tests of Between-Subjects Effects					
Dependent Variable: MS based on total premium					
Source	Type I Sum of Squares	df	Mean Square	F	Sig.
Sector	122623.584	2	61311.792	231.842	0.000*
Year	0.000	17	0.000	0.000	1.000
Error	4495.730	17	264.455		
Total	127119.314	36			

Source: IRDA Hand Book Primary data\*Significant at 5 per cent level of significance

The mean variation of the scores for the market share based on total premium among sectors and years is tested by Two way ANOVA, which shows that the sector wise variation of the mean scores is statistically significant at 5 percent level of significance (value of  $F 231.842$  Df 2 with  $p=0.000<0.05$ ), but year wise variation of the mean scores is not statistically significant at 5 percent level of significance (value of  $F 0.000$  Df 17 with  $p=1.000>0.05$ ). As per the tables 4.13, 4.14, 4.15 the market share based on total premium have significant difference among public and private sectors. While there is no significant difference in case of years. The market

share based on premium of the public sector goes on decreasing while the market share based on premium of the private sector goes on increasing. Whereas the market share based on premium is found to be Similar in all the years.

**Market share (MS) of the life insurance company based on policies.**

The market share of life insurance players based on policies issued by them is considered for analysis.

**Two way ANOVA of the MS based on policies by Sector and Year.**

Variations on the market share based on policies of the life insurers are analyzed with the

Two way ANOVA and the Output is presented in the following tables:

**Table 7 Two Way Anova**

Tests of Between-Subjects Effects					
Dependent Variable: MS based on policies					
Source	Type I Sum of Squares	df	Mean Square	F	Sig.
Sector	129603.653	2	64801.827	406.909	0.000*
Year	0.000	17	0.000	0.000	1.000
Error	2707.313	17	159.254		
Total	132310.967	36			

Source: IRDA Hand Book Primary data \*Significant at 5 per cent level of significance

The mean variation of the scores for the market share based on policies among sectors and years is tested by Two way ANOVA, which shows that the sector wise variation of the mean scores is statistically significant at 5 percent level of significance (value of  $F 406.909$  Df 2 with  $p=0.000 < 0.05$ ), but year wise variation of the mean scores is not statistically significant at 5 percent level of significance (value of  $F 0.000$  Df 17 with  $p=1.000 > 0.05$ ). As per the tables 4.16, 4.17, 4.18 the market share based on policies have significant difference among public and private sectors. While there is no significant difference in case of years. The market share based on policies of the public sector goes on decreasing while the market share based on policies of the private sector goes on increasing. Whereas the market share based on policies is found to be similar in all the years.

#### Claim settlement ratio of the Life Insurance Industry

Claim settlement ratio means a number of claims settled or paid by the insurance company on the claim or death of the policy holder. The claim settlement ratio is calculated as the total number of claims settled against the total number of claim received. The claim settlement ratio (CSR) plays a crucial role in determining the trustworthiness /reliability of the company. claim paid by the life insurance company has been explained with the help of the table and figure given below :

**Table 8 CSR Life insurance Industry ( Per cent)**

Year	LIC	Private Insurers
2008-2009	95.48	82.26
2009-2010	96.54	84.88
2010-2011	97.03	86.04
2011-2012	97.42	89.34
2012-2013	97.73	88.65
2013-2014	98.14	88.31
2014-2015	98.19	89.40
2015-2016	98.33	91.48
2016-2017	98.31	93.72
2017-2018	98.04	95.24

Source: IRDA Hand Book

The CSR performance of LIC and Private Insurers highlights that LIC has been doing outstandingly well during the study period. There has been continuous improvement in the performance of private insurers too even not up to that of Public counterpart.

#### Status of grievances of the life Insurance Industry.

The efficiency in handling Grievance from customers is one of the vital parameter in measuring performance of life insurers. The outstanding grievance in the respective years has been accounted for analysis.

**Two way ANOVA of the factors of performance of the life insurance company by Sector and Year**

variance on the basis of performance of the life insurance companies for the year 2016 and 2017 and the F value is presented in the following table.

**Table 9 Two Way Anova**

**Tests of Between-Subjects Effects**

**Independent Variable: Performance Understanding**

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Total	1174.112	77			
Year	114.112	1	114.112	9.78	.003
Sector	102.112	1	102.112	8.78	.004
Year * Sector	1.888	1	.1888	.016	.884
Total	1174.112	78			

Source: IRDA Hand Book Primary data\* Significant at 5 per cent level of significance

The mean variation of the scores for the performance understanding among sectors and years is tested by Two way ANOVA, which shows that the sector wise variation of the scores is statistically significant at 5 percent level of significance (value of F 9.78 of table 9.0.05), but year wise variation of the scores is not statistically significant at 5 percent level of significance (value of F 0.016 of table 9.0.05). As per the tables 4.25 & 4.26 the performance understanding score is significantly different among public and private sectors. While there is no significant difference in case of years. It also shows that company with the performance understanding score is higher than the public sector in the year 2016 and 2017.

**Two way ANOVA of profit and loss of the life insurance company by Sector and Year**

variance on the basis of profit and loss of the life insurance companies for the year 2016 and 2017 and the F value is presented in the following table.

**Table 10 Two Way Anova**

**Tests of Between-Subjects Effects**

**Independent Variable: Profit & Loss account**

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Total	5511.112	77			
Year	111.112	1	111.112	2.008	.161
Sector	102.112	1	102.112	1.846	.178
Year * Sector	1.888	1	.1888	.003	.958
Total	5511.112	78			

Source: IRDA Hand Book Primary data\* Significant at 5 per cent level of significance

The mean variation of the scores for profit and loss among sectors and years is tested by Two way ANOVA, which shows that the sector wise variation of the mean scores is statistically significant at 5 percent level of significance (value of F 1.846 of table 10.0.05), but year wise variation of the mean scores is not statistically significant at 5 percent level of significance (value of F 2.008 of table 10.0.05). As per the tables 4.25 & 4.26 the profit and loss are significantly different among public and private sectors. While there is no significant difference in case of years. The profit made by the private sector is higher than the profit made by the public sector during the last eight years. From 2009-2018 till 2017-18, the profit of the life insurers are increasing.

**Contribution of I.M. to Policy holders and Government.**

Contribution of I.M. to policy holders and government was explained with the help of the table and chart given below :

**Two way ANOVA of the Status of grievances of the life insurance company by Sector and Year.**

Variations on the status of grievances of the life insurers are analyzed with the Two way ANOVA and the Output is presented in the following tables.

**Table 9 Two Way Anova**

Tests of Between-Subjects Effects					
Dependent Variable: Grievance Outstanding					
Source	Type I Sum of Squares	df	Mean Square	F	Sig.
Sector	11936165.857	2	5968082.929	3.977	.045*
Year	14403764.429	13	1107981.879	0.738	0.704
Error	19507139.714	13	1500549.209		
Total	45847070.000	28			

Source: IRDA Hand Book Primary data\*Significant at 5 per cent level of significance

The mean variation of the scores for the grievances outstanding among sectors and years is tested by Two way ANOVA, which shows that the sector wise variation of the mean scores is statistically significant at 5 percent level of significance (value of  $F 3.977$  Df 2 with  $p=0.045<0.05$ ), but year wise variation of the mean scores is not statistically significant at 5 percent level of significance (value of  $F 0.738$  Df 13 with  $p=0.704>0.05$ ). As per the tables 4.20, 4.21, 4.22 the grievances outstanding have significant difference among public and private sectors. While there is no significant difference in case of years. Public sector has completely resolved the grievances reported and outstanding during the last four years. Whereas the grievances resolved by the private sector has also increased year after year.

**Profit and loss of the Life Insurance Industry.**

The financial performance of life insurers in terms of profit or loss is analysed.

**Two way ANOVA of profit and loss of the life insurance company by Sector and Year.**

Variations on the profit and loss of the life insurers are analyzed with the Two way ANOVA and the Output is presented in the following tables.

**Table 10 Two Way Anova**

Tests of Between-Subjects Effects					
Dependent Variable: Profit & Loss account					
Source	Type I Sum of Squares	df	Mean Square	F	Sig.
Sector	552492971868	2	2.762E+11	5.038	.019*
Year	1607648826884	17	94567578052	1.7246	0.136
Error	932161100614	17	54833005919		
Total	3092302899368	36			

Source: IRDA Hand Book Primary data\*Significant at 5 per cent level of significance

The mean variation of the scores for profit and loss among sectors and years is tested by Two way ANOVA, which shows that the sector wise variation of the mean scores is statistically significant at 5 percent level of significance (value of  $F 5.038$  Df 2 with  $p=0.019<0.05$ ), but year wise variation of the mean scores is not statistically significant at 5 percent level of significance (value of  $F 1.7246$  Df 17 with  $p=0.136>0.05$ ). As per the tables 4.23, 4.24, 4.25 the profit and loss have significant difference among public and private sectors. While there is no significant difference in case of years. The profit made by the private sector is higher than the profit made by the public sector during the last eight years. From 2009-2010 till 2017-18, the profit of the life insurers are increasing.

**Contribution of LIC to Policy holders and Government.**

Contribution of LIC to policy holders and government was explained with the help of the table and chart given below:

Table 11. Contribution to LIC Policyholders and Government (Crores)

Year	Policyholders	Government	Percent- Policyholders	Percent- Government
		433	100	100
2001-2002	8232	488	112.7187	112.7021
2002-2003	9279	548	126.81	112.2951
2003-2004	10439	548	162.828	100
2004-2005	13404	622	143.8411	113.5036
2005-2006	11841	758	174.9028	121.865
2006-2007	14398	830	191.4602	109.4967
2007-2008	15761	929	214.4436	111.9277
2008-2009	17653	1031	237.9495	110.9795
2009-2010	19588	1138	262.5729	110.3783
2010-2011	21615	1281	295.724	112.5659
2011-2012	24344	1436	331.5233	112.0999
2012-2013	27291	1634	377.1987	113.7883
2013-2014	31051	1803	416.1443	110.3427
2014-2015	34257	2497	576.312	138.4914
2015-2016	47442	2200	507.8474	88.10573
2016-2017	41806	2422	558.9772	110.0909

Source: Various Annual Reports of LIC

The table shows the Contribution of LIC to policy holders and government. The trend reveals that the contribution of LIC to both policy holders and government has been increasing at a higher rate. The surplus made by LIC are also increasing year after year.

#### Conclusions

With the new ideas and passion, insurance industry shows a remarkable growth i.e., increasing trend over the years in terms of insurance density and penetration ratio, amount of investment, total premium, number of new policy issued, number of offices opened etc. The sector witnesses a multi-fold growth in most of the insurance parameters. Even a tremendous growth in life insurance industry, there are still a large portion of population who are remain unnerved. So there is an opportunities to life insurer to tapped this untapped market through customized and innovative product and better facilities. The reason behind the downfall is slow economic growth rate, higher inflation, low saving, tighter monetary policy, global economic slowdown and crises, low industry growth rate etc. To tackle these issues life insurer required to change their policies and strategies so that it reverse the decreasing trends into increasing trends. LIC and private insurers will need to increase efforts to design new products that are suitable for the market and make use of innovative distribution channels to reach a broader range of the population. LIC India has to made radical changes in their strategies and product portfolio to face cutthroat competition.

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## CUSTOMER EVALUATION ON SELECTED E-SERVICES OF LIC INDIA AMONG TEACHERS IN GOVT COLLEGE CHITTUR

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### ABSTRACT

*LIC India, a prestigious institution in public sector, has conquered customer's mind and expectations through several decades of its efficient services. LIC online services provide ample opportunity to its customers for purchase and maintenance of their policies. As such, it is worthwhile to evaluate the effectiveness of E services from the perspective of customers. If the customers realize the possibilities and potentials of e-services of LIC to its full extend, it would be accepted at its acme. The analysis shows that, though the policy holders are aware of the e services of LIC India there is a great need to make appropriate arrangements to popularize or increase the usage of e services. There is an imperative need to make concrete efforts towards enhancing operational efficiency of e services of LIC as it is being the order of the day.*

*Keywords: E-services, LIC India, Customer, Awareness*

### Introduction.

Life insurance sector, especially LIC India plays a significant and vital role in the development of Indian economy. The speedy growth of internet in its usage and technological advancement has given remarkable opportunities to business. E-services are becoming increasingly important not only in determining the success or failure of e-commerce business services but also in providing consumers with a superior and enlightened experience with respect to the interactive flow of information in a cost effective way.

With a view to enhancing customer responsiveness and services, in July 1995, LIC started a drive of online services to policy holders and agents. It provides an opportunity for self maintenance of their policies to the customers of LIC.

Customers are the king of the market and customer evaluation becomes a major area of marketing. In offering E-services, LIC India can create opportunities to strengthen their relationship with customers. As such the study is driven towards having a better understanding and evaluating of customer response on selected E-services of LIC India.

### Review of literature:

- > **Dr. Lakshmanan M P (2014)**, in his thesis "Marketing strategies of LIC in Kerala" states that the resources, activities and programmes of LIC, and business performance parameters such as the corporate image, return on investment and market share are closely interlinked with its cross functional integration activities.
- > **Sudhkar (2000)** in his article, "LIC and the Internet Revolution", examines the various types of information given in the LIC's website. He also discusses the benefits of internet from various dimensions with special emphasis on cost benefit analysis.
- > **Edward K. strong Jr (1992)**, in the invaluable book, "The psychology of selling life insurance", illustrate psychological principles underlying selling in as non-technical manner as possible which are directly applied to selling
- > **Desai (1973)** in his book, "Life insurance in India its history and dimensions of growth", explains and elaborate the historical background of the life insurance industry in India and its growth since nationalization.

**Objectives:**

- To examine the level of awareness of e-services of LIC among policyholders.
- To examine various problems or difficulties experienced and the solutions opt by the policyholders in the usage of E-services of LIC.

**Research Hypothesis:**

There is no significant difference in the mean score on the the level of awareness of e-services of LIC among policyholders based on number of years of association with LIC

There is no significant difference in the mean score on the Problems faced by the customers in using E services based on their gender profile.

**Methodology and collection of data**

The data for the study will be collected from both the primary and secondary sources. The primary data will be collected from the policyholders among faculty members in GCC Chittur. The sample size is fixed after conducting pilot study. The tool used for data collection is a structured interview schedule. The secondary data will be gathered from the online service portal of LIC India, annual reports of LIC India, bulletins, magazines and journals of various commissions appointed by the government to regulate the life insurance business in India. Appropriate mathematical and statistical tools will be applied for analysis of data. The data is analyzed with help of SPSS and MS EXCEL.

**Conceptual framework:**

LIC customers enjoy an all-round support regarding their policies and plans through this online gateway. In fact, an online user can avail some of the services which were formerly available just at the LIC branches of the city. The various functionalities offered includes registration, revival quotation, locators claim history, loan status, premium due calendar, policy bond, online premium payment etc...

**Data analysis:****Awareness of policyholders on e services of LIC**

The awareness of policyholders towards the e services of LIC are analyzed with one -way ANOVA to test the statistical significance of difference in the mean scores with respect to years of purchase of policy.

**Table: 1 Descriptive Statistics and one way ANOVA on awareness of E services.**

	NUMBER OF YEARS OF ASSOCIATION WITH LIC (N)					F	Sig
	>10 Years(21)	6-10 years(14)	2-5 years(11)	<2 years(4)	Total(50)		
<b>E services</b>	MEAN(SD)						
Registration	4.29(.717)	3.79(1.36)	4(1.00)	4(.81)	4.06(.99)	0.716	0.548
Online payment	4.05(.921)	4.07(1.20)	4.27(1.00)	4.75(.50)	4.16(.99)	0.625	0.603
Policy schedule	3.43(1.02)	3.71(.82)	3.36(1.20)	4.50(.57)	3.58(1.01)	1.56	0.212
Policy status	<b>4.10(1.04)</b>	<b>4.07(1.14)</b>	<b>2.91(1.37)</b>	<b>4(.81)</b>	<b>3.82(1.20)</b>	3.016	<b>*0.039</b>
Bonus status	3.57(.811)	3.57(1.01)	2.64(1.28)	3.5(.57)	3.36(1.02)	2.573	0.065
Loan status	3.52(.81)	3.43(1.08)	2.55(1.44)	3.75(.95)	3.30(1.11)	2.457	0.075
Claim status	3.33(.93)	3.57(.92)	2.64(1.41)	3(.68)	3.22(1.07)	1.798	0.161
Revival quotation	2.9(1.17)	2.64(.92)	2.82(1.25)	2.5(1.00)	2.78(1.09)	0.245	0.865
Premium due calendar	3.52(1.12)	3.43(1.08)	2.73(1.34)	3.5(1.91)	3.32(1.23)	1.105	0.357
Premium paid certificate	3.81(1.03)	3.36(1.15)	2.82(1.32)	4(1.41)	3.48(1.19)	2.072	0.117
Claim history	3.14(1.15)	3.36(1.33)	2.64(1.02)	2.75(1.70)	3.06(1.21)	0.83	0.484
Policy bond'	3.81(1.03)	3.29(.91)	2.64(.80)	3(1.82)	3.34(1.09)	3.335	0.027
Grievance registration	3.81(1.07)	3.14(1.16)	2.55(1.21)	2.75(.50)	3.26(1.19)	3.584	<b>*0.021</b>
Online forms	4(.94)	3.43(1.15)	2.64(1.36)	3.75(1.25)	3.52(1.21)	3.592	<b>*0.02</b>
Locators	3.38(1.16)	3(1.03)	2.64(1.50)	2.75(2.06)	3.06(1.28)	0.919	0.439

Source: Primary data.

\*Significant at 5 per cent level of significance.

The result of one way anova for the variables of E services of LIC with the years of purchase of policy gives an F value 3.016, 3.335 and 3.584 which are significant at 5 per cent level ( $p < 0.05$ ). Hence the null hypothesis is rejected. This implies that there is difference in the mean scores of the variables related to the awareness on e services of LIC with respect to the years of purchase of policy as to policy status, online forms and grievance registration.

The class with highest mean value is regarded as the class with highest level of awareness regarding the above e services. Here in all the three cases the period of more than 10 years has highest mean value. This implies that people who have taken policy since more than 10 years are more aware about the e services than others. In the case of other e services policyholders are indifferent.

#### Problems faced by the customers in using E services.

Table 2 Descriptive Statistics and independent sample t test on problems of E services

PROBLEMS	GENDER(N)		T	Sig
	MALE(16)	FEMALE(34)		
	MEAN(SD)			
Login	3.31(1.30)	3.12(.977)	0.59(0.532)	.55(.6)
Account Locked	3.5(.894)	3.15(1.048)	1.161(1.23)	.25(.22)
Transaction Failed	4.06(.772)	3.94(.600)	0.60(.55)	.54(.58)
Money Loss	4.38(.719)	3.97(1)	1.44(1.62)	.15(.11)
Low Speed	3.25(1.065)	2.97(1.167)	.81(.83)	.42(.4)
Connection	3.5(.966)	2.74(.994)	2.55(2.58)	.01(.01)
Privacy	4.13(.885)	3.62(1.206)	1.5(1.67)	.14(.10)
Customer Support	3.63(.885)	3.47(.929)	.55(.56)	.58(.57)
Details Missing	3.25(.931)	3.26(.963)	0.5(.05)	.96(.95)
Lengthy Procedure	3.25(.775)	3.12(.972)	.47(.51)	.63(.6)
OTP	3.38(1.25)	3.09(.933)	.90(.81)	.37(.42)
Delay	3.44(1.26)	2.88(1.25)	1.46(1.45)	.15(.15)

Source: Primary data.

\*Significant at 5 per cent level of significance.

The problems on the E services of LIC India faced by the policyholders are analyzed with the help of independent sample t test. As the ( $p$  value  $< 0.05$ ) the null hypothesis is rejected i.e., there is significant difference in the case of connection problems to the website with respect to gender of respondents. Based on the mean score of connection problems it is observed that male has the highest score i.e., they might be experiencing less connection problems. The respondents are found to be indifferent in their opinion in the case of other problems.

#### Findings:

1. Analysis on awareness on E services with respect to years of purchase of policy, it is found that people who have taken policy since more than 10 years are more aware about the e services than others with respect to policy status, grievance registration and online forms. In the case of other e services policyholders are indifferent.
2. The respondents are found to have similar level of satisfaction with regards to gender.
3. Analysis on problems on e services of LIC with regard to gender, it is found that policyholders might be experiencing connection problems that too females are seriously confronting it.

#### Summary and Conclusion

In today's tech world the relevance of e services has been increasing day by day. It becomes essential to every type of service industry to incorporate e services to its practice. Especially to a prestigious organization like LIC it is highly essential to offer a better e service platform to its customer as being a market leader in insurance industry. The result of this study indicates that convenience is the major reason for the policyholders to use e services of LIC India. Policyholders having high level of association with LIC are found to be more aware of e services. Better relationship with customer demands improved service in the call alerts being the least used source of update by LIC. As regards to satisfaction level policyholders are indifferent except customer support. LIC can extend their customer support programs especially in case of e services more to the customers as it is being the symbol of trustworthiness of the organization. LIC must take care of its server efficiency as policyholders are experiencing connection problems, as an error free connection is one of the prerequisite for a website. There is great need to make concrete efforts towards enhancing operational efficiency of e services of LIC as it is being the order of the day.

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**கருத்துக்களம்**

தென்பேற்குப் பழவக்காற்று நளமும் மேற்கத்தொடர்ச்சி எனவானது பாரிக்கும் இட வெங்குதல் பகனவழைன் காட்சி எனப்பெற்று நிவனமும் நிவனமும் மிக்க இயல்பைச் சரீரகளில் இடமில், காட்சி, மனவமலசர், முதுவர், மலசர், இரவானர் போன்ற தென்மக்களது பழங்குடி மக்கள் ஆங்காங்கே வாழ்கின்றனர் இப்பழங்குடி மக்களின் குறிப்பிடத்தக்க இனமாக முதுவர் பழங்குடி மக்கள் விளங்கியிருந்தனர்.

கோவை மாவட்டம் ஆளமையை புலிகள் கைப்படுத்தித் தர மட்ட வாய்ப்பாறை சரகம் அமராவதி சரகம் மாணாய்ப்பள்ளி சரகம் உடுமலைப்பேட்டை சரகம் ஆயி நான்கு சரகங்களில் முதுவர் இன மக்கள் வாழ்கின்றனர் தமிழகப் பகுதிகளில் வாழும் மனவயாழ் பழங்குடி மக்களின் தமக்கெனத் தனித்த முயற்சியான அரசியலமைப்பு, குலமரபு, குலக்கட்டுப்பாடு, மயிளாடு, பழக்க வழக்கங்கள் போன்றவற்றைக் கொண்டு ஏற மனவயாழ் மக்களிடமிருந்து வேறுபட்ட வாழ்வியலைக் கொண்ட வர்வளாக இனங்கள் வாழ்கின்றனர் கருவத் தொற்றத்தினால் பிறப்பழங்குடி மக்களினத்தும் வேறுபட்ட தொற்றம் கொண்ட வர்வளாகவே தாண்டிடுகின்றனர் எட்டர் தென்மக்கள் மூலக்கள், இயற்கை கண்டிப்பத்தவர் என்று குறிப்பிடுகின்றனர் காட்டு மக்களோடு ஒர்த சாலவைக் கொண்டுள்ள தொற்றமும் முயர்களில் ஏரலாறு குறித்த வாய்மொழி வழக்காரும் இட மயிளாடு அண் செய்வதானவே அமையின்றது

**சமஸி வரலாறு**

முதுவர் இன மக்களின் பூர்வீகம் மதுரை மன்றல் பாய்நீரால் ஈயல் ஏற்றப்பட்ட கோர் அங்கத்து தொய்வையளில் காணமாக மனவயை விட்டு நிருவீதாங்கூர் மனவப்பகுதிகளில் தஞ்சை ஏரணத்திற்காக உறுதியின்றனர் மதுரைவிளிருந்து கயங்கம் பெயர்



# **SUSTAINABLE DEVELOPMENT**

**Impact and Incidence**

**Dr. Baby Kizhakkekalam  
Brejesh NS**



# SUSTAINABLE DEVELOPMENT

## Impact and Incidence

**Dr. Baby Kizhakkekalam**  
**Brejesh NS**



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## Adaptation and Mitigation Measures: A Solution for Climate Variability

Sumathy M., Smitha P. and Manju Varghese

### INTRODUCTION

Agriculture plays a vital role not only in Indian economy but also in Kerala. But various agricultural reports show that its share goes on declining due to several factors. Increase in cost of production, climatic factors, urbanisation, industrialisation, deforestation and loss of bio-diversity are important factors responsible for this deceleration. Among these, climatic factors are most critical one. There were so many studies that revealed the trend of climate in India as well as in Kerala. The mean minimum temperature in the state is 22-24°C and the mean maximum temperature is 32-34°C. There is spatial variation in annual mean temperature ranging from 25.5 to 27.5°C in the coastal belt, 27.5 to 29.5°C in the central region and 17.5 to 21.5°C in the hilly regions. During summer months the temperature is high leading to drying of surface soil and drought condition. Kerala is situated in the high rainfall humid tropical region. It is highly erratic in recent years. The rainfall of Kerala has shown a decreasing trend in the last 100 years. Because of these erratic nature in temperature and rainfall, the agricultural sector which is mostly depend on monsoon badly affected.



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# A dogbone metamaterial based electromagnetic cloaking scheme for microwave applications

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##### Abstract:

The practical demonstration of invisibility cloaking has attracted the attention of electromagnetic research community over the decade. The invention of metamaterials has boosted the research on electromagnetic cloaking due their exotic material parameters under plane wave incidence. In this paper, we are proposing the experimental realization of cylindrical cloaking scheme using the dogbone metamaterial by efficiently routing the incident electromagnetic fields around the target metal obstacle under consideration. Experimental and simulation studies reveals that the proposed cloaking scheme can effectively suppress the Scattering Cross Section of the metal cylinder and significantly suppresses the back scattered power compared to the bare cylinder.

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1. Introduction



Over the past decades there has been a considerable interest in the practical demonstration of different types of invisible electromagnetic cloaks in the microwave and plasmonic regime. The initial theoretical study on electromagnetic cloaking, based on coordinate transformation methods, relies on the creation of electromagnetic voids in free space [1]. Since the phase velocity of the wave passing through this cloak exceeds light velocity, this method is inherently narrow banded. The practical realization of this concept was proposed by Pendry using an array of Split Ring Resonators arranged in cylindrical fashion [2]. Another approach known as the plasmonic cloaking scheme utilizes the negative permittivity offered by the plasmonic shell to suppress back scattered power from the target. Engheta utilized the effective negative permittivity of parallel plate structures for back scattering reduction [3–4]. Plasmonic cloaking has also been used for cloaking a dipole antenna from the surrounding without sacrificing its receiving capabilities [5]. Many studies have been performed on the physical insights and reliability of plasmonic cloaking techniques for regular and irregular objects [6–8]. Another technique is the usage of non-magnetic non-resonant inclusions of ring resonators around the cylindrical target for backscattering reduction [9–10]. In plasmonic cloaking, increasing size of the target increases its visibility due to the excitation of higher order multi-poles. To overcome this disadvantage, Andrea Alu proposed the mantle cloaking technique in which the surface reactance of the cloaking frequency selective surface is properly designed for back scattering reduction [11–12]. Tretyakov utilized parallel metallic cylinders for effectively guiding the electromagnetic waves impinging upon the cloak boundary so that broad band operation can be achieved [13–14]. Experimental realizations of electromagnetic cloaking at optical wavelengths are well known [15–16]. The different topological aspects, classifications and characterization of metamaterial cloaking schemes are discussed in review reports [17–18].

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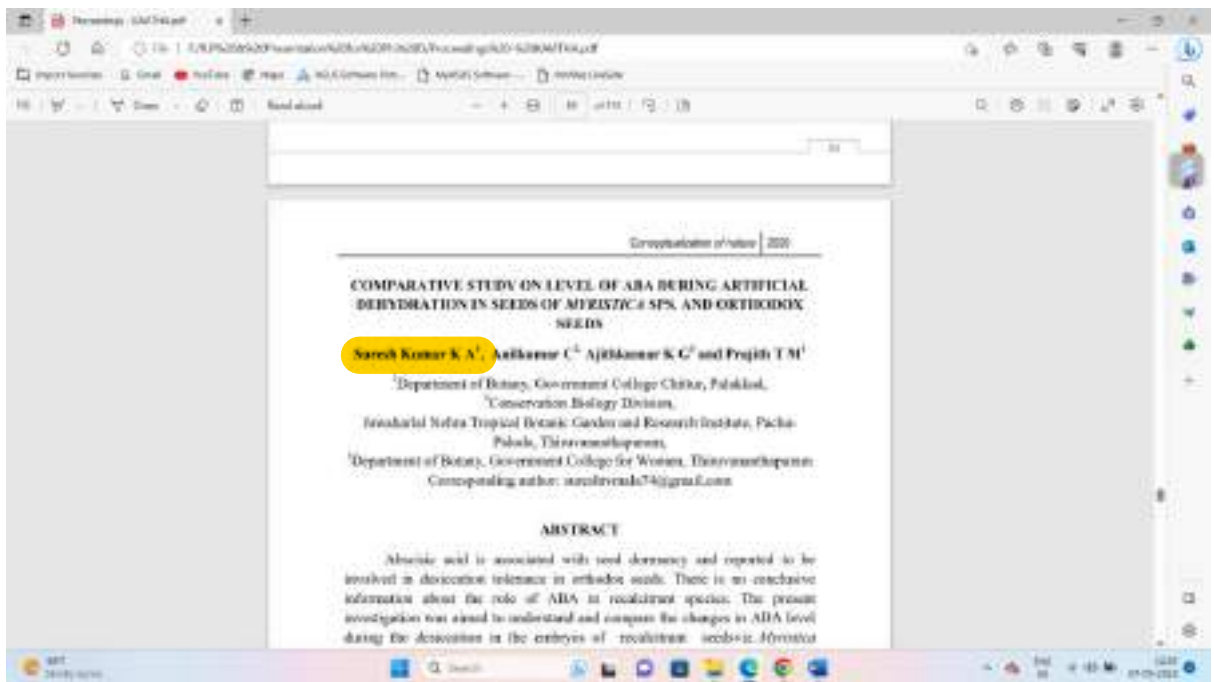
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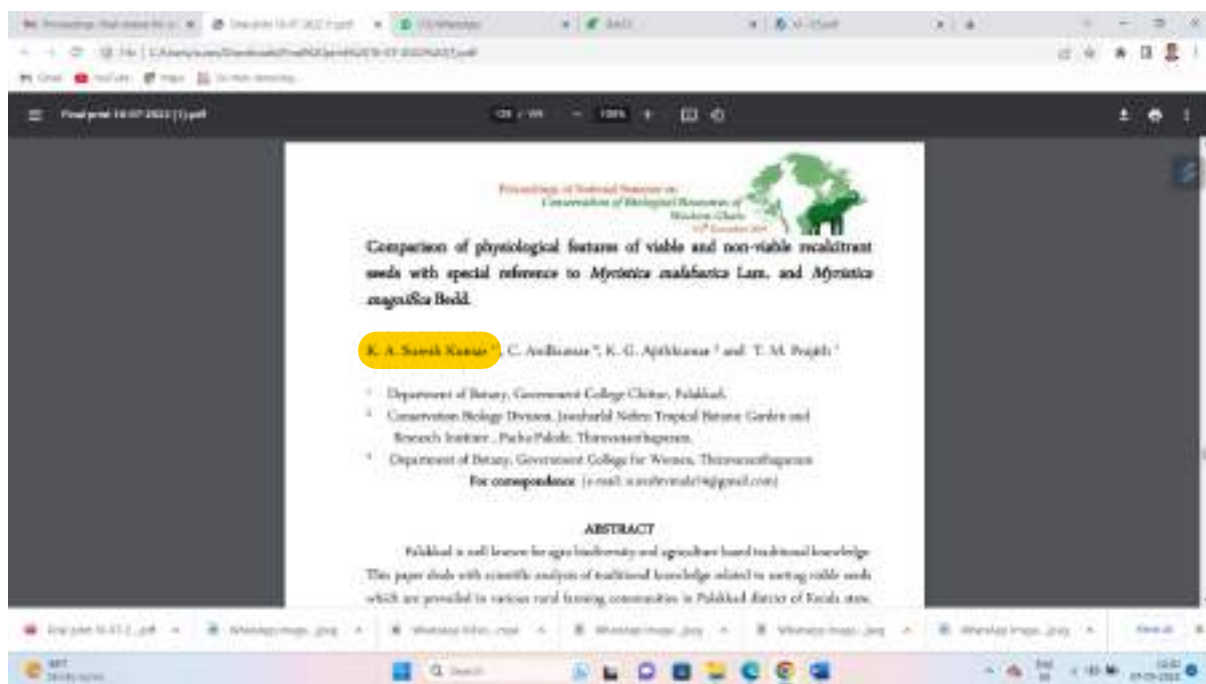




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# Modern Management Mantras: Things and People

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**Abstract**—Today, management of an organisation is complex not only from the point of its size and operations but also due to nature of social relationship in the organisation among the most vital stakeholders i.e., employees. Managing things has taken new phase – shift from man control to control by machines it. At the same time management of people took new turns giving importance to quality of work life, working environment, work culture and emotional intelligence. No enterprise can grow ignoring the demands and expectations of the employees at its own seriousness. The article is an attempt to examine the nature of organisational environment where employees can contribute their maximum and have a close look at management of things in high tech environment

## I. INTRODUCTION

Management is the cementing force between things and people elements in an organisation. Effective utilisation of both the resources determines the efficiency of organising its objectives in time. Creation of working environment where people element can share, expose and contribute to organisational goals sets a platform to organisation to excel in the competitive business environment. The Bhagavath Gita provides valuable inputs to modern managers in the effective integration of resources available in the organisation towards realizing its goals.

### Management of People element

The people element is the driving force in any form of organisation. Identification and utilisation of the potentials of people element demands a close observation on the factors influencing its contribution to organisation's growth and development. The performance of the key resource- people is influenced by multiple factors such as Emotions (Emotional quotient), Expectations (Understand and realise expectations of employees), Attitude (towards work, people and situation), experience, knowledge, nature of work environment etc.

To get maximum out of people, a manager must focus on both hiring the right people and then getting the most out of these people. Getting the most out of an employee means a business has consistent policies and practices in place to provide its people with appropriate training and development. Employees are involved as "partners" in the business. A better work environment can be ensured in an organisation by providing monetary and non-monetary benefits like bright, cheerful and inspirational **atmosphere**, Rest Area, Food and Drink, Staff Meetings (to facilitate interaction among staff), Flexible Work Hours, Social Events and approachable authorities.

The instillation of positive values, practicing Yoga/meditation, learning organisation is capable of bringing wonders in people performance. The absence of human values and

erosion of human touch in the organisational structure results in a permanent crisis of confidence among employees.

The people management comprises of identification of potential of employees, unlocking the potential (training), Channelisation of the resources and feedback and performance review. The potential threat of non utilisation of people resources is that they may turn out to be a person possessing attributes of Procrastinator, Martyr, Gossip, Manipulator, Backstabber, Narcissist, A Deer in the Headlights, Black Hole, Stonewalled, Curmudgeon, Bully, Predator etc. They are to be taught the basic lessons of achievement being Cooperation, Respect, Self-motivation, Trust and Self-discipline.

The managerial styles towards realisation of goal may of orienting towards getting things done or doing things for getting things done, relying on power than authority, driving organisation through commitment than command style, relationship strategies in place of rules, care towards concerns than control of people and idea, manager being role model instead of standard setter, guidance instead of instructions can create pleasant work environment where people can unleash their full potential towards organisational vision.

#### **Dimensions of Man –Machine management.**

There can be seen great shift in the role of man and machine in the work environment. The dominance of Man-Man management transformed to Man-Machine environment. Now Machine – Machine management environment is seen in all most all walks of Life. (from the early the use of Robots in scientific and risky experiments to Robots as server in restaurants and Big malls). In this context, it will be better to recall words of *Admiral Grace Murray Hopper* that “manage things and lead people”. The prominent concepts related to management of things are Systems, processes, and technology, Goals, standards, and measurements and control. It is just a way of doing than leading and inspiring emotional powerhouses.

The most dominant tech philosophies ruling management of things are artificial intelligence and internet of things. Artificial intelligence is an area of computer science that emphasizes the creation of intelligent machines that work and react like humans. Some of the activities computers with artificial intelligence are designed for include Speech recognition, Learning, Planning and Problem solving.

The Internet of Things (IoT) is an expansive network of connected sensors and smart devices combined with advanced analytics to draw insights from the data they produce in order to monitor equipment and improve services. Among other things, smart devices include wearables, smart home mechanisms (such as thermostats and lighting controls), connected cars and industrial equipment. The variety of articles, products and services that the Internet of Things covers is still unimaginable. From a special sensor managing crop irrigation based on the humidity detected in the soil, to an intelligent backpack used to carry different devices with discs to store multimedia material, to multifunctional robots and houses managed through smartphones.

In Artificial Intelligence, a machine will be equipped with a learning mechanism and a neural network something similar to a Brain which enables a cognitive ability, where the machine will learn by understanding and adopting to the environment that it is surrounded with and making rational decisions. Here the machine/devices is **not** coded with *what to do*

*and what not to* but coded with an **ability to learn** and understand itself *what to do and what not to*. In Internet of Things, you can know what a device is capable of doing. In Artificial Intelligence, you can never know what a machine is capable of until it actually does that.

**Few mantras to extract more out of people are presented below. They are based on teachings in Bhagavath Gita extracted from web resources.**

#### **Joy of working together:**

The main task of management is to make people capable of joint performance, to make their weaknesses irrelevant, as management guru Peter Drucker says. It creates harmony in working together—equilibrium in thoughts and actions, goals and achievements, plans and performance, products and markets. It resolves situations of scarcity; be they in the physical, technical or human fields, through maximum utilization with the minimum available processes to achieve the goal. Lack of management causes disorder, confusion, waste, delay, destruction and depression. Managing people, money and materials in the best possible way, according to circumstances and environment, is the most important and essential factor in an organization's success.

#### **Search for excellence**

Management is a process of aligning people and getting them committed to working for a common goal to the maximum social benefit. The critical question in many managers' minds is how to be effective in their job. The answer to this fundamental question is also found in the Bhagavad Gita, which repeatedly proclaims that "you must try to manage yourself." Unless a manager reaches a level of excellence and effectiveness, he or she will be merely a face in the crowd

#### **Utilization of available resources. (KEY MAN)**

The first lesson of management science is to choose wisely and use scarce resources optimally. During the curtain raiser before the Mahabharata War, Duryodhana chose Sri Krishna's large army for his help, while Arjuna selected Sri Krishna's wisdom for his support. This episode gives us a clue as to the nature of the effective manager—the former chose numbers, the latter, wisdom.

#### **Work commitment.**

A popular verse of the *Gita* advises detachment from the consequences or results of actions performed in the course of one's duty. Being dedicated to work means "working for the sake of work, generating excellence for its own sake." If we are always calculating the date of promotion or the rate of commission before putting in our efforts, we aren't detached. We're working only for the extrinsic reward that may or may not result. Working with an eye only to the anticipated benefits means that the quality of performance of the current job or duty suffers (through mental agitation or anxiety for the future). Events don't always respond positively to our calculations, hence expected fruits may not always be forthcoming. The *Gita* tells us not to mortgage present commitment to an uncertain future. Thus, the best means of effective performance management is simply the work itself. Attaining this state of mind, called *nishkama karma*, is the right attitude for work because it prevents the ego from dissipating attention by speculating on future gains or losses. The mind can be one's friend or enemy, the cause of both bondage and liberation.

### **Motivation and self-transcendence.**

It's been presumed for many years that satisfying basic needs of workers—adequate food, clothing and shelter, etc.—are key factors in motivation. However, it's a common experience that the dissatisfaction of clerks and of directors is identical—only the levels of dissatisfaction and composition vary. It should be true that once the basic needs are more than satisfied, directors should have little problem in optimizing their contribution to the organization and society. But more often than not, it doesn't happen that way. On the contrary, a lowly paid schoolteacher or a self-employed artisan may demonstrate higher levels of self-actualization despite poorer satisfaction of their basic needs. This situation is explained by the theory of self-transcendence propounded in the *Gita*. Self-transcendence involves renouncing egoism, putting others before oneself, and emphasizing teamwork, dignity, cooperation, harmony and trust; potentially sacrificing basic needs for higher goals. The ego spoils work and the ego's the centerpiece of most theories of motivation. People don't need a theory of motivation, but a theory of inspiration.

### **Work culture**

An effective work culture is about vigorous and arduous efforts in pursuit of given or chosen tasks. Sri Krishna elaborates on two types of work culture—*daivi sampat*, or divine work culture, and *asuri sampat*, or demonic work culture:

- *Daivi work culture* involves fearlessness, purity, self-control, sacrifice, straightforwardness, self-denial, calmness, absence of fault-finding, absence of greed, gentleness, modesty, and absence of envy and pride.
- *Asuri work culture* involves egoism, delusion, personal desires, improper performance, and work not oriented towards service.

A mere work ethic isn't enough. A hardened criminal may exhibit an excellent work ethic. What is needed is a work ethic conditioned by ethics in work. It's in this light that the suggestion, *yogah karmasu kausalam*, should be understood. *Kausalam* means skill or technique of work, which is an indispensable component of a work ethic. *Yogah* is defined in the *Gita* as an unchanging equipoise of mind—detachment. Bal Gangadhar Tilak, a leader of the Indian Independence Movement and a social reformer, said that acting with an equable mind is yoga

### **Work results**

The *Gita* further explains the theory of detachment from the extrinsic rewards of work in saying:

- If the result of sincere effort is a success, the entire credit shouldn't be appropriated by the doer alone.
- If the result of sincere effort is a failure, then the entire blame doesn't accrue to the doer.

The former attitude reduces arrogance and conceit, while the latter prevents excessive despondency, demotivation and self-pity. Thus, both these dispositions safeguard the doer against psychological vulnerability, the cause of the modern managers' sicknesses such as diabetes, high blood pressure and ulcers. Assimilating the ideas of the *Gita* can lead people to the wider spectrum of *lokasamgraha* (general welfare), but there's also another dimension to the work ethic: If the *karmayoga* (service) is blended with *bhaktiyoga* (devotion), then the

work itself becomes worship, a *sewayoga* (service for its own sake). Along with *bhakti* yoga as a means of liberation, the *Gita* espouses the doctrine of *nishkamyā karma* (pure action) untainted by hankering after the fruits resulting from that action. Modern scientists now understand the intuitive wisdom of that action in a new light

### **Manager's mental health**

*Sound mental health is the goal of any human activity. Sound mental health is that state of mind that can maintain a calm, positive poise—or regain it when unsettled—in the midst of all the external vagaries of work life and social existence. Internal constancy and peace are the prerequisites for a healthy, stress-free mind.*

Some of the impediments to sound mental health are:

Greed—for power, position, prestige and money

Envy—regarding others' achievements, success and rewards

Egotism—about one's own accomplishments

Suspicion, anger and frustration

Anguish through comparisons.

The driving forces in today's business are speed and competition. There is distinct danger that these forces cause erosion of moral fiber, that in seeking a goal, people encourage immoral means (i.e., tax evasion, illegitimate financial holdings, hiding the truth, deliberate oversight in an audit, etc.)

It can be concluded that the nature of work environment has been subject to shift in its structure and form due to the technological advances. Even in such situation, the role of people can't be undermined until situation of Machine- Man management arises. As such any organisation can cherish its vision by ensuring presence and practice of relationship management highlighting and emphasizing management of self as cherished in Holy Gita.

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கவிஞர்களையும் தமிழர்களையும் கட்டு  
 சினைகளும் அன்பும் வாய் கவிதை  
 அடங்கியது. புதுக்கவிதை அறிவித்த  
 நவீன கவிதைகளைக் குறிப்பிட்டு எதை  
 தேர்ந்து பிழை அந்த கவிதைகள்  
 கவிதை இயக்கத்தை வகிப்பதற்கு  
 முயற்சி அந்த நவீன கவிதைகள் புதிய  
 யாழ்வு கவிதைகள். அந்தக் கவிதை  
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தமிழகப் பழங்குடிகள் ஆய்வு வண்பாட்டில் கொண்டு வர அறிவியல் கண்டு பிடிப்புகளையும் பரம்பரை நன்வயப்படுத்தியுள்ளது. தமிழகப் பழங்குடிகளுக்காக இக்கண்டு இன்றைய நாளில் செய்து கொண்டுவரும் பங்களிப்பு மகத்தானது. தமிழக சமுதாயம் பண்பாட்டு வரலாற்றையும் பரிணாமத்தையும் மீள மீட்டுவதற்கு இத்தகைய முயற்சி தீவிரம் உடனம்.

தமிழகப் பழங்குடிகள், வரலாறு, சமூகம், பண்பாடு ஆகிய தகவல்கள் இக்கண்டிளி வெளியீட்டுள்ள இவ்விரண்டு தொகுதிகள் ஓர் அரிய பண்பாட்டுக் கருவியாகும். பழங்குடி மக்களை மண் வாசிப்பாகவும் மக்கள் வாசிப்பாகவும் அறிந்து கொள்ள உதவும். பழங்குடி மக்களின் அமைதிகள் இந்த வாசிப்பு நம்முடைய பழங்குடி மக்களின் கல்விப்படை விளக்கும் ஒரு களத்தைய சமர்ப்பம் தமிழகக் ஆய்விதழ், பண்பாட்டியல் ஆய்விதழ், பழங்குடி ஆய்விதழ் இது குறிப்புகளை மக்கள் பண்பாட்டுக்காக மக்கள் துறை அமைப்பு.

(முனைவர் பக்தவத்சல) பாரதி

இதழில் இடம் பெற்றவை வரலாறு கட்டுரைகளும் சித்திரம் ஒரு புவிய சைதீகியை பதிவு செய்திருக்கிறது. உருவகளைப் படிக்க படிக்க விவிய ஒப்பீடுகளை கருவியும் சந்தையாக பதிவுப்புகளை மீள் துறக்கவாகத் தள்ளல் செய்து மகத்தானது என்பதை அறிபக விவகளைகளில் பெரும் விவியப்புகளை மேலாற்றிது பழங்குடி மக்களின் விவகாரத்த சாற்களை தொழில்கள், நம்பிக்கைகள், உலகங்கள், வழிபாடுகள், பழக்க வழக்கங்கள், விடுகள், முயற்சியோடுகள், உணவு, பொழி, பண்பாடு வற்று தமிழகம், மேலும் சந்தையு மீட்டி பற்ற தகவல்கள் இக்க கட்டுரைகள் அமைந்து தமிழகப் பழங்குடிகள் சமூகம் துறைசெயல்தா அமைப்பு சந்தையுள்ளும்.



PRINCIPAL  
SVET. COLLEGE  
METHUR



# தமிழகப் பழங்குடிகள்

வரலாறு சமூகம் பண்பாடு

முனைவர் பக்தவத்சல  
முனைவர் சி. சிவசுந்தரன்  
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தமிழகப் பழங்குடிகள்  
வரலாறு சமூகம் பண்பாடு



பதிப்பாளர்  
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முனை  
106. Telu  
107. Telu  
108. இந்  
முனை  
109. செ  
தி  
110. இ  
முனை  
111. த  
வ  
112. (

**88. பழங்குடி மக்களின் சடங்கு சார்ந்த மரபுகள்**

**முனைவர் க. முத்து இலக்கும்**  
 புவரத்தையன்  
 தமிழகத்தை மறும ஆர்வ மயமா  
 அரக்கமணர், சிதூர், பாங்காடு

மனித வாழ்வில் சடங்குகள் தீவிரமானவை இடம் பெறுகின்றன ஒரு செயலாக சீரமைந்த தீயம் செயலில் சடங்காக மாறுகின்றது மனிதனின் பிரபல முதிர் கிரபல வகை பல சடங்குகள் தீவிரமற்றவற்றினால் சடங்குகள் மதம் சார்ந்தவை இவை சார்ந்தம் வேறுபடுகின்றன மனிதனை ஒரு சமூக உறுப்பினனாக மாற்றுவதில் சடங்கு முக்கியப் பங்கு வகிக்கின்றது இனக்குழு மக்களின் பழங்குடி மக்களிடம் பரவிவருபட்ட சடங்குகள் தலைபெற்றுள்ளன தாம் பெறவேண்டிய சடங்கிற்கு மிகுந்த முக்கியத்துவம் கொடுப்பவர்களை பழங்குடியினர் விளங்குகின்றனர் சடங்குகள் தீவிரமற்றவற்றில் ஆர்வம் அக்கறை இல்லாதவர்கள் இனக்குழு சமுதாயத்தில் சடங்கில் வாழ்க்கையாகவும் வாழ்க்கையில் சடங்காகவும் அமைந்தன. அச்சடங்குகள் இனக்குழு சமுதாயத்தை இயக்கிக் கொண்டிருக்கின்றன. அச்சமுதாய மதிப்புகளை உறுதி செய்துள்ள மூல மனங்களைப் பங்கிட்டு செய்துள்ள சமூக சமூகியை (சங்ககாலச் சமுதாயம்) சடங்குகளை அவர்களது கூட்டு சக்தியை இயக்கும் சட்டங்களை மீறாமல் மனித மனங்களை

**பிறப்புச் சடங்கு**

பெண்கள் குழந்தைப் பெறு அளவுப் காலத்தை வாயடை நடவடிகை கொண்டனர் சங்கத் தமிழ் பழங்குடி மக்களும் பெறு காலங்களில் பெண்களைத் தனி வீடுகளில் தங்க வைத்து அவர்களுக்குத் துணையாக முதுபெண்டிர் உடனிருக்கின்றனர். இவ்வழக்கம் முதலடி, மனமலர் மற்றும் கூட்டி இயைக்கப்பட்ட வழக்கம் உள்ளது. பெறு தந்தை ஒரு சில மாதங்களுக்குப் பின்னர் வீட்டிற்கு அழைத்து வந்திருந்து முதல்கால முயற்சியை தனி தாயைப் போலவும் தோஷம் பின் அழைத்து வந்து மனமலர் அழைத்து நடவடிகை வாயடை நடவடிகை கொண்டிருந்து கூட்டி இயைக்கப் பதிவானது நடவடிகை சந்திப் பிடி விடுகப்பட்ட. தனி மனித அழைத்து வந்திருந்து வாயடை தீவிரமற்றது கூட்டி மனமலர் குடியிருந்து (பதிர்) பெண்கள் தாயைப் போலவும் அருகிலுள்ள தந்தையுக்கு அழைத்துப் சென்று தோஷ அழைத்து வந்து இயைக்கின்றன.

'புலவர் புனிதர் தீர்த்து கொடுத்த கற்றலொடு  
 வளமனை மகன் குளிர் அயர் (மதுரை 600-01)  
 மறை அருங்கிரந்த மகன் குளிர் தீர்த்து தீர்த்து தோஷ வாயடை தீயம்  
 பெற்றமையை மருத்துவர்களினால் மதுரைகாலத்தில்

**இருமணச் சடங்கு**

உடம்போக்கு கூடுபடாற வாழ்விலிருந்து தமக்களை சில கூடுபடாறமையது உடம்போக்குகளையும் அழைத்துக் கொண்ட மனித வாழ்வில் தீவிரமானவை மூன்றாம் அமைந்து திருமணமே மனம் மூத்த தாயைத் தமையின் உடம்போக்கு மனத்தையும் மீளவும் தொழுகையில் தூதர் கூடுகின்றது

**கொடுப்போர் இன்றியும் ஏனம் உன்மே  
 புனர்த்தூள் போகிய காலையான (தொல் 372)**

தாயைத் தமையின் அடிய மனம் பெற்றபுதிய சங்கத் தமிழ் வாழ்வியல் இயக்கியங்கள் பதிவு செய்கின்றன சங்க காலத்தில் கூடுபெறுகின்ற காலம் தமையின் விடுபட்டது வாழ்வியல் அமைந்து கொண்டது வாடிய இருந்தது ஆதிய காலமென்பது கூடிய வாழ்வு பெற்றோர் மற்றும் உற்றோரை அங்கீகரிக்கப்பட்டு கூடிய வாயடை சீரமைக்கப்பட்டது தீயமை, மீளவும் ஐங்குறுமூன்று 100, மகன்

**'மகன் கொட்டும் மருங்கு யாதும்  
 உயர்நெடும் குன்றம் பழமறை தமையின்  
 கருமனி மீதிய வாகு தில்ல  
 அறநெறி தீயமென தெளிந்தமென  
 பிற்றத்தற் குறமகன் போகிய காலே' (மூல்-371)**

மருங்கு அங்காறு உடம்போக்கு சென்ற தம் செவிய மகன் பெறு தமையின் தீயத்தை வந்ததும் தாம் அவர்கள் விளையில் வீடு தீயம் வேண்டும் என்று கற்று அளவுகம் படி, காலத்தின் காலம் வாழ்த்து வேண்டியதை.

மறுமில் தாவீர் சிறுமறை மகன்  
 அளவுகம் மரபின் தீயத்தை பெறுகின்ற  
 மருங்கு பெய்த காலத்தில் மரபின் மருங்கு  
 மொழியுளை காலத்தில் காலத்தின் மருங்கு  
 மெய்சின் விளையில் காலத்தின் மருங்கு  
 அளவில் ஒதியை வாகு காலத்தின் மருங்கு



PRINCIPAL  
 GOVT. COLLEGE  
 CHITTOOR

மருங்கு வாழ்வியல் பெறுகும் தீயத்தை மனம் அழைக்கப்பட்ட மருங்கு தமையின் உடம்போக்கு சென்ற தமையின் பெறு தீயம் வேண்டும் தாவீர் மருங்கோடு மகன் கற்றுதலும் அமைந்து

**சிறந்தானை வழிவகைச் செய்தானர்  
 அந் தமையின்மீது ஆறும் மற்று ஆறியே (மனித 4)**