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## **EDITORIAL**

We are very delighted to introduce the fifth issue of the Aquinas Journal of Multidisciplinary Research. The Journal attempts to investigate new perspectives on the crosscurrents of diverse disciplines to create a discourse of learning. We believe this fifth issue will be increasingly adequate to our well-wishers who probe for new topics.

The fifth issue of Aquinas Journal of Multidisciplinary Research includes the inventive and innovative thoughts of researchers that empowers the journal to take its wings far and wide that covers the area of research in the present social and cultural context. The Journal contains research papers and academic articles covering a wide range and enveloping a wide canvas of contemporary issues. Our central goal is to encourage and bring together the whole gamut of the fast changes occurring in the field of research under the umbrella of this journal. The Journal provides an outlet for innovative research, which advances understanding of the core areas of study in all its varied aspects. We wish to provide a forum for effective discussions on various issues related to society through this venture of ours.

Through this journal we aim at publishing research papers on multidisciplinary areas in different spheres of science, humanities, commerce, sports and arts. Let me take this occasion to extend our heartfelt thanks to the eminent contributors who enriched this journal by their research findings. We would also express our sincere gratitude to the peer review committee for their peer review work. We also extend our thanks to the Editorial Board who contributed immensely for the success of our Journal. We are looking forward for the constant support, cooperation and feedback of our beloved readers.

### **Editors:**

**Mrs. Bridgit Jeeji C. J., Principal**

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# Investigation on the conduction and polarization mechanisms of BLSF- Bismuth Titanate and Multiferroic Perovskite-Bismuth Ferrite

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## ABSTRACT

*Bi<sub>4</sub>Ti<sub>3</sub>O<sub>12</sub> and BiFeO<sub>3</sub> samples were synthesized using soft chemistry procedures. The phase purity was confirmed using X-ray Diffraction and surface morphology was observed using Scanning electron microscopy. Conduction mechanisms of the samples were studied by carrying out dielectric measurements while the variations in polarization mechanisms were clearly observed in the ferroelectric measurements.*

**Keywords:** *multiferroics, magnetoelectric, dielectric, ferroelectric*

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## INTRODUCTION

Multiferroic materials which possess at least two ferroic orders (both ferromagnetic and ferroelectric) evoke great interest among the scientific community because of their fundamental importance in the study of magneto-electric coupling. They are potential materials for applications as transducers, sensors, actuators and in other electronic devices. In particular the focus is on the multiferroic magnetoelectrics materials that are simultaneously ferromagnetic and ferroelectric with or without ferroelasticity. Perovskites namely Bismuth Ferrite and Bismuth Titanate are widely investigated now a days because of their simultaneous coexistence of ferroelectric and anti-ferromagnetic order parameters in perovskite structure, which are useful for applications in nonlinear optics, thin film capacitors, photo electrochemical cells, nonvolatile memories etc. [1,2].

$\text{BiFeO}_3$  (BFO) is one of the few multiferroics that has Curie and Neel temperature above room temperature. The ferroelectric properties appear in  $\text{BiFeO}_3$  below ferroelectric Curie temperature  $T_C = 1100\text{K}$  whereas the antiferromagnetic ordering together with weak ferromagnetic moment appear below the Neel temperature  $T_N = 643\text{K}$ . It is the only material that is both magnetic and a strong ferroelectric showing multiferroic property at room temperature. Magnetoelectric coupling is realized at room temperature and such coupling is strongly enhanced by proper doping [3,4]. Bulk bismuth ferrite can be described as a rhombohedrally distorted ferroelectric perovskite with the space group  $R3c$ . BFO magnetic structure showed that each  $\text{Fe}^{3+}$  spin is surrounded by six antiparallel spins on the nearest Fe neighbours that is, a G-type antiferromagnet. As bulk  $\text{BiFeO}_3$  is a room-temperature ferroelectric, it has a spontaneous electric polarization directed along one of the [111] directions of the perovskite structure [5,6].

$\text{Bi}_4\text{Ti}_3\text{O}_{12}$  is a room temperature ferroelectric with Curie temperature  $675^\circ\text{C}$  with wide applications in non-volatile ferroelectric random access memory devices (FRAM) and WiMAX/WLAN Antenna[7-8]. Bismuth Titanate belongs to the layered perovskite compound (Bismuth Layered-Structure of Ferroelectrics-BLSFs) which is the Aurivillius [9–11] family, used as alternative lead – free ferroelectric and piezoelectric material with the general formula  $(\text{Bi}_2\text{O}_2) [\text{A}_{m-1}(\text{B})_m\text{O}_{3m+1}]$ , which consists of  $(\text{Bi}_2\text{O}_2)^{2+}$  sheets alternating with  $(\text{Bi}_2\text{Ti}_3\text{O}_{10})^{2-}$  perovskite-like layers.

## MATERIALS AND METHODS

All the reagents were of analytical grade and used without further purification. Synthesis of  $\text{BiFeO}_3$  was carried out by soft chemical route using bismuth nitrate, ferric nitrate, nitric acid and carboxylic acid (tartaric acid) as source materials. In a typical experimental procedure 0.1 M of  $\text{Bi}(\text{NO}_3)_3 \cdot 5\text{H}_2\text{O}$  and 0.1 M of  $\text{Fe}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$  were prepared separately in 100 ml deionized water. Nitric acid was added to both solutions until it became saturated. These solutions were mixed together. 1 M of tartaric acid solution was added drop wise until a yellow precipitate is formed. The reaction mixture was stirred using a magnetic stirrer. Then the solution was heated at a temperature of about  $100^\circ\text{C}$  to  $120^\circ\text{C}$  for 3 hours till the residue was completely burned. A brownish red sol was obtained.

$\text{Bi}_4\text{Ti}_3\text{O}_{12}$  ceramics were synthesized by the sol-gel method. The starting materials Bismuth nitrate and Titanium isopropoxide were mixed in 4:3 proportions and dissolved in methoxy-ethanol under vigorous stirring for 4 h to obtain a sol and stirring was stopped in a closed system. The samples were aged for 12 h, after that an excess of water was added to hydrolyse the system completely. The resulting gel was dried overnight. After that the samples were again heated at 200 °C for 6h.

The structural phase formation is confirmed using Rigaku D-Max X-Ray Diffractometer and morphology was analysed using scanning electron microscopy. Dielectric measurements were performed to get an insight into the conduction mechanism using a homemade dielectric cell and an LCR meter HP 4285A automated using virtual automation package LabVIEW. Ferroelectric measurements were carried out using Precision LC tester Ferroelectric Loop Tracer (Radiant Systems).

## **RESULTS AND DISCUSSIONS**

### **Structural Characterization**

The phase formation is confirmed from the X-Ray Diffraction pattern obtained using Rigaku D-Max Cu  $\text{K}\alpha$  X-Ray Diffractometer. . The perovskite structure is clearly visible from the peaks and the graphs obtained were compared using the ICDD file. Synthesis using tartaric acid yielded phase pure  $\text{BiFeO}_3$  (BFO) while the  $\text{Bi}_4\text{Ti}_3\text{O}_{12}$  (BIT) samples prepared showed a little bit of impurity phase of  $\text{Bi}_2\text{O}_3$  and is compared with the standard ICDD file (JCPDS- No.35-0795).

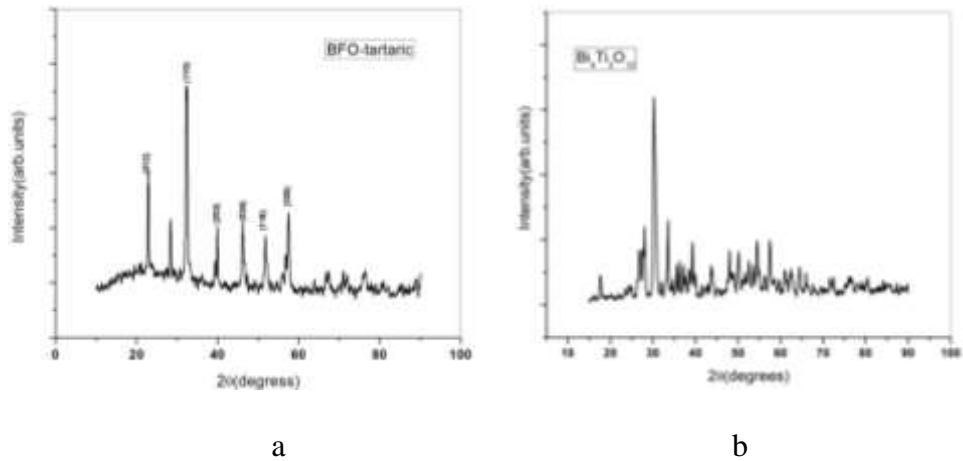


Fig 1: XRD of a) BFO and b) BIT

Scanning Electron Microscopy images show signs of grain growth and clear cut grain boundaries. The figure shows the SEM micrographs of BFO and BIT.

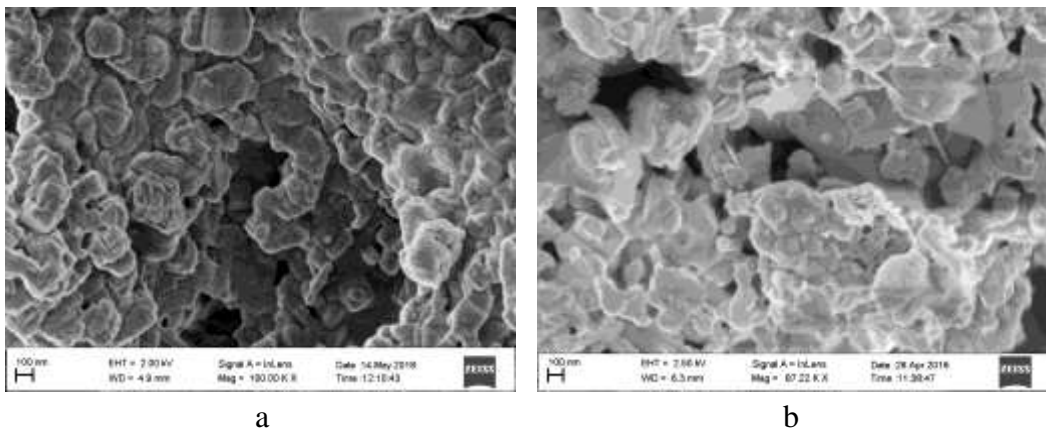


Fig 2: SEM images of (a) BFO and (b) BIT

### Dielectric Studies

The dielectric studies carried out using a homemade dielectric cell coupled with LCR meter provided information on the conduction mechanisms inherent in the perovskite materials. The datas were obtained by interfacing the LCR meter with desktop PC using LabView software from National Instruments.

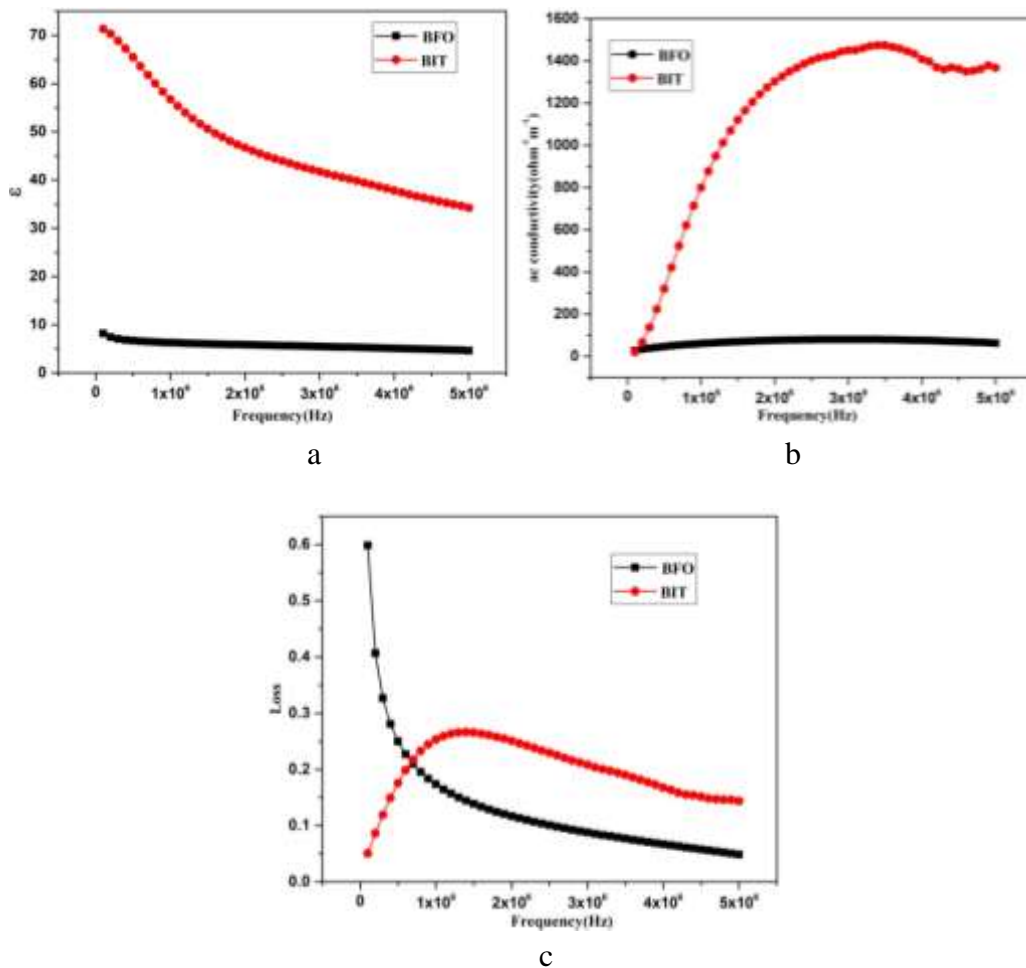


Fig3: Variation of (a) dielectric constant, (b) ac conductivity and (c) loss with frequency for BFO and BIT

The dielectric constant remains constant at lower frequency while as the frequency increase it starts decreasing in accordance with the Maxwell-Wagner theory. The polarization finds it difficult to cope with the increasing frequency and it lags behind leading to fall in the dielectric constant values. The grains form a conducting layer mainly dominant at high frequency giving low dielectric constant while the grain boundaries are poorly conducting mainly dominant at low frequency and having high dielectric permittivity values [12].

The BFO samples have lower dielectric constant than the BIT samples (Fig3a). The ceramic BIT sample has higher ac conductivity compared to the BFO sample even though it shows an anomaly at the high frequency side (Fig3b). The loss graph of ferroelectric BFO sample is similar to usual perovskite dielectric phase but that of BIT shows a peak at the low frequency side. The loss peaks are signature of relaxation mechanism inherent in the material and the polarization can have dependence on thermal or other sources of energy (Fig.3c).

### Ferroelectric Measurements

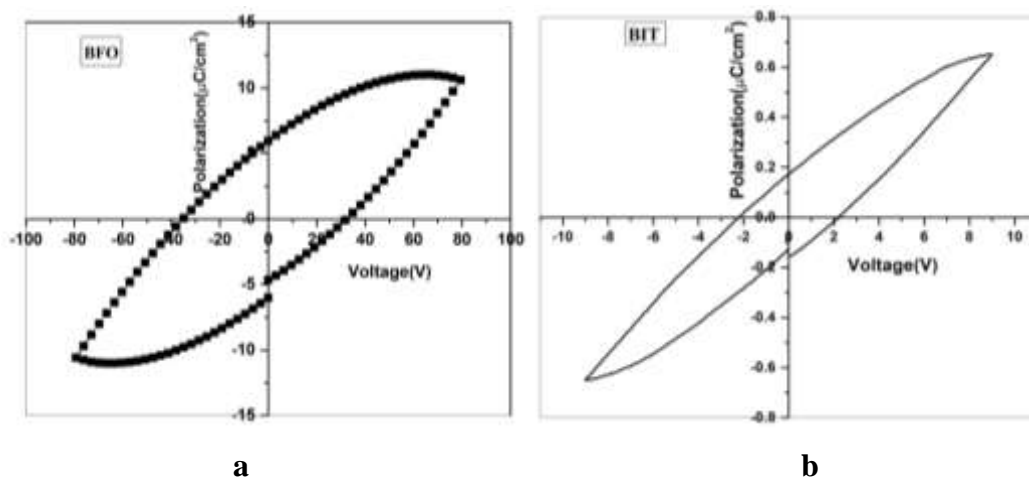


Fig 4: P-E measurements of a) BFO and b) BIT

The ferroelectric measurements carried out on the sample revealed their polarization mechanisms and inherent ferroelectric nature. BFO sample showed higher polarization compared to BIT sample asserting the superior ferroelectric nature of  $\text{BiFeO}_3$ . The hysteresis loops are not saturated and there is a leakage in the measurement setup evident from the loops. But the hysteresis loops have the signature of ferroelectric phase making these perovskites efficient multiferroic materials.

## CONCLUSION

Bismuth ferrite has captivated the interest of scientists all over the world due to its multifunctional ability and multiferroic properties making it a potential candidate for memory applications. In the current study one of the newly emerging perovskite Bismuth Titanate which belong to BLSFs with a high curie temperature was investigated and their dielectric and ferroelectric properties were compared. We have conducted an elaborate literature survey regarding the synthesis methods and we have tried to optimize the parameters needed for the synthesis. We selected a low temperature soft chemical route which requires minimal resources and gives better results. Dielectric studies confirmed the conduction mechanism with a signature of relaxation processes visible in the studies carried out on Bismuth Titanate and also the results were well in agreement the processes described in literature. Ferroelectric measurements accurately revealed their inherent ferroelectric nature and suitability for potential applications in memory devices employing ferroelectric properties.

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# Black Hole in Bulk viscous universe with varying Cosmological Constant.

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## ABSTRACT

*In this paper we consider Schwarzschild Black hole in bulk viscous dominated universe with varying cosmological constant. We calculate the cosmological parameters and found that such a model can be the best explanation for the recent acceleration of the universe. We also investigated the effect of bulk viscosity and varying cosmological constant on mass of the Black hole and found that it decreases with the cosmic expansion. We have also analyzed the generalized second law of thermodynamics (GSL) and extracted the condition for the validity of GSL. It was found that GSL is valid only if Hubble's parameter as a function of time has a lower value compared to that of present Hubble's constant.*

**Keywords:** *Black hole, bulk viscosity, phantom energy, cosmological constant.*

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## INTRODUCTION

Recent observations show that the current universe is accelerating in the expansion [4,6]. The reason for this was ascribed to be an exotic component called dark energy [1-3]. There are mainly two classes of dark energy, the Quintessence model with  $\omega > -1$  and phantom energy model with  $\omega < -1$ . Phantom energy can cause some peculiar phenomena such as the existence of worm hole [8], Big Rip where the universe may undergo exponential expansion. Observational data reveals a range for equation of state  $\omega$  that is  $-1.38 < \omega < -1$  [7] which clearly predict the existence of phantom energy.

Standard  $\Lambda$ CDM model is the most successful model of the universe, which explain the recent acceleration of the universe. This model incorporates a cosmological constant with  $\omega = -1$ . Even though cosmological constant could explain the expansion of the universe and is very well fit with the observed data, it

has two drawbacks namely cosmological constant problem and coincidence problem [5]. In order to avoid these problems, we can use a varying cosmological constant. Bertolami was the one who first proposed the idea of varying cosmological constant of the form  $\Lambda \sim t^{-2}$ . Choudhari and sil investigated the evolution of the universe which have flat geometry with viscous fluid and  $\Lambda(t) \propto H^2$  and they found nonsingular solution for that. Here in the present work we use  $\Lambda$  as varying and take the form,

$$\rho_A = \rho_{A0} + 3\beta H^2 \quad (1.1)$$

It was proposed by several authors [10,11] that a bulk viscous fluid can accelerate the expansion of the universe even in the absence of dark energy( $\Lambda$ ). Still we do not know how it originated in the universe. Theoretically it was shown that deviation from thermodynamical equilibrium can be the cause of origin of bulk viscosity in the universe [28-30]. Due to the easiness in analyzing the cosmological parameters we use Eckart theory or non-casual theory [9] to explain bulk viscosity.

It was Hawking and Bekenstein who made a connection between black holes and thermodynamics a decays ago [13]. Hawking discovery of thermal radiation [12] shows that black hole can be consider as a thermodynamical object with entropy and temperature. It was proposed that entropy of the black hole is proportional to the area of the event horizon and temperature is inversely proportional to the mass of the black hole. Hawking temperature, entropy along with mass of the black hole obey the first law of thermodynamics  $Tds = dE + pdV$ .

Babichev et al [15] showed the accretion of phantom energy as a perfect fluid into the black hole and Ref [16] also examine the accretion of PE as an imperfect fluid consist of bulk viscosity into the black hole. Here we try to get a better picture in which we incorporate varying cosmological constant along with bulk viscosity. In this work we follow the same path as in the paper [16].

The paper has the following sections; In first section we discuss about the bulk viscous cosmology with varying cosmological constant. Section two deals with the accretion of viscous fluid into the black hole and the decreasing nature of mass of the black hole. Third section give the details about the generalized second

law of thermodynamics, after that we conclude our topic with conclusion and discussion.

### **Bulk viscous cosmology with varying cosmological constant.**

We study the cosmological model with a bulk viscous fluid and varying cosmological constant as an explanation for the recent acceleration of the universe. Here we consider the pressure less fluid which characterize both baryon and dark matter component.

The FRW metric for a homogeneous and isotropic flat universe is given by

$$ds^2 = -c^2 dt^2 + a^2(t) \left[ \frac{dr^2}{(1-kr^2)} + r^2(d\theta^2 + \sin^2\theta + d\phi^2) \right] \quad (2.1)$$

Where  $a(t)$  is the scale factor and  $t$  is the cosmic time. We use  $8\pi G=1$  in the following calculations.

The introduction of bulk viscosity [17] only redefines the effective pressure  $P_{ef}$  and it is given by,

$$P_{ef} = p + \Pi = p - 3H\zeta \quad (2.2)$$

Where  $\Pi$  is the bulk viscous pressure.

$$\Pi = -3H\zeta \quad (2.3)$$

And 
$$\zeta = \zeta_0 \rho_m^\nu \quad (2.4)$$

In this study we take  $\nu = 0$  and hence  $\zeta$  will be  $\zeta = \zeta_0$ , Assuming the dark component obeys the state of equation,

$$p = (\gamma - 1)\rho \quad (2.5)$$

But here we consider the pressure less fluid and hence  $\gamma = 1$ . Conservation equation is given by,

$$\dot{\rho} + 3H(\rho + p + \Pi) = 0 \quad (2.6)$$

It can also be written as,

$$\dot{\rho}_m + \dot{\rho}_A + 3H(\rho_m + p_m + \rho_A + p_A) = 0 \quad (2.7)$$

Using Eckart theory, field equation in the presence of bulk viscous stress is,

$$\left(\frac{\dot{a}}{a}\right)^2 = H^2 = \frac{\rho_m + \rho_A}{3} \quad (2.8)$$

Substituting the terms from (1.1) and (2.8) in (2.7) we get the following,

$$\dot{H} = \frac{1}{2}(3H^2(\Omega_A + \beta - 1) + HH_0\tilde{\zeta}_0) \quad (2.9)$$

Where  $\rho_{A0} = \Omega_{A0}3H^2$  and  $\zeta_0 = \frac{H_0\tilde{\zeta}_0}{3}$

On integrating and simplifying the above equation we get the expression for Hubble's parameter and is given by,

$$H(t) = \frac{H_0[(-1 + \sigma\tilde{\zeta}_0)(1 + \sigma(-6 + 6\beta + \tilde{\zeta}_0)) - \left(\exp\left(\frac{H_0(t-t_0)}{2\sigma}\right)(1 + \sigma\tilde{\zeta}_0)(-1 + \sigma(-6 + 6\beta + \tilde{\zeta}_0))\right)]}{6(-1 + \beta)\sigma[-1 - \sigma(-6 + 6\beta + \tilde{\zeta}_0) + \exp\left(\frac{H_0(t-t_0)}{2\sigma}\right)(-1 + \sigma(-6 + 6\beta + \tilde{\zeta}_0))]} \quad (2.10)$$

Here  $H_0$  is the present value of the Hubble's parameter and

$$\sigma = \sqrt{\frac{1}{\tilde{\zeta}_0^2 - 36(\beta - 1)\Omega_{A0}}}$$

We know  $H = \frac{\dot{a}}{a}$  Substituting this on (2.10) and solve for scale a(t) we get,

$$a = \kappa \frac{\left(1 + \sigma(-6 + 6\beta + \tilde{\zeta}_0) + \exp\left(\frac{H_0(t-t_0)}{2\sigma}\right)(1 - \sigma(-6 + 6\beta + \tilde{\zeta}_0))\right)^{\frac{-4}{6(\beta-1)\sigma}}}{2^{\frac{-4}{6(\beta-1)\sigma}}} \quad (2.11)$$

Where  $\kappa = \exp\left(\frac{H_0(t-t_0)(-1+\sigma\tilde{\zeta}_0)}{6(\beta-1)\sigma}\right)$

### Accretion into Black hole

In this work we consider a gravitationally isolated Schwarzschild black hole of mass  $M$  is specified by the metric,

$$ds^2 = -\left(1 - \frac{M}{4\pi r^2}\right) dt^2 + \left(1 - \frac{M}{4\pi r^2}\right)^{-1} dr^2 + r^2(d\theta^2 + \sin^2\theta d\phi^2) \quad (3.1)$$

Here the back ground space time is filled by bulk viscous fluid along with varying cosmological constant. Due to the spherical symmetry of Schwarzschild black hole the fluid is assumed to be fall into the black hole in radial direction. This fluid is specified by the stress energy tensor of viscous fluid [18,19].

$$T^{\mu\nu} = (\rho + p)u^\mu u^\nu + pg^{\mu\nu}$$

Here we follow the path of [16]and gives the rate of change of black hole mass as follows,

$$\frac{dM}{dt} = \frac{AM^2}{16\pi}(\rho + p) \quad (3.2)$$

Equation (3.2) shows that Black hole mass will decrease only if  $(\rho + p) < 0$ .

In order to satisfy the above condition, the energy must be a phantom energy and it should obey the equation of state  $\omega < -1$ .

Equation of state is given as,

$$\omega = -1 - \frac{2\dot{H}}{3H^2} \quad (3.3)$$

On substituting equation (2.9) into (3.3) we get Eos in our model as,

$$\omega = -[\Omega_{A0} + \beta + \frac{H_0 \tilde{\zeta}_0}{3H}] \quad (3.4)$$

And for  $H = H_0$ , the present value of  $\omega$  is,

$$\omega_0 = -[\Omega_{A0} + \beta + \frac{\tilde{\zeta}_0}{3}] \quad (3.5)$$

Phantom energy should have  $\omega_0$  less than -1, which gives the condition for  $\tilde{\zeta}_0$  as,

$$\tilde{\zeta}_0 > -3(\Omega_{\Lambda 0} + \beta) \quad (3.6)$$

$\Omega_{\Lambda}$  generally, varies between 0.6 to 0.8 and  $\beta$  is in between 0.1 and 0.4.

Substituting (2.2) and (2.8) in equation (3.2) gives,

$$\frac{dM}{dt} = \frac{-AM^2}{16\pi} [HH_0\tilde{\zeta}_0 + 3H^2(\Omega_{\Lambda 0} + \beta - 1)] \quad (3.7)$$

From equation (2.9),

$$2\dot{H} = [HH_0\tilde{\zeta}_0 + 3H^2(\Omega_{\Lambda 0} + \beta - 1)] \quad (3.8)$$

Substituting and solving for M we get,

$$M = \frac{8\pi M_0}{8\pi + M_0 A(H - H_0)} \quad (3.9)$$

Where  $H_0$  is the present value of the Hubble's constant. It was found that mass of the black hole decrease with cosmic expansion.

### Generalized second law of thermodynamics(GSL)

It was shown by several authors that bulk viscosity in FLRW universe can produce entropy in the universe [20,21]. In cosmology, it has been proven that the sum of entropy of the cosmological horizon and the matter in it should be greater than or equal to zero during the evolution of the universe. This statement is generally known as the GSL. The evolution of entropy and GSL in FLRW universe with matter and cosmological vacuum was discussed in Ref [22]. The validity of GSL in FLRW universe dominated by bulk viscous stiff fluid was discussed in Ref [23]. Where the authors shown that GSL is valid in the flat universe with the cosmological apparent horizon [14] as the boundary. In cosmology GSL generally states,

$$\dot{S}_s + \dot{S}_h \geq 0 \quad (4.1)$$

Where  $S_s$  and  $S_h$  are the entropy of the fluid in the horizon and that of the cosmological apparent horizon.

Here we also consider the entropy of the black hole hence, the form of GSL [27] will be,

$$\dot{S}_s + \dot{S}_h + \dot{S}_b \geq 0 \quad (4.2)$$

Where  $S_b$  is the entropy of the black hole. The amount of bulk viscous fluid inside the black hole is much lower than outside, so we consider only the entropy of the black hole and avoid the entropy of the fluid inside the black hole.

In order to calculate the entropy of the fluid inside the apparent horizon we use the Gibb's relation [24] which relates the energy and pressure with the entropy as,

$$T ds = d(\rho_s V) + P dV \quad (4.3)$$

Where  $V = \frac{4\pi}{3H^2}$  is the volume of the cosmological horizon with  $r = \frac{1}{H}$  and T is the temperature given by,

$$T = \frac{H}{2\pi} \quad (4.4)$$

It is taken as the hawking temperature of the horizon with the assumption that fluid is in equilibrium with the horizon.

Using equation (2.2) and (2.8) we get the time evolution of the entropy of the fluid as,

$$\dot{S}_s = \frac{8\pi^2 \dot{H}}{H^3} \left( \frac{\tilde{\zeta}_0 H_0}{H} - 1 \right) \quad (4.5)$$

Entropy of the apparent horizon can be calculated using the Bekenstein-Hawking formula [13,25,26].

$$S_h = 2\pi A \quad (4.6)$$

Where  $A = \frac{4\pi}{H^2}$  is the area of the apparent horizon. Time evolution of the entropy of the horizon from the above equation is,

$$\dot{S}_h = \frac{-16\pi^2 \dot{H}}{H^3} \quad (4.7)$$

From equation (4.5) and (4.7),

$$\dot{S}_s + \dot{S}_h = \frac{8\pi^2\dot{H}}{H^4}(\tilde{\zeta}_0 H_0 - 3H) \quad (4.8)$$

In order to satisfy GSL in cosmology generally require a condition (4.1) and gives,

$$\frac{8\pi^2\dot{H}}{H^4}(\tilde{\zeta}_0 H_0 - 3H) \geq 0 \quad (4.9)$$

H is a positive quantity, Hence the condition will be,

$$\dot{H}(\tilde{\zeta}_0 H_0 - 3H) \geq 0 \quad (4.10)$$

Black hole event horizon possess temperature which is inversely proportional to mass and have entropy related with the area of the event horizon given by,

$$S_h = \frac{A_h}{4} \quad (4.11)$$

Where  $A_h = 4\pi R_h^2$  is the area of the black hole event horizon, then equation(4.11) becomes,

$$S_h = \pi R_h^2 \quad (4.12)$$

The relation between black hole radius and mass of the black hole can be established using equation (3.1) as,

$$R_h = \frac{M}{4\pi} \quad (4.13)$$

Therefore, the entropy of the black hole is,

$$S_h = \frac{M^2}{16\pi} \quad (4.14)$$

Using equation (3.2) and (4.14) the rate of entropy change will be,

$$\dot{S}_h = \frac{-AM^3}{64\pi^2} \dot{H} \quad (4.15)$$

On substituting equation (4.15), (4.8) on (4.2) leads to the GSL as per equation (4.2) as,

$$\frac{-AM^3}{64\pi^2} \dot{H} + \frac{8\pi^2\dot{H}}{H^4}(\tilde{\zeta}_0 H_0 - 3H) \geq 0 \quad (4.16)$$

In terms of Hubble's parameter alone (4.16) becomes,

$$\dot{H} \left[ -A \left\{ \frac{M_0^3 8\pi}{(8\pi + M_0 A (H - H_0))^3} \right\} + \frac{8\pi^2}{H^4} (\zeta_0 H_0 - 3H) \right] \geq 0 \quad (4.17)$$

In the above case, GSL will be valid under two conditions, Case (1)  $\dot{H} \leq 0$

and  $8\pi + M_0 A (H - H_0) > 0$ , Case(2)  $\dot{H} \geq 0$  and  $8\pi + M_0 A (H - H_0) < 0$ .

When we consider the second case it is clear that the value will be negative only if Hubble's parameter is lesser than present value of Hubble's constant. For phantom energy case (2) is the most suitable condition.

## CONCLUSION

In this paper we study the expansion of FLRW universe with bulk viscous fluid and varying cosmological constant. We extracted the expressions for Hubble's parameter and scale factor which show the recent acceleration of the universe. We use this model for analyzing the black hole nature, when this fluid falls into the black hole. We get the expression for black hole mass in terms of Hubble's parameter and realized that black hole mass will decrease exponentially as cosmic expansion increases. This fluid shows phantom behavior rather than quintessence under certain condition and that conditions are also extracted in this paper. Black hole mass shows a decreasing nature even the fluid is a dark energy different from that of [16]. On analyzing the GSL it was founded that for phantom energy  $\dot{H} \geq 0$  Hence, for the validity of GSL, Hubble's parameter as a function of time should be less than that of the present value.

In this paper we discussed the GSL by considering the cosmological apparent horizon instead of cosmological event horizon. We get a discrepancy between the conditions for black hole mass and for GSL. We would like to discuss GSL on considering the cosmological event horizon rather than apparent horizon. Further we also have a plan to study the universe filled with bulk viscosity which depends upon the velocity of expansion and its effect on black hole mass.

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## **An emerging threat Fileless malware**

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### **ABSTRACT**

*With the evolution of cybersecurity countermeasures, the threat landscape has also evolved, especially in malware from traditional file-based malware to sophisticated and multifarious fileless malware. Fileless malware does not use traditional executables to carry-out its activities. So, it does not use the file system, thereby evading signature-based detection system. The fileless malware attack is catastrophic for any enterprise because of its persistence, and power to evade any anti-virus solutions. The malware leverages the power of operating systems, trusted tools to accomplish its malicious intent. To analyze such malware, security professionals use forensic tools to trace the attacker, whereas the attacker might use anti-forensics tools to erase their traces. This survey makes a comprehensive analysis of fileless malware and their detection techniques that are available in the literature. We present a process model to handle fileless malware attacks in the incident response process. In the end, the specific research gaps present in the proposed process model are identified, and associated challenges are highlighted.*

**Keywords:** *Fileless malware, Botnet, Incident response, Memory forensics, Incident investigation, Memory resident malware, Rootkit.*

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### **INTRODUCTION**

Throughout the history of the malicious programs, there is one thing which had remained unchanged, the development of the malware program. Someone had to develop the code in such a manner so that no existing anti-virus (AV) software can detect its presence in the system. In 2002, the development of the malware industry had changed the entire threat landscape. This malware has the capability of residing in the system's main memory undetected making least changes in the file system. This strategy has become the non-malware or fileless

malware. When a system is detected as the compromised by some malicious program or malware, the very first thing a forensic expert will work to look for some malicious programs or software that should not be there. However, in this case, there is none because the fileless malware does not reside in the file system, it is a running program in the .The attacker has been using malware for its capabilities to control the compromised systems locally or remotely. Although, the operating systems itself providing several capabilities to the attacker.

The attackers are mostly involved in exploring vulnerabilities in the legitimate software that are already installed in the machine such as flash player, web-browser, PDF viewer and Microsoft office to exploit and load a script directly into the main memory without even touching the local file systems. In Windows Operating Systems, two most powerful tools and .NET frameworks are already installed which attacker can use to exploit the vulnerability, one is WMI (Windows Management Instrumentation) and second is PowerShell. WMI came into the limelight of the cyber security community when it was discovered that it is used maliciously as a component in the suite of exploits by Stuxnet. Since then, WMI has been gaining popularity amongst the attackers, because it can perform system reconnaissance, AV/VM (Virtual Machine) detection, code execution, lateral movement, persistence, and data theft. Similarly, in the case of PowerShell, it is a highly flexible system shell and scripting platform for the attacker to provide all the features in the different stages of an intrusion. Since, it can also be used to bypass anti-virus detection, maintain persistence or infiltrate data. For example: In 2016, a hacker group infiltrates into the DNC (Democratic National Committee) with fileless malware. In this incident, the PowerShell and WMI were used as the attack vectors.

In recent time, malware developers have adopted the high-level language in the development of the malicious codes that have changed the malware industry. After the release of Microsoft .Net framework, it became the center of attraction for all the windows software developers and unintentionally revolutionized the malware industry. It gives the malware writers a new and powerful arsenal equipped with all the features to make a malware undetected and stay ahead of the anti-virus software. With the use of this framework, malware creator may easily interact with the operating system and exploit vulnerabilities with the entire catalog of products with the help of the framework. The attacker

uses a tool like PowerShell to coordinate attacks with the help of existing toolkits such as meterpreter, SET (Social Engineering Toolkit) or the Metasploit Framework including an extensive list of modules that are already built-in and ready to use for the purpose of plotting additional attacks.

The fileless malware attacks in the organizations or targeted individuals are trending to compromise a targeted system avoids downloading malicious executable files usually to disk; instead, it uses the capability of web-exploits, macros, scripts, or trusted admin tools. Fileless malware can plot any attacks to the systems undetected like reconnaissance, execution, persistence, or data theft. There are not any limitations on what type of attacks can be possible with fileless malware. This survey includes infection mechanisms, legitimate system tools used in the process, analysis of major fileless malware, research challenges while handling such incidents in the process of incident and response. This type of study was not done in the literature, which includes the different perspectives of fileless malware. The main contributions of the paper are mentioned below.

- The background of the malware with evasion and propagation techniques used to identify targets and stay undetected in the victim machines.
- We analyze the behavior of all the fileless malware and discuss their persistent mechanisms in detail.
- We analyze many solutions given by researchers to detect such malware by analyzing the malicious patterns in the process, registry, minor changes in file systems, and event logs.
- We proposed a novel investigative model of incident handling and response, especially in fileless malware. The model includes all the phases with memory forensic, analysis and investigation of such incidents.

### **Background of Fileless Malware**

Unlike traditional file-based malware attacks, instead of using real malicious executables, it leverages trusted, legitimate processes i.e. LOLBins (Living off the Land Binaries) (Living Off The Land Binaries And Scripts - (LOLBins and LOLScripts), and built-in tools of operating systems to attack and hide. The detailed comparisons between traditional file-based malware and fileless malware are mentioned in the Table 1. In this section, the formal definition of the fileless malware and execution techniques along with the system

tools, is discussed. The section also elaborates on the infection technique used by such malware with attack vectors, as shown in Fig. 1.

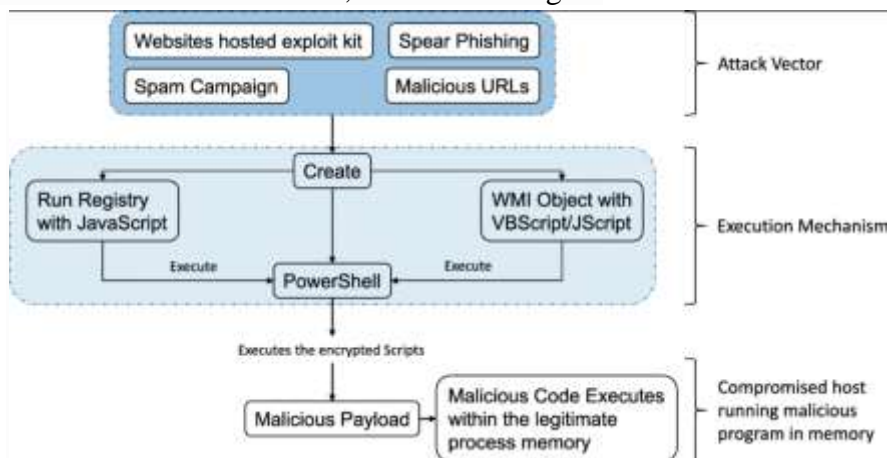


Fig: 1 Infection Flow of Fileless Malware

Techniques	Traditional file-based malware	Fileless malware
Source code	Yes	No
Malicious file	Yes	No
Malicious process	Yes	No (Uses trusted OS processes)
Complexity	Moderate	Very high
Detection complexity	Moderate	Very high
Persistence	Medium	Low
File Types	<ul style="list-style-type: none"> <li>• Executable files</li> <li>• Script embedded in a format that executes scripts (PDF, Word, Excel etc.)</li> </ul>	<ul style="list-style-type: none"> <li>• JavaScript</li> <li>• WMI</li> <li>• PowerShell</li> <li>• Flash</li> <li>• WScript/ CScript</li> </ul>
Targets	Executable file with single targeted OS/ patch level combination	Can target many different OS/ patch level combinations
Obfuscation methods	<ul style="list-style-type: none"> <li>• Encrypt file</li> <li>• Archive file</li> <li>• Executable file disguised as another type of file</li> <li>• Executable file embedded in another file</li> </ul>	<ul style="list-style-type: none"> <li>• Encoding</li> <li>• Escaped ASCII/ Unicode values</li> <li>• String splitting</li> <li>• Encryption</li> <li>• Randomization</li> <li>• Data obfuscation</li> <li>• Logic structure obfuscation</li> <li>• White space</li> </ul>
Anti-virus detection	Possible with known signature	Not possible
Sandboxing detection	Physically availability of file	Not possible
Behavior-based heuristics and unsupervised machine learning	File-based malware shows abnormal behavior in the system after compromising the targeted host. Hence, these systems are designed to detect such behavior.	Fileless attacks are designed to behave like a benign process in the system, so they may not alarm as an anomaly. Hence, very difficult to detect.

Table: 1, Comparison between file-based malware & fileless malware

### Definition

Fileless malware attacks do not download malicious files or write any content to the disk in order to compromise the systems. The attacker exploits merely the vulnerable application to inject malicious code directly into the main memory. The attacker can also leverage the trusted and widely used applications,

i.e., Microsoft office or administration tools native to Windows OS like PowerShell and WMI to run scripts and load malicious code directly into volatile memory. The procedures and attack vectors are mentioned in Fig. 1.

### **Execution of fileless malware**

The malware authors have leveraged the advantage of two powerful legitimate windows applications Windows Management Instrumentation and PowerShell to execute their malicious binaries to make the attack undetected by AV solutions. The life cycle of the fileless malware works in three phases. First, attack vector, which has methods through which the attacker targets their victims. Second, the execution mechanism in this the initial malicious code could try to create a registry entry for its persistence or WMI object with VBScript/JScript to invoke an instance of PowerShell. Third, PowerShell can further able to execute the malicious program into the legitimate process memory directly without dropping any files to the file system making its target compromised by fileless malware; the infection life cycle is shown in Fig. 1.

### **Windows management instrumentation**

With the emergence of new technologies, many changes have occurred in the Windows Operating System over the period, but WMI remains powerful since Windows NT 4.0, and Windows 95. It has an excellent reputation in the security community to launch an attack across many phases of the attack life-cycle like reconnaissance, AV/VM detection, code execution, lateral movement, covert data storage, to persistence. Using these capabilities of WMI, an attacker can build a pure backdoor without even dropping the single file to the file system. In addition to this, it can be used to execute malicious JavaScript/VBScript directly in the memory to possibly evade the AV solutions.

### **PowerShell**

PowerShell has a rich number of features to facilitate the attacker to even bypasses the detection capability of AV solutions to maintain persistence or spy on the system. Windows operating system has already whitelisted many modules for PowerShell. For example, evasive techniques can be used to dynamically load PowerShell scripts into the memory without even writing anything on the file system.

### Analysis of Fileless Malware based on their persistent technique

There are major three categories of fileless malware, which are described below by their persistence techniques and detailed classification of their attack vectors in Table 2. The fileless malware can hide their location to make difficulties in the process of detection by traditional AV solutions and also for the security analyst.

Functionality/ Attack Vector	Memory Resident Malware				Windows Registry Malware		Rootkit Malware
	SQL Slammer	Code Red	Poweliks	Lurk	PowerWare	Kovter	Phase Bot
Infection method	In memory	In memory	In memory	In memory	In memory	Registry	In memory
Configuration data	In memory	In memory	In memory	In memory	No	Registry	Registry
Injection data	In memory	In memory	Registry	In memory	No	Registry	Registry
Persistence method	No	No	Registry	No	No	Registry	Registry
Malware Category	Worm	Worm	Click fraud Bot	Trojan	Ransomware	Ad-Click fraud	Bot

Table: 2, Classification of attack vector for fileless malware detection

### Memory-resident malware

The malware that wholly resides in the main memory without touching the file systems. It uses only legitimate process or authentic windows files to execute and stays there until it triggered. The malware having such capabilities are described in this section:

**Code Red :** Code red infect Microsoft’s Internet Information Server (IIS) of version 4.0 and 5.0 having known buffer overflow vulnerability. The system is infected when server GET/default.ida request on TCP port 80 allowing the worm to run code on the server.

**SQL Slammer:** SQL Slammer is a computer worm. It has the power to choke the bandwidth of the network resulting in a denial-of-service condition. The worm has used the method to propagate and infect by scanning the buffer-overflow vulnerability over the internet.

**Lurk Trojan:** Lurk is a banking Trojan, infection could be possible either using command “regsrv32” and “netsh add helper dll” or via the ShellIcon Overlay Identifiers branch of the system registry. The Trojan uses its specific features to gain access

to the users' sensitive data, and with the help of it, an attacker can compromise their online banking services.

**Poweliks :** Poweliks is fileless malware that is further being developed from file-based malware, known as Wowliks. The malware installs itself into the registry as well as use it to persist in the system, thus escape from AV solutions as it did not leave any files written on the disk. Also, the malware installs PowerShell in the background without alarming the defensive system if the system does not have it already. The system is penetrated by exploiting the Microsoft Office vulnerabilities and used the PowerShell along with JavaScript with shellcode to directly execute into legitimate memory. The attack vectors are compared between Wowliks and Poweliks in Table 3.

- **Persistence mechanism** - Poweliks uses system registries to achieve persistence, to stay undetected. It added two registries to the run key. First, in the form of JavaScript program encoded data written under (Default) value and other is the autorun entry that reads and decodes the encoded JavaScript data.

Functionality/ Attack Vector	Wowliks	Poweliks
Infection method	File-based	In memory
Configuration data	On-disk	In memory
Injection data	DLL file on disk	Registry
Persistence method	DLL file on disk	Registry

Table: 3, The evolution of poweliks

### Windows registry malware

Registry is the database for storing low-level settings of the Windows operating system and some critical apps. In there, the malware authors managed to store complete malicious code into the registry in an encrypted manner, to make it undetected. To obtain the persistence, it can exploit some operating

systems thumbnail cache using registry. However, the file is set to self-destruct once it carried out its malicious task.

**Kovter:** Kovter can conceal itself in the registry and maintain persistence through the use of registry run key. The infection mechanism of Kovter has the feature to leave very few file traces of artifacts. It uses PowerShell for the execution of commands to achieve its malicious venture. Once the execution is completed PowerShell losses all the environment variables and it does not log the list of executed commands due to this, it leaves little chance to recover the script executed and the sample or information about the final payload.

- **Persistence mechanism** - JavaScript code is added into the registry and is executed by a legitimate Windows file, mshta.exe, via WMI instead of mshtml.dll:

HKLM\path{\Software\Microsoft\Windows\Current Version\Run}.

Data: mshta javascript: {javascript code}.

Kovter decrypts the first stage JavaScript code, which resides in the registry leading to the second stage JavaScript containing a PowerShell script, which decodes the encoded shellcode and injects it to the legitimate windows process (regsvr32.exe) to execute, using a technique called Process Hollowing. The flow of injecting shell code is mentioned in Fig. 2.

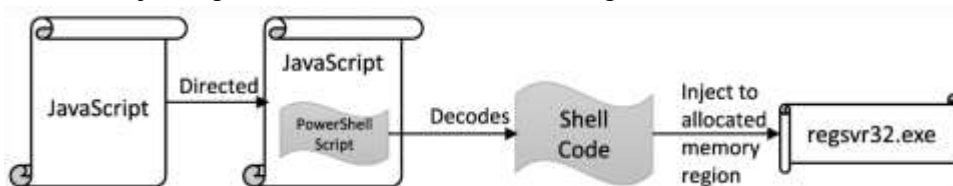


Fig: 2, Shellcode injection flow

**Power Ware:** It is a fileless ransomware, which is mostly delivered via a macro-enabled Microsoft Word document. The malware uses the core utilities of windows operating the system such as PowerShell. By leveraging the capabilities of it, the ransomware entirely avoids writing any file on the disk and perform its malicious activities.

## Rootkits fileless malware

An attacker can install this kind of malware after getting the administrator level privilege to hide the malicious code into the kernel of the Windows operating system. While this is not a 100% fileless infection either, it fits here.

**Phase Bot:** It is a type of bot, which can grab its' victim information by applying form-grabbing approach and stealing FTP data connection with the ability to run without a file. Phase hides its relocatable code encrypted in the registry and uses PowerShell to read and execute this independent position code into memory. Both Phase Bot and Poweliks uses similar persistence mechanism.

## Detection by monitoring the behaviour of the system

In order to detect fileless malware, the system needs to consider two things. First, the processes which have elevated privileges after becoming live into the memory and Second, monitor the security events for the program execution by command-line console or PowerShell.

1. The attacker first aim is to gain the root access to its victim machine to take the full privilege of the PowerShell. To identify fileless infections, the system needs to monitor all the essential features that are accomplished by PowerShell capabilities, such as:
  - a. Remote command execution by the PowerShell.
  - b. Change of standard user privilege to administrative privilege to access WMI and .NET Framework base class library.
  - c. Programs, which are executing in the main memory, may be malicious.
2. It is essential to identify the principal sources of information such as network traffic, network connections, and suspicious modifications to particular Windows registry keys. In addition, the Windows event log, being on guard for clear indicators that may suggest the malicious activity has taken place. Some of the indispensable events need to be adequately monitored, such as:
  - a. **Event ID 4688:** The system needs to monitor all the newly created processes whose parent process is PowerShell.

- b. **Event ID 7040:** If the service has been changing to auto-start from disabled/demand start of the Windows Remote Management (WS-Management).
- c. **Event ID 10148:** This event is responsible for listening to the specific IP and Port for WS-Management related requests.

### **Detection by rule-based**

Majority of malicious programs spread across the internet via targeted by the attacker or by the botnet to find the vulnerable victim is packed with Microsoft Office applications such as winword.exe, excel.exe, and powerpnt.exe. Furthermore, the detection of such programs, which trigger the cmd.exe or powershell.exe, could be malicious. Hence, the detection mechanism may work by the rule that can distinguish between benign process and malicious process. These similar rules can be implemented in the browsers to block such malicious apps from executing PowerShell and Command prompt. This should also help with other types of malware leveraging other Microsoft Office applications as mentioned in Fig. 3.

**CASE-1:** ProcessName: cmd.exe AND (parentName: winword.exe OR parentName: excel.exe OR parentName: powerpnt.exe OR parentName: outlook.exe) AND chilprocessName: powershell.exe

**CASE-2:** ProcessName: cmd.exe AND (parentName: winword.exe OR parentName: excel.exe OR parentName: powerpnt.exe OR parentName: outlook.exe)

**CASE-3:** ProcessName: powershell.exe AND parentName: winword.exe

**CASE-4:** ProcessName: powershell.exe AND filemodCount: [1000 to \*]

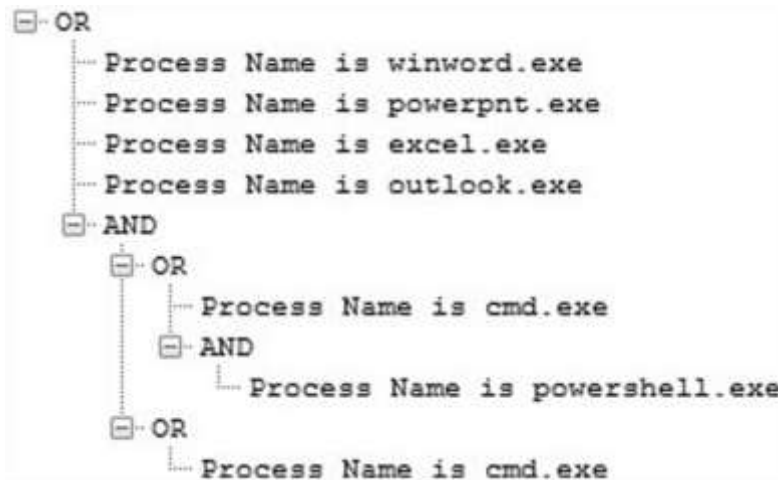


Fig: 3, Malicious process flow

### Detection by learning behavior of attack

A framework can be developed in the paradigm of client-server, wherein all the endpoints have a client deployed, and a server in the cloud. The framework is divided into three stages, like capturing events, tagging events, and learning from the events. In this system, the client can capture all the generated events by the host machine as mentioned in the Fig. 4, to monitor the full stream of activity. In addition, the client also assigns a tag to each event appropriately to uncover the attacker’s progress. At last, in the server, many analysis engines working on the tagged-events supplied by the client to detect the malicious activity in the host machine. The tagged-events will be the raw data for learning algorithms and analyzing the behavior of the patterns to prevent or detect malicious activity through the co-relation amongst the event streams.



Fig: 4, A framework to detect & prevent fileless malware attack

### Proposed process model for incident response

The proposed model is especially for malware related incidents both in real-time attacks and after attack scenarios. The process flow diagram and block diagram are thoroughly explained in Fig. 5 and Fig. 6. The first five-phase (including incident response) is for the identification and investigation of the incident. Each organization should have an incident response team to handle cyber security incidents. The team can follow this process model and process flow to investigation the root cause of such attacks.

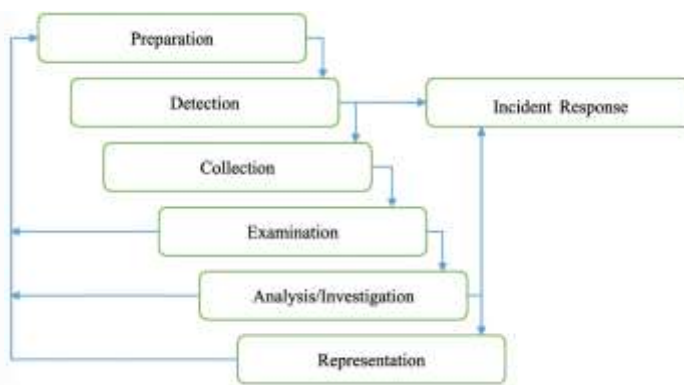


Fig: 5, A process model for memory forensic

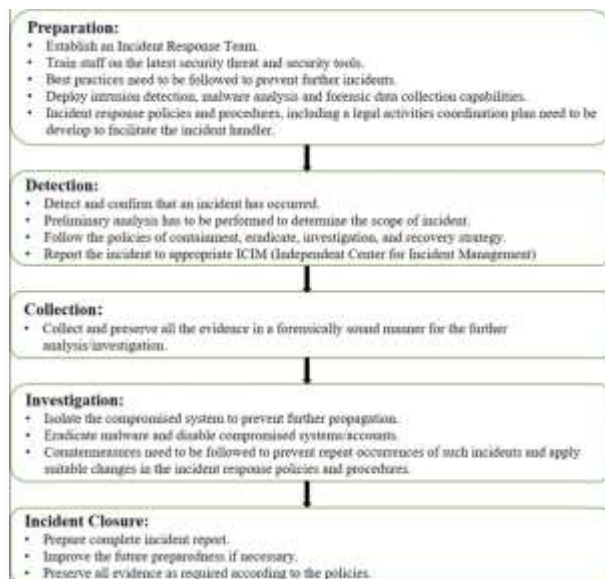


Fig: 6, The process flow of cyber security incident handling & response

The analysis of evidence and artifacts are starts from the examination stage, where forensic examiner concludes whether the malware sample needs to investigate further. In this scenario, the attack pattern can be identified with the help of many techniques. Which are useful in detecting anomalies between the benign and malicious behavior of the system.

### **Preparation**

The primary motive of this phase is continuous capability enhancement of the handling incident based on risk assessment and experiences of the incident handling team. In this context, regular training of the individual incident handler needs to be arranged to keep them ready for new security threats and related security tools for more sophisticated malicious programs like fileless malware, botnet, APT (Advanced Persistent Threat) and DDoS. An incident handler needs to gather all available information about the incident. To facilitate the incident handler, forensic software and most advanced malware analysis tools are required. In case of occurrence of such incidents, an organization must have a policy in place containing reporting, information sharing, especially with outside organizations such as law enforcement.

### **Detection**

In the organization, security tools (anti-malware agents, intrusion detection /prevention systems, network sandboxes, and firewalls, etc.) must installed in their infrastructure to prevent and detect it from the security breaches and policy violations. If any alert are unauthorized events or anomalies triggers, then it requires a security analyst to examine logs and analyze the root cause of the unauthorized event. The malicious events could lead to the existence of malware, which could be determined by the various parameters, and quick validation can be done to confirm the attack. The validation is required to determine whether to investigate the suspected attack or ignore it. This phase can generate two branches – *incident response* and *collection*.

## **Incident response**

The reactive and proactive response will be generated for intrusion detection according to the organization's policy and guidelines. The damage already caused due to a cyberattack could be mitigated, and future action plans can be determined for such attacks. In addition, a similar response with more information obtained from the investigation can be initiated.

## **Collection**

The evidence of the incident can be acquired from the sensors, which are in place in the network or from the compromised machines. The sensors can be honeypot / honeynet to collect malicious samples or to capture the network behavior. All the collected evidence are preserved for further analysis and investigation purpose, as mentioned in Fig. 6. All the analysis and investigation must be done on a copy of the original data, and the original evidence file is untouched to facilitate legal requirements.

## **Examination**

The traces obtained from various security sensors are integrated and fused to form one extensive data set on which analysis can be performed. The data set may contain redundant information, which needs to be removed and rectified efficiently. In this process, the crucial data should be intact. The indicators of cybercrime can be searched from the extensive data set of evidence like malicious network traffic. The finding may be shared with the development team of security tools for improvement purposes.

## **Analysis & Investigation**

While analysis of such incidents, an expert should consider the behavior of the systems such as registry entries, network communication, operating system fingerprinting, memory analysis, and process analysis to match for any malicious activities. Thorough investigations must be performed from a victim network or system through any intermediate nodes and communication pathway to pinpoint from where the attack originated. The attacker can remove their footprints from the crime scene, such as securely delete the log files, payloads, registry entries, and cookies. IP spoofing and stepping stone attack strategies can also be used by

the attacker to hide their IP address. The investigation phase provides data for incident response and prosecution of the attacker.

## Representation

All the findings from the different phases, such as examination and analysis/investigations, are collected and presented in a proper, understandable language for legal purposes with evidence. The detailed documentation can be presented in the form of a report with visualization so that they could be easily grasped.

## Research Challenges

Fileless malware already presents a significant problem, and it is gaining further popularity among attackers because it is undetectable by traditional file-based prevention and detection systems. Since, there are no files written on the disk, when the malware is persisting exclusively through process memory and registry files. The malicious process is not accessible without doing in-memory analysis because the source code of the process is not available. The fileless attacks can evade these AV tools without triggering alarms as deduce from the eq. 1.

$$\text{No Code OR Files} \Rightarrow \text{No Detection} \quad \text{eq.1}$$

In the process of prevention, detection, and collection of the malicious files or attack vectors in the infrastructure poses the various research challenges in incident handling and response, which are discussed in the following subsections. In Table 4, the specific and common challenges are compared for both file-based and fileless malware.

Challenges	File-based malware	Fileless malware
1. Detection and collection	Malicious files are available and detect by the AV solutions.	Since, the malicious files are unavailable, it required to do in-depth memory analysis for the identification of malicious programs running in memory and collect malicious patterns as evidence.
2. Examination	Perform static and dynamic analysis of the malicious sample to extract indicators of compromises (IOCs).	To establish and validate the attack, all pieces of evidence, such as network events, logs of all security tools, and hosts are required to examine.
3. Analysis & investigation	Co-relate the intention of the attacker from the IOCs and investigate the attacker IP through mapping with IP-geolocation.	Co-relate the intention of the attacker from the IOCs and investigate the attacker IP through mapping with IP-geolocation.
4. Incident response	The accurate response of malicious activity should be communicated to mitigate the threat.	The accurate response of malicious activity should be communicated to mitigate the threat.

Table:4, Comparison of challenges between file-based and fileless malware

## **Detection and collection**

The first step to detect the fileless malware attacks is to identify the malicious pattern of the system and the malicious scripts, which are running in the memory. The malicious scripts are interpreted files such as JavaScript, Visual Basic, and PowerShell, which also need to consider as a parameter of detection engine. However, some points raise even more significant questions for the researcher:

- Are we want to scan all text files, scripts, and XML files?
- Are we to build a parser/interpreter for each type of interpreted files?
- Are we to block any suspicious string, even if it is just a comment in the scripts?

Researchers are facing these questions when trying to balance false positive in early detection systems. The detection system must consider different attack vectors and source of evidence to block fileless attacks at the pre-execution stage. It must leverage the machine-learning algorithm to analyze command lines, scrutinize internet connections, monitor process behavior and protect the memory space of the running process to detect such attacks. The system should collect all the relevant data from different sources to feed on the machine learning algorithm and get the best out of it. The data from the different sources may be quite large, so to handle the data, the system can use big data technologies with a machine learning algorithm for more efficient results.

## **Examination**

The system is compromised with fileless malware having less possible to find traces of malicious activity. Although the evidence must be collected from different sources. Data fusion of all the evidence and logs collected from various security tools deployed in each host on the entire network is major challenges faced by the security researchers. The traces from the logs, attack vectors from various tools and reconnaissance of attributes from different hosts validate an attack. Characterization of anomalous network events, the malicious behavior of the system, and distinguishing attack traffic from legitimate traffic by searching for patterns of anomalies is a significant.

## **Analysis & Investigation**

The large volume of data can be used to scrutinize to understand the relationship of attack and attacker intention, to do so the classification and clustering techniques can be used on the suspected data events to separate the benign events and malicious events. Pattern recognition can be used to find anomalies in the malicious events. A malicious cluster can help to categorize the attack patterns and attack reconstruction to uncover the motivation and intention of the attacker can be a challenge. All the collected evidence needs a thorough investigation to find the source IP of the attacker. Security researchers are facing problems to trace back the attacker IP address due to the advanced techniques of IP spoofing. Identifying a mechanism to find the IP location mapping with attacker geolocation is itself a significant challenge.

## **Incident response**

In the whole process, the incident response is the phase where the result is reflected. The response should be quick and accurate so that the malicious activity should be mitigated and attacker unable to damage any further.

## **CONCLUSION**

Security defenders should have a significant focus on detecting and preventing fileless malware attacks. The attackers use the legitimate application to fulfill their malicious motives. Since, the PowerShell and WMI can also be used to bypass signature-based detection systems, maintain persistence or ex-filtrate data makes it difficult to detect malicious activities. In this paper, we categorized most of the existing detection methods and types of fileless malware, which are targeting the real world. The proliferation of non-malware attacks has only accentuated this issue. Major global hacks against SWIFT (Society for Worldwide Interbank Financial Telecommunication) and the Ukraine power grid, among others, have served as clarion calls that critical infrastructure and worldwide financial systems will continue to be targeted by this type of sophisticated attacks.

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## **Processing contemporary culture trends, vogues and fads: zeitgeist on the decline**

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### **ABSTRACT**

*The twenty first century bears witness to an unprecedented transformation in human lives owing to changes in technology and related activities. The velocity of such a change inevitably reflects in lifestyles and choices of people. 'Update or remain outdated!' the new tune played by Pied Pipers of technology has a widespread loyal following. This paper will make an earnest attempt to document the phenomena of popular culture, albeit, at the risk of conveying outmoded information by the time this is read; as every new dawn brings with it an announcement of an innovation ready for mass consumption simply because of the clamour for anything new or different on the block. Here is one feature that spreads itself uniformly, cutting across lines of caste, class, race, ethnicity, gender or any such categorization.*

*It would be stating the obvious to mention that the advent of computers and its gradual inevitable insertion in various forms, into human life, is the single most consequential catalytic advancement of the century. So radical are the changes that a total assessment of human conditions and if those changes were for the better or for the worse, is still a difficult task fraught with ambiguity of means and choices. The term 'zeitgeist' is rapidly headed for redundancy regardless of race, class, ethnicity, regionalism and other parameters. If previously, human choices and preferences created popular culture and literature; of late, it is memes and likes that anoint what popular culture and literature is, which hold sway, albeit, for a limited duration, by which time a new meme takes over. This paper engages in assessing the ever-changing scenario of what constitutes 'IN' with a telescopic view of how fast the 'IN' becomes an 'OUT'.*

**Keywords:** *Technology, zeitgeist, innovation, popular culture, categorization.*

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Zeroing in on what is popular is an exercise in futility. Even when done in all earnestness the end of the exercise would only be the realization that the content would be passé. It calls for a steely incorrigible to continue such documentation to repeatedly come to the same inference. It is in human nature to be on an eternal vigil for a different beat and to tap to it at the first available opportunity, this being the case in all his choices. When ‘update, or remain outdated’ is the chant of the times, those not in tune risk isolation to dangerously undesirable extents. It would be stating the obvious to mention that the advent of computers and its gradual inevitable insertion in various forms, into human life, is the single most consequential catalytic advancement of the century. So radical are the changes that a total assessment of human conditions and if those changes were for the better or for the worse, is still a difficult task fraught with ambiguity of means and choices.

From a sociological point of view, the existing beliefs and trends in a society form the essence of temperaments and tendencies for that particular period of history. This defining set of features can be grouped under the term ‘zeitgeist’. Zeitgeist finds a prominent mention in early nineteenth century German philosophy where it is defined as the ‘spirit of the age’. Theo Jung describes zeitgeist as a key element in the new “temporalized discourses” of cultural rumination emerging during this time (Jung). The concept of zeitgeist drew strength from the theorizations of philosophers Herder, Goethe, Voltaire and most notably Hegel. Hegelian philosophy equates this ‘spirit’ to the culture of the population and is constantly evolving to suit the developments arising in the immediate environments, simultaneously causing changes through what he called “cunning of reason” (Nisbet). Thus, according to him, ‘art’ in a region was a clear reflection of the culture of the time in which it was created (Magee). The term ‘zeitgeist’ is however rapidly headed for redundancy regardless of race, class, ethnicity, regionalism and other parameters. If previously, human choices and preferences created popular culture and literature; of late, it is memes and likes that signal popular culture and literature which hold sway, albeit, for a limited duration, by which time a new meme takes over. The greater the use or dependence on technology, the shorter is the span of loyalty to a reigning choice or trend.

The human mind is bombarded with quick moving images of facts, factoids and trivia, forming a virtual cornucopia of visual and auditory pleasures

to select, emulate or imbibe. With greater induction of people from rural confines and remote topography onto the information highway; connectivity and percolation of information in the form of trends and waves have only increased. Quite often, resistance to technology brought about by conservatism, lack of skill and simply, fear of the modern have kept influences to the minimum in such pockets of humanity. But the inevitable march of technology and liberal availability of it has brought down even the surviving few dissuaders. A remarkable feature that has to be acknowledged is the speed with which technology spreads, considering that the gap between Johannes Gutenberg's invention of the printing press in mid fifteenth century, circa 1439, and the spurt in development of computer related inventions in the 1950s, is more than five hundred years. The dissemination of knowledge through now easily available books played a role in its democratization, inducing greater participation of minds from all strata of society in inventions and discoveries. Sciences, philosophies and literature was now dabbling ground of not just an elite few with means and access, but close to five centuries later, progression of computers from analog to digital, closed network to Internet, invention of applications like email and World wide web, and now; Facebook, Twitter, WhatsApp and the like, all within a span of a mere fifty years has brought fantastic transformations in human lives. Fantastic, both from the enormity as well as implausibility of the proportion of changes that have occurred. Human lives are yet to brace for greater development in this field where the slow but sure dominance of Artificial Intelligence (AI) is cheered and feared for in equal measure (Isaacson 104).

In such a rapidly transforming scenario, processing the popular is akin to keeping track of sastrugi on an increasingly warm day. Till recently taste and choices were influenced by a staid set of factors, most of it being gradual to permeate into society. Coco Chanel, the high priestess of fashion and lifestyle, remarked prophetically, "In order to be irreplaceable one must always be different", and her words strangely qualified all things and activities in the human domain (Horton 103). Any action or thought that differed from what previously existed created a stir, especially if it emanated from a prominent member of that society. The change, even if it was welcomed by a very few inevitably caught on to transform the old guard. Fashion in attire, food, art and architecture were some of the areas where trends were immediate, as it was a visible feature. More often than not, royalty and members of their court were generally the fountainheads of

all changing trends. It was the privilege and right of these entitled few, direct access to anything new in the land. Acceptance by royalty or the elite guaranteed assured patronization and profits. In clothing, excessive use of fabric, of varying finesse, worn over corsets, hoop shirts or bustles, later giving way to reduction in fabric content with an emphasis on comfort, were all in keeping with changing royal choices. Men were no different when it came to emulating blue bloods and aristocrats in attire, hairstyles and weaponry. Prominent persons in society later went on to include artistes of all nature; singers, writers, silver screen idols, business elite and sports personalities. What was earlier an inner circle of credible-by-birth coterie, started to accept those who excelled in one thing or the other. All around the world depending on their acceptance and acknowledgement on a regional, national or international level, this chosen few successfully dictated trends in art, literature, clothing and fashion. In mid 1920s entrepreneur Aristotle Onassis' idea to get idolized opera singer Claudia Muzio to smoke his brand of stylishly designed feminine cigarettes in public, led him to monopolize the sale of women's cigarettes even while the idea of women smoking was nascent. The concept of 'Brand consciousness', 'Brand promotion', 'Brand ambassador' was in embryonic stages when he managed this coup and as such this singular instance can be deciphered as a change in choice for women, lifestyles or one from an economic point of view.

The radical change in dissemination of information leading to choices is evident today where a century later Claudio Muzio, an accomplished singer's decision to espouse a particular brand with a particular intent then is done unabashedly now by very ordinary unaccomplished people on Instagram and other applications with a titular profession called 'Influencer'. Such influencers rank in excellence based on the number of followers they have and not on quality of work, art or craft produced by them. These influencers operate not only in the field of lifestyle choices and fashion but in matters of social concern, politics, financial issues and every other topic that piques interest. Apropos then to the crux of this paper, society and its constituent elements were always subject to changing trends and issues with the addendum that sources of such opinions continue to change. Theoretically, opinion sways and choices have been scrutinized in the scholarly book 'Diffusion of Innovations' by Everett Rogers. Of the four main parameters of extant of influence an idea evokes, namely, the innovation itself, communication channels, time and a social system;

communication channel is of prime relevance. The oft repeated observation that the world is shrinking is primarily due to proliferation of communication channels. Quite surprisingly, education or the lack of it including illiteracy does not seem to affect the use of these channels. A herd grazing Sherpa in the mountains can be included in the loop as much as a fisherman in the remote islands of a vast ocean. The only difference being they may fall in the varying categories of late majority as compared to early adopters, early majority and even laggards in taking to use of technology. Here too, the early adopters are a trend introducing group but its longevity depends on its adoption by the late majority and the laggards.

The singularly decisive player in today's times, invisible yet omnipotent, is the algorithm (Campbell-Kelly). To a lay person an algorithm is a helpful aid but in reality, is a string held by a puppeteer with the lay person gently nudged and guided into making choices. As long as a consumer is capable of making choices, the algorithm is in play in the background, carefully monitoring these choices and digitally converting it into data. People today are plugged into their phones in a manner reminiscent of a helpless human depending on a life supporting ventilator and switching off the machine equivalent to cutting off that person from rest of the world. This dependence is justified due to the various services and applications in these gadgets that respond round the clock without them being aware, in it are algorithms surreptitiously keeping track and intruding into lifestyle, food, clothing, banking, reading and even entertainment choices. Consequently, consumers are divided into demographics and each demographic is catered to accordingly. Adolescents and young adults being the largest category; applications facilitating fun, frolic, creative self-expression without restrictions like TikTok, Twitch, the now slowing YouTube and others rule the bandwidth. Gone are the days when a child would display its talent in singing or dancing in the limited confines of its home with a finite crowd watching earnestly. The same child can now project itself to the world and garner appreciation from voices located in different latitudes and longitudes of the globe. For instance, people in icy corners of Europe watching a grandma cooking in a remote forest in India, a dancing dog in China, a skiing child in Russia or a band jamming in South Africa is tapping into popular cultures and trends bereft of boundaries. Trends, occasionally border on whimsically ditzzy prompting viewers to imitate on screen activities like the #Birdbox Challenge where people attempt doing everyday tasks

blindfolded even at peril to themselves. The #10Year Challenge where participants post picture of themselves today and that of what they looked like ten years back is according to Kate O'Neill, author of the book *Tech Humanist: How You Can Make Technology Better for Business and Better for Humans*, "A data mining trap to train facial recognition algorithms on age progression and age recognition" masquerading as a fun task (Fortin 20). A recently developed app called Click to Pray, informs users what the Pope is praying for, like world peace or people hit by a natural disaster, so they can join him which in turn will have a hidden algorithm assessing and quantifying the world's desires.

An outstanding feature of the twenty-first century is the addition of robots as members in a society, though the numbers are too miniscule for the time being for it to make a discernible difference. But Humanoids and bots being developed and tested to replace teachers, waiters and even specialist surgeons, becoming increasingly anthropomorphic is a sign that popular culture may be decided not just by human component in a society. With this probability increasingly visible on the horizon, racial divisions of Aryan, Dravidian, Caucasian; class division of rich, poor, owners, workers; gender division of male, female, transgenders and any such categorization may run obsolete. Thus, the continuously evolving changes have gradually brought about the decline of a definitive 'spirit' of the times. Life is fast paced and fleeting preferences do not contribute to any defining essence of the society. Philosophers and sociologists will have to formulate terminology to address this ever metamorphosing zeitgeist.

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## Cyberdrama: A New Paradigm for Interactive Narrative

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### ABSTRACT

*The article analysis the backgrounds of narratological aspects in interactive videogames. It also attempts to show how narrativity is intrinsic to the videogame medium, in what ways it appears and what its use in gaming terms. It suggests that role playing games are considered as interactive narratives, instead of simply as 'games', as the essential qualities of the genre make role playing games lend themselves to be considered more as a type of storytelling or narrative device than what is traditionally considered as a game. And also, how this new form of interactive narrative offers possible pedagogical implications.*

**Keywords:** *Digital narrative, Cyberdrama, Interactive fiction, Video games, Ludology, Role Playing Video Games, Traditional narratives.*

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In the postmodern world, our everyday experience has become game like. The ordinary categories of experience, such as parent, child, lover, employer or friend have come to be described as “roles” and are deconstructed into their culturally invented components. Therefore, the union of game and story is a vibrant space, open to exploration by high and low culture, and sustained in incidental engagements. The human brain, the map of the earth, the protocols of human relationships are all elements in an improvised collective story-game, an aggregation of overlapping, conflicting, constantly morphing structures that make up the rules by which we act and interpret our experiences.

In search of a new medium to express the story and to practice it, we found that the digital medium is more appropriate because it could easily enact and explore the contests and puzzles in the postmodern inner life. This new kind of storytelling emerged to match the need for expressing our life in the twenty-first century. The interrelations of computer technologies and literature has put

forward a new concept called cyberliterature, which was characterized by various computer specific qualities such as multilinearity, lexias (blocks of text connected with various hypertext links), linking a written text with multi-media, interactivity etc.

If we look into the history of videogames, they have been seen as nothing more than a means of entertainment at best. Some have claimed that games were “satanic tools that enslave children” (Davis). It’s only in the late twentieth century that videogames have begun to be taken seriously by the academic community and scholars, who started to look at games as an instructional tool, work of art and as a means of self-expression and representation. But the ludologic rush to study games simply as games, an approach closely resembling deconstructionism- an almost outdated approach to literature which looks at texts simply as text- the academic study of game aspects others than ‘rules’ and ‘addiction’. There were several terms, such as ‘simulations’, ‘interactive representations’ and ‘interactive narratives’, which have been awarded to video games. However, not all games are not simulations or representations and all games cannot be considered as narrative. Mainly racing games, fighting games, sports games and MMORPGS should not be seen as narratives, as the narrative element in these games are almost absent because their narratives are just an excuse to have an interaction between gamer and the game. At the same time some ludologist also accept the fact that all role-playing games, many adventure games and tactics and strategy games are narratives too.

Role playing games are story driven interactive adventure narratives, where the player took the control of a character and start the mission on some quest to save the world from the destruction. Normally after such an explanation about the story line, because of the several misconceptions, many visualizes the role-playing video games are just, a cartoon character running from the left side of the screen to the right, destroying anything in the way with a sword or laser gun. This is not what role-playing games are. A role-playing games can be described as an interactive novel. It usually takes place in a lavishly detailed world, where towns inhabited by characters with an in-game life. Some characters milk cows, some farm vegetables, some forge weapons, some build cities and fort, maintain and develop army, some are thieves, others sit around and govern. The players are

able to interact with all these different personas at any given time in the game, for example: *Farmville*, *Clash of Clans* etc.

If we examine the present contributions of the video game industry, we will find out that the virtual gaming and interactive storytelling have finally achieved some sort of harmonious balance. Games like *Max Payne* positions themselves both in the logic of actions of stories and in the tradition of games. But an in-depth examination of the link uniting game and narrative is still an ambiguity. In most games, narrative information is transmitted to the player by way of non-interactive cinematic ‘cut scenes’, a practice that does not seem fit to call ‘interactive narrative’. The complex stories found in games can often be summed up in a few lines as if their only use was to establish an appealing context for the game itself. Gerstmann tells us that gamers like well-weaved stories, but that they are playing video games first and foremost to play games and later tell stories.

Before going into further details of Cyberdrama, we should briefly define two important terms, narrative and game. The narrative theorist Marie-Laure Ryan defines, “narrative as a coherent and significant telling or retelling of a fictional or non-fictional event or events”. It is rational because it orders the events in a pattern that can be easily followed, whether it is chronological or based upon interpreting connections between non-chronologically presented events. It is significant to know whether these events presented are to entertain, educate or evoke an emotional reaction from the audience. Ryan also suggests a definition for game. Games are “freely played and played for their own sake and have ironclad rules”. It can also define as a structured framework for spontaneous play. By structured framework means goals, obstacles, resources, reward penalties and information. Furthermore, games and stories have two common important structures: contest and puzzle. The contest is a structure of human experience i.e. as a cognitive structure evolved in survival mechanism. The second structure is the puzzle, which can be seen as a contest between the reader/player and the author/game designer. In a puzzle story, the challenge is to the mind, and the pacing is often an open-ended rearrangement rather than turn-based on moves. Most stories and games whether it’s electronic or otherwise, include some contest elements and some puzzle elements. So, now the question arises, is there a story-game? And which comes first, the story or the game?

Video games thus seem to be riding on the horses of game and narrative. This vivid opposition is represented in video game studies by the clear splitting of two schools of thought. The first, the narratologists, who saw video games as a new way of express and respond to the ‘desire of fiction’ that inhabits humanity. Like the case of films in the late 19<sup>th</sup> century, video games have started to be seen as a new expressive form whose narrative potential has yet to be developed. Consequently, the theories of narratology developed in literary and film studies serve as basic analytical tools to study this new medium: to play a video game is essentially to play the part of the main character in a story and to experience an “interactive narrative”. The second is the ludological approach, which is based on the observation that games are not narratives, since games like *Pong* and *Tetris* (Pazhitnov) do not share many of the traits of narratives. For the ludologists, the study of video games necessitates the development of new analytical concepts that are made for games in general and video games in particular (Frasca). According to them, game and narratives are two concepts which are either incompatible or outright opposites, since the theories developed for other mediums cannot account for their specificity.

The quote, “In life, unlike chess, the game continues after checkmate...”by Issac Asimov is the appropriate explanation to prove that Cyberdrama are not just game stories but, something that sticks on to your mind even after you finishes it. In simple terms, Cyberdrama can be defined as the recreation of storytelling itself for the new digital medium. The game story means the video game stories which are highly enriched with stories in digital formats, like the hero driven video game, the first-person shooter, the genre focused role-playing game etc. And why it is so important to discuss the storytelling going on in electronic games is because, it is the digital medium which is well suited for gaming and the reason is that it is technical(generating behavior based on rules) and participatory (allowing the players as well as creator to move things around). And also, it includes still images, moving images, text, audio, three-dimensional etc., in storytelling than any single medium has ever offered us.

Cyberdrama, the term was coined by Jannet H. Murray, in her book *Hamlet on the Holodeck: The Future Narrative in Cyberspace*. She used the term to discuss, a new type of storytelling which emerged when the computer becomes an expressive medium. Cyberdrama appears to tell the story of our lives now,

much as the novel emerged to tell the story of a previous culture and time. The term emphasizes on the enactment of the story in the particular fictional space of the computer. Murray's *Hamlet* followed Brenda Laurel's *Computers as Theatre*, and the central topic of discussion was the dramatic experience in the new media community. Her book was focused on the forms of interactive, first person, computer enabled story telling. In her work, Laurel offered Aristotelian dramatic experience as the model toward in which the designers of interactive computer experiences should aspire.

The narratologists like Murray, Henry Jenkins and Mark S. Meadows view video games as a narrative driven. Murray believed that video games and other similar forms are slowly developing to the primitive form of Cyberdrama. The model Murray has in mind is that of an interactive theater (Murray, 1997). She views authorship in videogames as "procedural"; a video game's developer creates the rules and choreograph the game's performance for the "interactor," who plays or performs the game with limited effect on the narrative. Jenkins claims that narrative is embedded in the structures of games and realized by playing a game (King and Krzywinska, 2000). And Meadows defined "interactive narrative" as a time-based representation of character and action in which a reader can affect, choose or change the plot. The first, second, or third person characters may actually be the reader. "Opinion and perspective are inherent. Image is not necessary, but likely" (Meadows, 2003). Interactive narrative resembles a flow chart, with the complexity of the branching paths dependent on the text type and authorial intent.

There are two distinct kinds of Cyberdrama: Standard Cyberdrama and Applied Cyberdrama. A standard cyberdrama is a video game that is primarily driven by its story and an applied cyberdrama is a video game that is driven by game play, eg: *Mass Effect: Andromeda*, the *Resident Evil 7: Biohazard* and *Battlefield Series*. While applied cyberdramas may have stories attached to them, but it may not have an traditional narrative "attached" and it only have a story applied into them *later*, through official updates or through fanworks, eg: *Clash of Clans*, *Grand Theft Auto Series* and *Assassin's Creed*. According to Murray, there are three aspects of Cyberdrama: immersion, agency and transformation. The most important aspect is the transformation and the other two are depend on it. Transformation is the way in which the reader/player of a Cyberdrama becomes

another character in other words it is the process by which they become an avatar. Then through immersion and agency, the avatar gets into the story and does something in its own world. And this is what Murray meant by saying, a player becomes something else by having “the opportunity to enact stories” (1997).

Steven Johnson in his book, *Everything Bad is Good For You* states that “the interactive nature of games means that they will inevitably require more decision making than passive like television or film”. He also argues that video games are indeed partially interactive. He says that at the beginning of the game the player has very little control over the narrative, but when the game develops, he tells the reader that “you are more in control of the narrative now, but your supply of information about the narrative is only partial and so playing these games is all about filling the information gap”.

James Paul Gee, one of the pioneering video game scholars has stated in his book *What Video Games Have to Teach Us About Learning and Literacy* that, “Video games are an immensely entertaining and attractive technology built around identities”. He also states that:

Narratives in video games with rich stories function quite differently that they work in books or movies. A book or movie can tell its story from first episode to last or it can begin in the middle of the action and only later get to the initial events in the story. In either case the reader or viewer knows someone else (the reader) has determined the order in which events in the story will be encountered. This author (which can be any number of people) also determines the sources through which the reader or viewer gains a crucial information. For example, a crucial piece of information may be in a conversation between two lovers rather than in a hidden diary. In a video game, on the other hand, some players will get such information one way and others in another way”.

The characters in an interactive drama should be rich enough, that the player can assume a consistent model of the characters’ thoughts. If the characters’ thoughts can be understood (e.g., goals, motivations, desires), then these thoughts become a material resource for player action. By reasoning about the other characters’ thoughts, the player can take actions to influence these characters, either to change their thoughts, or actively help or hinder them in their

goals and plans. The dialogue or the language spoken by the characters and the chance for the player to engage in dialogue are other material resources for action. Dialogue is a powerful means to influence character behavior. If the experience makes dialogue presented to the player, it becomes a powerful resource for expressing player intention. The objects available in the experience are yet another resource for player action. The limitations are not directly perceived by the player, just as in non-interactive drama, understanding the formal chain of causation allows the audience to appreciate how all the action of the play necessitates the plot and theme. In interactive narrative, the understanding of the formal connection from the level of plot to character additionally helps the player to have an understanding of what to do, means why they should take action within the story world at all. Just as the material constraints can be considered as affording action from the levels of spectacle through thought, the formal constraints afford motivation from the level of plot. This motivation is conveyed as dramatic probability. By understanding what actions are dramatically probable, the player understands what actions are worth considering.

Although some video game scholars argue that video games are interactive simulations of real life, Crawford stated in his paper entitled, *Interactive Storytelling* that, video games are not interactive simulations of reality but linear stories. Non-interactive stories, according to Crawford are games that have a linear plot and have an interface. This applies to many role-playing games, but not to all. For e.g.: *Magna Carta: Tears of Blood*. Crawford suggests that videogames are not interactive narratives or simulations, but instead they are non-interactive stories. However, this is something that can be argued against. Interactivity commonly involves new media art technologies and user interfaces. All video games have graphical user interfaces (GUIs) and by engaging in the use of these GUIs, the player interacts with the game. In *Kingdom Hearts*, a video game with an adventure game with a story, where the player controls all the other characters. The player then embarks on a quest to find the Kingdom Keys and defeat the Heartless, who are polluting the worlds of the Disney Kingdom. If we go by definition, definitely this is an adventure role playing game, but it also has several elements of a traditional role-playing game as well as branching story-trees. Once the game starts, it completely depends on the player's choices, whether or not to engage in a number of events, which have the potential to alter the final outcome

of the game. If the player decides to not to interact with the artificial intelligence characters within the game, the story will not progress.

## CONCLUSION

This paper does not attempt to glorify role playing games or did not try to state that all video games are interactive narratives or to suggest that all games can be used in an educational context or social context. On the contrary we can look role playing video games as an interactive narrative and as a cultural device which allow for the exploration of myriad of topics. Janet Murray had envisioned the coming of a “cyberbard”, a true “mega narrator” wielding the literary world with a velvet glove and the computer code with an iron fist, putting the computer’s power at the service of imagination and grand stories rich in emotions. The educational possibilities of interactive narratives are almost endless.

Video games are narratives because the algorithm, analogous to the game master in a role-playing game not only serves as refereeing authority who only upholds the rules, but also as a narrative authority responsible for ordering and informing the player about what becomes of the fictional world and the actions he undertakes. Just as stories in print have been used in language classrooms the world over, video games can be used in the same manner. Open world role-playing games, such as *Morrowind* can be used to teach about morals and right or wrong. Personality simulators such as *The Sims*, can be used to teach about human behavior while Strategy games can be used to teach macro and micro management skills. The major benefit of doing so is that, these games can be discussed in language classroom in the same manner as traditional narratives have discussed so far.

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## Significance of the ICT in English Education

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*“ICT in education is the key to unlocking the skills and knowledge of our future generations of young people. It is the tool for learning for the 21st century.”*

(Kate McKenzie)

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### INTRODUCTION

Information Communication Technology refers to technological equipments used for communicating and managing information. Literacy in Information and Communication Technologies are the fundamental to life in our 21<sup>st</sup> century society, a society that is dominated by technology. The International Foundation for Information Technology provides three definitions for Information Technology:

- A. The technology used for the study, understanding, planning, design, construction, testing, distribution, support and operation of software. Computers and computer related systems that exist for the purpose of Data, Information and knowledge processing.
- B. The industry that has evolved to include the study, science, and solution sets for all aspects of Data, Information and Knowledge management and/or processing.
- C. The organization is an enterprise or business that is held responsible and accountable for the technology used for planning, design, construction, testing, distribution, support and operation of software, computers and computer related systems that exist for the purpose of Data, Information and Knowledge management and/or processing.

ICT has been used in all spheres of life including education. It could be with this notion in mind that the central government of India has put ICT as one of the curriculum in education. This notion laying emphasis on the need and importance of ICT in our present society has led many notions to set up centres

that would provide training in the utilization of ICT in the field of education to the maximum level. It is with this view to providing training in ICT that Techno Park, the largest IT Park in India situated at Trivandrum, the capital of Kerala is opening the world's largest ICT training centre in Techno City.

### **Role of ICT in English Language Classroom**

The utilization of ICT in education has recently started to appeal the potential and significant progress in language learning. It has now become a focus of attention in the field of education and has been used from Pre-school up to university to facilitate students and teacher in teaching and learning process. ICT has proved to be a medium that facilitate people in learning language although the effectiveness of learning depends totally on the users. In this regard English language learning could be made more effective by the application of ICT in the teaching - learning process.

English language is an inevitable part for most people in today's world. As English is one of the difficult lessons, teacher must create interactive teaching and learning to make the students more active and interested. ICT ranging from printed books and telecommunication to media, voice record on tape, video, television, CD and internet enable the students to grasp even the complex aspects related to English language learning more easily. More over the term ICT includes technologies like the Computer Assisted Language learning (CALL), the internet and variety of generic computer applications such as Electric Books, E-learning etc. The use of ICT in the English classroom extends beyond its motivational value to address key outcomes of the syllabus, and allow students to become competent user as well as consumers of English.

The development of ICT has enabled as a better way of teaching and learning English language compared to the exiting methods. Through the internet or any other multi-media resource, teachers or learners can obtain as many sources as possible such as text, songs, stories etc. Those sources can contribute as models of English language used in the real context and in proper manner. Applications of ICT eventually change the nature of the texts, the process of reading and responding to and also the ways in which student access materials for better learning. ICTs offer a number of advantages to both students and educators when it successfully integrated into a learning environment.

The application and utilization of ICT in English classroom helps to:

- Improve teaching and learning process.
- Develop speaking and listening skills.
- Improve writing and reading skills.
- Give clarity, precision and accuracy.
- Support collaboration, creativity, independent learning and reflection.
- Help easy understanding.
- Provide recreation.
- Create interest
- Improve quality of language
- Provide concrete experience

### **Role of a Teacher in ICT classrooms.**

“Technology is just a tool. In terms of getting the kids working together and motivating them, the teacher is the most important.” (Bill Gates)

Teacher plays a vital role in ICT classroom. A teacher should create a warm and good environment for learning process that enables the learners to achieve the learning objectives accurately. One of the qualities of a good teacher is to ensure student’s participation in the learning process and it is at this point, the resource of the ICT make their way in by providing a lively atmosphere for learning. ICT based teaching opens the doors into a new learning atmosphere which the students find so thrilling and innovative. It provides both the teacher and learner with new ideas and information. A teaching involving the various resources of ICT such as T.V, newspapers, radio, Internet will undoubtedly make far more impact on the students as the students themselves directly experience it through these activities that involve reading, listening, watching and surfing internet and students gradually develop their skills of using English language in the natural way Students find it easier and interesting to learn English by living in the world of English than to remain a practitioner of conventional mode of learning.

Here as teachers it is necessary for us to realize how far the media play their role in the society as well as in the teaching learning process. It is up to the teacher to what extent he/she can utilize the resources of ICT and thereby bring

about a rapid change in the foreign language acquisition of the students. “This is a challenging time for all teachers and especially for English teachers because we are living in the time of general uncertainty here the rapid changes in professional practice are commonplace. Now many changes in professional practice are emerging as the result of the implementation of Information Communication Technology.”

The basic objective of the second language teaching is making the learners proficient or communicatively competent. This proficiency is best achieved when equal attention is paid to develop all the four skills such as listening speaking, reading and writing in an integrated manner. So as an English teacher we must integrate all the four skills with equal importance.

Now a days we follow activity-oriented or student centered learning process in our class. One of the major advantages of this method is that it ensures the active participation of the learner and also creates good learning atmosphere. As far as English language is concerned there are many activities such as reading newspaper, articles, magazines watching movies, listening audio lesson etc. which could be provided to the learners in order to create a lively learning environment. As it involves fun and entertainment the student remain active and curious all through the learning process and all these could be made possible only through the application of ICT in our classroom.

### **ICT to Improve Listening Skills**

*“The art of conversation is the art of hearing as well as of being heard.”*

The two integral parts of oral communication is listening and speaking. Listening is very important in language learning process, because speaking skill is directly related to listening skills; it helps the learners to pick up the habit of speaking more meticulously. It also helps the learner to develop their vocabulary and refine their understanding of grammar. Through ICT we can create the software that can motivate active listening in English. The ICT materials for listening may contain the following four types of listening tasks.

The Listening for Information Task: The listening for information or informative listening is very important for the development of knowledge in a student. So we must give prime importance to this task.

A General Listening Task: Here the learners listen to a talk or to interview and answers specific questions based on the context.

Listening and Note making Task: Note making is an important part of the life of every student, and taking notes helps the learners to make sense of the context. Through this task the writer records the essence of the information, freeing their mind from having to recall everything.

Listening and Responding: In this context the learners take the part of one of the speakers and respond by the choosing most suitable options.

### **ICT to improve Speaking Skills**

*“Speaking on any language is all about imitating others people.”*

Communication is the main purpose of a language, because through communications we satisfy our needs and express our thoughts, feeling, emotions and our ideas with others. For the proper communication speech is essential. So the importance of speaking skill is very tremendous. Speaking is a skill which requires a great deal of practice and there are softwares which help the learner to develop their speaking skills properly.

### **ICT to Improve Reading Skills**

*“The best advice I ever got was that knowledge is power and to keep reading.”*

There are many opportunities to gather information; books are not only the materials for this. The IC infrastructure is very convenient in integrating the skill of English language by learning through a variety of activities in the classroom. An English teacher having the knowledge of using ICT tools can help the learner to acquire the reading skills by giving them meaningful practice in reading. Most of the reading text can be explained and enhanced through using ICT applications. Digitalized language laboratory functions as a self-directed language learning system.

## **ICT to Improve Writing Skills**

*“Writing is an exploration; you start from nothing and learn as you go.”*

As dictionary says, writing is *the activity or skill of making coherent words on paper and composing text*. Writing is considered as an important ways of expressing our thoughts and communicating ideas and views to others. Writing good English requires more effort in terms of care and in terms of thought than speaking English. Many software programmes have been carved out to help the learner in English writing and composition.

### **Conclusion**

“Rapid advances in Information and Communication Technology have created unprecedented opportunities in the field of education and have had a profound influence on the way teachers teach and the way learners learn. Mastering ICT skills and utilizing ICT towards creating an improved teaching and learning environment is of utmost importance to teachers in creating a new learning culture” (Molly Lee)

ICT is an integral part of modern life; the knowledge of Information Technology is becoming essential in the present era in which people mainly depend on Information Technology. It plays an important role in teaching-learning process. The success of a class depends upon the effectiveness of teaching strategies that we impart in our classroom. English is a foreign language which plays a pivotal role globally. India is one of the several countries which regard English as necessary in the communication. Teaching English traditionally emphasized on memorizing and training, but language teaching using ICT has been proved to be more effective in recent years than the traditional methods and approaches. ELT has gained great momentum under the powerful influence of ICT. It is clear that the number of teachers using the computer laboratory for teaching lesson and preparation of English language teaching materials has increased and most of them have found their productivity improved by ICT facility. So everyone should make sure the knowledge of ICT for providing a better education.

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## तारे ज़मीन पर एवं माणिक्यकल्लु में शिक्षा विमर्श

डॉ.श्याम प्रसाद.के.एन

सहायक प्राध्यापक, . पी.जी.विभाग, द.भा.हिंदी प्रचार सभा, एरणाकुलम

उपनिषद् का वचन है -

"उत्पत्तिं च विनाशं च भूतानाम् अगतिं गतिं ।

वेति विद्यां अविद्यां च स वाच्यो भगवान् इति ॥"

अर्थात् ईश्वर की परिभाषा देते हुए ऋषि का कथन है कि सृष्टि की उत्पत्ति तथा विनाश, पंचभूतों के गतिनियन्त्रण करनेवाले तथा आध्यात्मिक विद्या तथा वैज्ञानिक विद्या को दर्शानेवाले सभी ईश्वर ही होते हैं । याने कि ईश्वरीय प्रवृत्तियों में विद्या तथा ज्ञान का भी श्रेष्ठ महत्व है। संसार में छिपे ज्ञान को शिक्षा के माध्यम से व्यक्ति अर्जित करता है । व्यक्ति का कर्तव्य होता है कि "त्रिंशतोविंशतो मध्ये विद्यांअर्थं च साधयेत् ।" याने कि बीस साल से तीस साल के उर्म के अंदर विद्या तथा नौकरी का अर्जन करना ही चाहिए । शिक्षा को परिभाषित करते हुए रेमाण्ड का कथन है-"शिक्षा उस विकास का नाम है जो शैशव अवस्था से प्रौढ अवस्था तक होता ही रहता है, अर्थात् शिक्षा वह क्रम है, जिससे मानव अपने आवश्यकतानुसार भौतिक, सामाजिक तथा आध्यात्मिक वातावरण के अनकल बना लेता है । शिक्षा व्यक्ति में चारित्रिक तथा नैतिक गुणों एवं सामाजिक भावनाओं को विकसित करके उसे प्रौढ जीवन के लिए इस प्रकार तैयार करती है कि वह अपनी संस्कृति तथा सभ्यता का संरक्षण करते हुए, उत्तम नागरिक के रूप में सामाजिक सुधार करके राष्ट्रीय सुरक्षा के लिए अपने प्राणों की आहुति देने तक तैयार हो । अतः शिक्षा व्यक्ति को अपने पैरों पर खड़े रहने के लिए काबलियत देती है जिससे व्यक्ति के जीवन में भी सुधार होता है तद्वारा समाज एवं राष्ट्र क भविष्य भी प्रोज्वलित होती है । शिक्षा विमर्श से तात्पर्य है साहित्य या कला के किसी भी प्रतिमानों में अभिव्यक्त शिक्षा

संबंधी तत्वों का विश्लेषण करना । इस प्रकार के विमर्श में गुण एवं दोष दोनों पर चर्चा होती है। अन्य साहित्यिक विमर्श के जैसा आजकल शिक्षा विमर्श का भी बहुत बड़ा योगदान है । स्कूल से लेकर कॉलेज तक अनेक गतिविधियाँ ऐसे हैं जिनपर आजकल के साहित्य ने खूब आस्था जतायी हैं । भारतीय सिनेमा में भी एक विशिष्ट मुद्दे के रूप में शैक्षिक जगत के सच्चाईयों को कथा के रूप में लिया गया है । शैक्षिक जगत में व्याप्त भ्रष्टाचार, राजनीति, अध्यापकों के वेतन की समस्या, छात्र अनुशासन की समस्या, प्रबंधन की दिशाहीनता, दंगेफसाद, नशीले पदार्थों से उत्पन्न परेशानियाँ जैसे अनेक शैक्षिक मुद्दों को लगभग भारतीय सिनेमा ने प्रकाश डालने का परिश्रम किया है । यहाँ पर अध्ययन की परिधि में हिंदी के 'तारे ज़मीन पर' (2007) तथा मलयालम के 'माणिक्यकल्लु' (2011) फिल्म को तुलनात्मक दृष्टि से देखने का प्रयास किया जा रहा है ।

भारतीय शिक्षा व्यवस्था के अनेक पहलुओं को लेकर चलने वाला फिल्म था 'तारे ज़मीन पर' । इस फिल्म के दो प्रतिनिधि पात्र हैं, एक तो आठ वर्षीय इशान नन्दकिशोर अवस्थी हैं और दूसरा उनके कला अध्यापक 'राम शंकर निकुंब' हैं । इशान अवस्थी को पढ़ने-लिखने से ज्यादा चित्रकला में दिलचस्पी थी। माँ के हज़ारों बार समझने पर भी वह ठीक तरह से पढ़लिख नहीं कर पाता था । जिसे माता-पिता उनके शरारत समझते थे । इससे तंग आकर इशान को वे शहर से दूर एक बोर्डिंग स्कूल में भिजवा देते हैं । वहाँ जाकर इशान का जीवन ओर दूर हो जाती हैं । अध्यापकों से तथा क्लास के दोस्तों से हमेशा उन्हें परिहास सहना पड़ता है। इसी बीच राम शंकर निकुंब उस स्कूल में चित्र कला अध्यापक के रूप में दाखिला पाता है । पहले ही क्लास में उन्हें इशान की समस्या का अंदाज़ लगने लगता है । निकुंब स्कूल के प्रिंसिपल तथा इशान के माता-पिता को समझाता भी है कि लड़के को 'डिसलेक्सिया' का रोग है । इस प्रकार के बच्चों को थोड़ा सा अतिरिक्त मदद मिलने पर वे इस परेशानी से मुक्त हो सकते हैं, ऐसा निकुंब का विचार था । निकुंब अतिरिक्त ट्युशन देकर तथा विशेष तकनीक अपनाकर इशान की परेशानियों से उन्हें मुक्ति दिलाता है ।

सिनेमा के अंतिम भाग में एक विशेष चित्र कला प्रयितयोगिता का आयोजन भी निकुंब करवाता है, जिसमें इशान अवस्थी को प्रथम स्थान मिलता है। इशान अपने खोये हुए सम्मान को भी वापस पकड़ता है। सच में हमारे शैक्षिक जगत की कमियों को बड़े ही खूबसूरती से 'तारे ज़मीन पर' फिल्म दर्शाती हैं।

शैक्षिक जगत के चुनौतियों को लेकर श्री.एम.मोहनन के निर्देशन में आए मलयालम फिल्म है 'माणिक्यकल्लु'। पृथ्वीराज, संवृता सुनिल, नेडुमुडिवेणु, सलिम कुमार आदि इस सिनेमा के प्रमुख पात्र हैं। यह फिल्म केरलीय गाँव 'वण्णामला' के एक सरकारी स्कूल की कहानी बताती है। विगत साल दसवीं कक्षा के विजय प्रतिशत लगभग शून्य के बराबर थी।

पढ़ने में बच्चों के लिए भी रुचि नहीं थी और पढ़ाने के लिए अध्यापकों को भी। हेडमास्टर से लेकर सभी अन्य अध्यापकों का 'साइड बिजनेस' भी था। छात्र भी रोज़ क्लास में आनेवाले नहीं थे। दुनिया भर का शरारत भी वे करते थे। इन परिस्थितियों में विनयचन्द्रन साहब का आगमन स्कूल में होता है। प्यार एवं हमदर्दी से वह छात्रों के दिल जीतता है। बच्चों के घर घर जाकर वह उनके मूल समस्याओं से वाकिफ होता है। विनयचन्द्रन के आदर्श से बच्चे भी प्रभावित होते हैं साथ-साथ अन्य अध्यापक भी उनके आदर्श का तारीफ करने लगते हैं। छात्रों में पढाई के प्रति रुचि जगाने वाले गुरु के कारण उस साल वण्णामला स्कूल को 100 प्रतिशत विजय भी मिलता है। पूरा गाँव झूम उड़ता है तथा भरे सभा में मंत्री महोदय के हाथों विनयचन्द्रन सर को नमाज़ा भी जाता है। शैक्षिक जगत में परिवर्तन को कैसे लाना है उसी थीम को लेकर सिनेमा दर्शकों से संवाद करती हैं।

शैक्षिक विमर्श के संदर्भ में अनुशीलन करने से कुछ समान तथ्य दोनों फिल्मों में देखने को मिलता है। जिसपर चर्चा आगे हो रही है।

### 1. अध्यापक मानसिकता

देश निर्माण में अध्यापकों की बड़ी भूमिका होती है। छात्रों को सही दिशा देना तथा राष्ट्र की भलाई के लिए उन्हें तैयार करने की जिम्मेदारी गुरु जनों की ही होती है। इसलिए उम्मीद किया जाता है कि अध्यापक लोग जाति, धर्म, राजनीति, भाषा, दिमाग आदि में स्वस्थ रहे। जब अध्यापक किसी का पक्ष लेने लगते हैं तो छात्रों में ध्रुवीकरण फैलने लगते हैं चूँकि इससे समाज को बहुत झटका भी लगती है। गुरु मानसिकता को तारे ज़मीन पर फिल्म में दर्शाया गया है। बोर्डिंग स्कूल के अध्यापक निकुंब से फरमते हैं “लेकिन इस स्कूल के बच्चों उन बच्चों जैसे नहीं हैं। तुलिप्स स्कूल में पढ़ाते हैं ना ? बच्चों को। भविष्य तो बनता नहीं है उन बच्चों का। इधर हम बच्चों को तैयार करते हैं। लाइफ के रेस के लिए। They have to compete, succeede, make a future.” वही अध्यापक उस स्कूल का शैक्षिक दर्शन का भी खुलासा करते हैं कि “हमारे विद्यालय के तीन सिद्धांत हैं- नियम अनुशासन, परीक्षण। सफलता के तीन स्तंभ। संपूर्ण शिक्षा का आधार।” इससे साफ-साफ ज़ाहिर है कि ये अध्यापक नौकरी प्राप्त कराने के उद्देश्य से अध्यापन को देख रहे हैं। बच्चों के सर्वांगीण विकास के लिए इस प्रकार के स्कूलों में कोई योजना ही नहीं देखने को मिलता। उनकी मानसिकता से पुतले को 'की' देकर चलाना शिक्षा का महत्वपूर्ण उद्देश्य है।

'माणिक्यकल्लु' में चित्रित वण्णामला सरकारी स्कूल के अध्यापक मानसिकता भी लगभग ऐसा ही है। स्वयं प्रधानाध्यापक विनयचन्द्रन से कहते हैं-“पूरे विश्व में अप्रचलित एक विशेषता इस स्कूल को है। वार्षिक परीक्षा के पहले पाठ्यक्रम को खतम करने के विचार न अध्यापक को है न कि पढ़ने का विचार विद्यार्थियों को है।” शिक्षा का मूल उद्देश्य ही यहाँ पर लड़गड़ाते हुए नज़र आती है। अध्यापकों को अपनी निजी पेशे से ज्यादा साईड बिजनेस पर दिलचस्पी है जिससे विद्यार्थियों में भी बुरा प्रभाव पड़ने लगा है। फिल्म में चित्रित कुछ संवादों के माध्यम से अध्यापक मानसिकता को हम पहचान सकते हैं। असीस सर और ढाबावाले का वार्तालाप है-

“ढाबा वाला :- आइए मास्टर । चलिये एक चाय पीते हैं ।

असीस :- नहीं चाहिए ।

ढाबावाला :- ऐसा है तो थोडा सोकर जाइए ना । वहाँ कोई नहीं आया है। स्कूल बन्द करने तक खाना-पीना-सोना ही है न काम ।”

पूरे फिल्म में असीस सर को ऐसा दिखाया गया है जिन्हें केवल खाने-पीने में ही रुचि हैं ।

फिल्म के दूसरा अध्यापक पवनन जी है जिन्हें नेनीकोण कंपनी के उत्पादों का विवरण का काम भी है । अपने एक ग्राहक के साथ उनकी बातचीत है -

“ग्राहक : आपको कोई दूसरा काम है ?

पवनन जी : ऐसा पूछे तो है । वण्णामला स्कूल है न । उधर का मास्टर हूँ। कोई फायदा भी नहीं है ।”

संवाद से तो ऐसा लगता है कि पवनन जी का साइड बिसनेस स्कूल का काम है । इस प्रकार के अनुशासन विहीन अध्यापक शैक्षिक जगत के लिए एक शाप ही है ।

## 2. आदर्श अध्यापक के रूप में निकुंब एवं विनयचन्द्रन

दोनों फिल्मों में आदर्शधीर अध्यापकों के रूप में निकुंब एवं विनयचन्द्रन जी का चित्रण किया गया है । विद्यार्थियों को केवल ज्ञान देने से ज्यादा उनके संपूर्ण व्यक्तित्व विकास में दोनों गुरुओं की रुची थी । निकुंब सर को पहले दर्शन से ही मालूम हुआ कि इशान की तकलीफ बाह्य नहीं है आन्तरिक है । इशान को डिस्लोकिसिया रोग की जानकारी मिलते ही वह उनके माता-पिता से मिलने के लिए जाता है । उनसे बातचीत करने के सिलसिले में निकुंब का शैक्षिक दर्शन वह व्यक्त भी करता है "जानता हूँ.....। बाहर एक बेरहम कॉपिटेटीव दुनिया बसी है । इस दुनिया में सभी को अपने अपने घरों में टोपेर्स और रेसेर्स उगाने है । हर किसी को अक्वल नंबर चाहिए । डॉक्टर, इंजीनियर, मानेजमेन्ट । इससे कम बरदाश्त ही नहीं है । 95.5%, 95.6%, 95.7% इससे कम तो गाली के बराबर है । क्यूँ ? अरे ज़रा सोचो । हर बच्चों की अपनी खूबी होती है । अपनी

काबिलियत होती है। अपनी चाहत होती है। लेकिन नहीं। हर उँगली को सींचकर लंबी करने में लगे है सब। लगे रहो। चाहे उँगली क्यूँ न टूट जाए।" एक आदर्श गुरु के नाते इशान की कमजोरियों के साथ उनकी खूबियों को भी निकुंब ढूँढ निकाले थे। निकुंब को अच्छा खासा मालूम था कि इशान को चित्रकला में रुचि है। यह एक अध्यापक की खूबी है कि उन्हें मालूम होता है कि छात्रों के ताकत किस क्षेत्र में है। अगर उन्हें उस दिशा की ओर अग्रसर करते हैं। तो महान प्रतिभाकारी के रूप में छात्रों का भविष्य भी उज्वल हो जाता है। ठीक विनयचन्द्रन जी में भी यही आदर्श आपको देखने को मिलता है। अपने शैक्षिक आदर्श को वह इस प्रकार व्यक्त भी करता है- "बुरे जगत के बुरे स्कूल के बुरे बच्चे है तो बहुत अच्छा है। वे बच्चे जब पास हो जाते है तो हम जीत जाते है ना ?"10 विनय जी साहसी गुरु थे। शिक्षा मनोविज्ञान का खूब प्रयोग करनेवाले गुरु भी थे। एक बार विनय सर का मज़ाक उठाने के लिए छात्र बषीर बोर्ड पर कार्टून चित्र बना लेता है। उनके इस हरकत पर गाली देने के बजाय विनय बषीर को वाटर कलर का बक्सा देकर उन्हें प्रोत्साहित कर देता है। यह घटना पूरे क्लास को प्रभावित करती है तथा समस्त छात्र विनय सर के स्नेहजाल में फस जाते हैं। पूरे क्लास का स्वर बषीर के मूँह में इस प्रकार गूँज रहा है "अब मुझे ही नहीं.....हमारे लिए सब कुछ आप ही है .....। पढना है, पास होना है, इसका एहसास आप ही ने हमें दिया था मास्टर। अम्मी और अब्बाजान ने बोला था कि आप को खुदा ने इधर लाये थे। बल्कि हमारे लिए आप ही है खुदा।" इससे साफ साफ स्पष्ट है कि विनय तो महान गुरु ही थे।

बच्चों में पढ़ने की रुचि जगाकर, उन्हें क्लास में लाकर, अनुशासनपूर्ण जीवन सिखाकर ये गुरु उन्हें पास भी करवाते हैं। विनयसर की एक छोटी सी चिंगारी को बच्चों ने बड़े आग के रूप में तब्दील किया।

विश्लेषण से प्राप्त तुलनात्मक निष्कर्ष है कि -

1. मूल्याधिष्ठित शिक्षा को आगे की दुनिया में लागू कर देना चाहिए।
2. शैक्षिक व्यवस्था में मानक शिक्षा (Standard education)के बदले विद्यार्थी के रुचियों

के आधार पर व्यवस्था परिवर्तन कर देना चाहिए ।

3. अंक के बदले सर्वांगीण गुणवत्ता (overall performance)के आधार पर छात्रों को स्कोर देना चाहिए । 4. अध्यापकों के प्रदर्शन को भी परखने के लिए साल भर में प्रदर्शन अंक (Performance score) को लागू कर देना चाहिए।

5. आधुनिक शैक्षिक तकनीकों से (जैसे बैजु ऐप) अध्यापक तथा छात्र अवगत हो ताकि शिक्षा की गुणवत्ता कायम रहे।

### **संदर्भ**

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## ममता कालिया और माधविकुट्टी की कहानियों में अभिव्यक्त लिंग समानता

जिबी . के.बी,

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प्राचीन समय में महिलाओं और पुरुषों को धार्मिक दृष्टि से समानता प्राप्त थी। हम सब अपने प्राचीन ग्रन्थों और साहित्य का अध्ययन करते हैं तो स्त्री पुरुष के मध्य अनेकों समानता दिखाई पड़ती है। उन्हें भेदभाव कम ही दिखाई पड़ता है। इस समय लैंगिक असमानता का प्रश्न ही नहीं उठता था। महिलाओं को जन्म से लेकर मृत्यु तक वे सभी अधिकार प्राप्त थे, जो पुरुषों को होते हैं, किन्तु कालान्तर में महिलाओं से वे अधिकार छीन लिये गये तथा पुरुष समाज का अधिनायक बन बैठा। इस अधिनायक वर्ग ने स्त्री जाती पर अनेक प्रतिबंध लगाये सम्भवतः इसी कारण से लिंग असमानता का दौर प्रारम्भ हुआ जो आज भी निरन्तर जारी है।

लिंग संरचना की असमान्यता का प्रमुख कारण प्राचीन समय की तत्कालिन घटना और रुढ़िवादिता का प्रसार है। इन रुढ़िवादी परम्पराओं को हमारा समाज आज भी तोड़ नहीं पाया है। आज भी समाज में, परिवार में सभी महत्वपूर्ण निर्णय लेने का अधिकार केवल पुरुषों को ही है।

हमारी सामाजिक व्यवस्था के तहत ही बच्चों की परवरिश के दौरान हम लैंगिक भेदभाव के बीज बो देते हैं। ये ही बीज आगे चलकर हमारे समाज में लैंगिक अपराध को जन्म देते हैं। लैंगिक असमानता कोई एक ही दिन में आ जानेवाली बुराई नहीं है। असल में इसका संबंध हमारे दृष्टिकोण और परवरिश से है।

ममता कालिया और माधविकुट्टी दोनों लेखिकाओं ने अपनी कहानियों में इस विषय पर तूलिका चलाई। ममता जी के इरादा नामक कहानी में नायिका शांति को अपने

घर जाके माँ को देखने के लिए पति और सास के सामने कितने कष्टपूर्ण प्रार्थना पडने की जरूरत आती है। एक स्त्री होने के नाते, पत्नी होने के नाते वह परिवार के अन्य सभी लोगों की अनुमति की अनुरोध करती है। पति ने उससे पूछता है -“ साल में कितनी बार तुम्हारी सवारी निकल करेगी, उसी हिसाब से कमाई किया करु ?”<sup>1</sup> | वहाँ भी शांति चूप कर आँखे भर खडती है।

माधविकुट्टी की कहानियों में दम्पत्य जीवन के परखें देखे तो नारियाँ इतनी चुप्पी नही जितना ममताजी की कहानियों की। यहाँ नारियाँ अपनी गुस्सा या जीवन की अतृप्ती पति के सामने प्रदर्शित करती है। इसी कारण से भी पति और पत्नि के बीच झगडा उठ जाती है। 'यजमानन्' नामक कहानी में माधविकुट्टी ऐसी एक नायिका का चित्रण किया है। नायिका अपना पति से प्यार मिलने के लिए उसके पीछे चिढ़ कर चलती जाती है। आत्माभिमान को भी छोडकर उसके छाती पर सिर रखकर प्यार के लिए रोती है। पूर्व स्मरणों का याद दिलाने की कोशिश करती है। लेकिन अपनी जिम्मेदारियों के कारण वह उनसे बात करने की, उसके साथ कुछ समय बिताने की कोशिश न करता है। दाम्पत्य जीवन में एक पुरुष की केवल एक रात्रिकालीन सम्पत्ति बनाने की इच्छा प्रकट न करती यह नायिका पति से हमेशा प्यार माँग रही है। इसलिए वह पिछे से पिछे चलकर पूछती है -“राजेन्द्रन, तुम क्यों मुझसे नाराज़ करते है, मैं ने क्या अपराध किया। इस तरह दाम्पत्य जीवन में समतुल्य स्थान प्राप्त करने के लिए कई नारियों को इन दोनों लेखिकाओं की कहानी में देख सकती है।

लडकियों को बचपन से शिक्षण करना अभि भी एक बुरा निवेश माना जाता है क्योंकि एक दिन उसकी शादी होगी और उसे पिता के घर को छोडकर दूसरे घर जाना पडेगा।

ममता जी की बिटिया नामक कहानी में मधुरिमा की शादी परिवारवालों ने तय किया। सच में मधुरिमा आगे पढने की चाह करती है और उसकी मन में एक प्रेमि भी है। लेकिन परिवारवालों के लिए वह सब छोडने की तैयारी होती है । शादि तय करने के बाद घर की

बड़ी बूढ़ियों ने कह दिया – “बड़े दिन की छुट्टियों के बाद मधुरिमा पढ़ने नहीं जायेगी। बहुत हो गया पढ़ना लिखना। अब पढ़ने से क्या फायदा । जिनकी चीज़ उनके पास । वे जाने उनका काम जाने । जवाब देना मधु जानती है पर जवाब देने से फायदा । अब जब सिर कढ़ाई में डाल ही दिया है तो तले जाने से क्या डर। उसका मन पाखी बस उड़ा जाता है । जाने कहां पंख फड़फड़ा कर वापस लौट आता है ।

माधविकुट्टी की “शिक्षा” नामक कहानी में इस विषय ही आती है पन्द्रह साल की लडकी रात के अन्धेरा में रो रोकर अपनी नानी के सामने लेटती है नानी रोने की कारण तलाश करते समय उसने दर्द से कहती है कि "में अच्छी तरह पठती थी तो मेरी शादी इतना जल्दी न किया होगा"4 नानी उसे लिपटकर कहती है -" लडकी है तो शादी करना जरूरत है। लडकियों को ज्यादा पढ़ने की ज़रूरत क्या है?"5 यही है हमारा समाज का दृष्टिकोण। कानून ने सबको एक ही अधिकार लिख देती है लेकिन समाज में कहीं यही लैंगिक आसमानता देख पाती है।

समाज को अकेली रहनेवाली नारियों को बुरी दृष्टि से देखने का आदत होती है। इसलिए अकेली रहनेवाली नारियाँ कितने भी आर्थिक दृष्टि से उच्च हो, कितने भी बोलुड हो, वह समाज की इसप्रकार आदतों डरती है।

'बिमारी' नामक कहानी में भाई और भाभी नायिका को देखने के लिए आते हैं जो बुखार से पीडित है। नायिका नौकरी के वजह से शहर में अकेली रहती थी। वह शादीशुदा लडकी न थी। भाभी ने बोली- “तुम कैसे गुजारा करती थी। कम से कम एक नौकर तो रहना चाहिए था। नायिका चुप रही । उन्हें बताना मुशिकल था कि अकेली लडकी के घर नौकर के साथ क्या क्या अफवाहें जूड़ जाती है।

'समय' नामक कहानी में एक अकेली रहनेवाली एक औरत की जिन्दगी बताती है। आंटी ने अपने घर में बाहर खुलनेवाले दरवाजे पर स्वचालित ताला लगवा रखा था। अकेले जीते जीते उन्हेंने एक प्रणाली विकसित कर ली थी। रात ठीक आठ बजे वे मुख्य दरवाजे पर

ताला लगा देती। जो भी आगन्तुक उनके पास उस वक्त बैठा होता उसे उठना ही पड़ता। वह ज़रा भी देर लगाता तो आटी कहती “अब आप जाएं। मेरे घर में रात आठ बजे के बाद लोग केवल उपग्रह चैनल से ही आ सकते हैं। नमस्ते” यहाँ नायिका को असुरक्षा की भावना से ज्यादा समाज की भावना को डर लगती है। इसप्रकार माधविकुट्टी 'ताण्डम्मा डिचरुटे पट्टि' नामक कहानी में समाज से डरी हुई जिन्द करनेवाली नारी की कहानी बताती है। टीचर अकेली रहने के कारण कोई उसे घर पर आना उसे पसन्द न करती है। एक सोलह साल लडका उसके पालतु कुत्ते देखने के लिए घर आने की अनुमति पूछते समय टीचर घबराती है। मन ही मन इनको इनकर करती है। लेकिन मुँह खोलकर बताने में अक्षम होती है। यह चित्र पाठक के सामने प्रस्तुत करने के लिए लेखिका कहानी के अंतिम भाग में इसप्रकार लिखा “ मैं टीचर की घर आऊँ?... क्या आपको पसन्द नहीं है? टीचर मुडकर उसे देखा और सिर हिलाती। उसके आँखों आसु से भर रहा था। यह वह सोलह साल का लडका आश्चर्य से देखा रहा।

लिंग असमानता को स्पष्ट रूप से चित्रित किया गया कहानी है माधविकुट्टी द्वारा लिखित 'लोककप्प'। इसमें एक औरत राष्ट्रीय जागरीकरण के लिए भाषण करने के कारण पुलीसवालों ने उसे लोककप्प में डाल दिया। वहाँ उसके साथ दो औरतें भी थी। वह दोनों वेश्याएँ थी। इनके बीच होनेवाली वार्तालाप से समाज के दृष्टिकोण और लिंग असमानता को समझ सकते हैं।

“मैंने सुना है, भाषण कर के कारण तुम्हें यहाँ ले लिया है। पेट भरने के लिए किसी के साथ लेटे तो भी हमें पर दोष है। हम औरत... क्या, कुछ कर भी तो, सब दोष हैं।

नायिका उसके जवाब के रूप में कह दिया कि 'मर्दों को भी पुलीसवालों पीडा करते हैं। “तब वह वेश्या की कहना इसप्रकार है। मर्दों पर पीड़ने की उन्हे इतना मस्ती न लगा होगा। हमें निर्वरत्र होकर दण्ड करना उन्हे ज्यादा पसन्द है। समाज में नारियों, अधिकार वर्ग से कैसे शोषित करते हैं। इनका खूला चित्रण इस कहानी पर होती है।

हालांकी हमारे धार्मिक विचार औरत को देवी का स्वरुप मानते है। लेकिन हस उसे एक इसान के रुप में पहचानने से ही मना कर देते है। हम देवी की पूजा करते है, पर लडकियों का शोषण करते है। जहाँ तक की महिलाओं के संबध में हमारे द्दष्टिकोण का सवाल है तो हम दोहरे मानवों का एक ऐसा समाज है जहाँ हमारे विचार और उपदेश हमारे कार्यों से अलग है।

यहाँ अपनी रचनाओं द्वारा ममता जी और माधविकुट्टी ने यह बताना चाहती है कि हम सभी अपने देश में लिंग समानता में सुधार केलिए जिम्मेदार है और हमारे परिवारों में महिलाओं केलिए बेहतर अवसरों को प्रोत्साहित करके शुरुआत करना चाहिए। पुरुष महिलाओं के बराबर व्यवहार करना सीखेंगे और महिलाएं आत्मविश्वास विकसित करेंगी।

1. ममता कालिया ममता कालिया की कहानियाँ (खंड -2) - पृ – 188
2. माधविकुट्टी : माधविकुट्टियुडे संपूर्ण कथकल – पृ – 64
3. ममता कालिया - ममता कालिया की कहानियाँ (खंड - 1) - पृ – 383
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# **Rural Entrepreneurship– Concept and Contribution of 'Rural Self Employment Training Institutes'**

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## **ABSTRACT**

*Various evaluation studies about self-employment schemes for the rural poor shows that due to lack of necessary skills for undertaking particular enterprises it is difficult for the BPL youth to take up any trade for self-employment. Even if they are already engaged in some trade they need some hand holding in the form of periodic doses of skill up-gradation training for making their initiative viable and sustainable in an increasingly competitive environment. This, among other factors, paved the way for the establishment of Banks-led Rural Self Employment Training Institute (RSETI) in 2009, in various districts of our country, with active cooperation from the state governments and lead banks, with a view to train unemployed rural youth of Below Poverty Line to become successful entrepreneurs. RSETIs are district level training institutes established and run by respective Lead Banks with financial support from MoRD, which impart skill development training to rural youth particularly from BPL families. The paper covers the genesis, its replications from 1980s as RUDSETI-type institutions, as a robust tool for endorsing rural entrepreneurship. It also includes an overview and analysis of data regarding the functioning of RSETI from 2009 to 2019.*

**Key Words:** *Entrepreneurial Development Programmes (EDP), Rural Self Employment Training Institute (RSETI), Rural Entrepreneurship.*

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## **INTRODUCTION**

Mahatma Gandhi has rightly quoted, ‘The real solution to the problems of this country is production by its masses and not mass level production’. Unemployment has been the biggest challenge faced by India since ages. Even then, in the earlier Five Year Plans, the need for self-employment was not recognized. Scarcity of physical capital and not less developed human resources, in the form of entrepreneurs, was considered as the reason for unemployment. Consequently, maximum emphasis was given to the development of physical capital. In the late sixties, the need and significance of developing entrepreneurs was recognized. In spite of its fast development in various fields, India remains to be slow in the development of its rural areas. One of the major reasons for rural poverty is unemployment, which is rising at an alarming rate. Rural unemployment and resulting rural poverty are among the core problems of Indian economy, as a majority of the Indian population lives in villages. Government, from time to time, launches various development programmes, especially entrepreneurial schemes for rural areas.

### **Literature Review**

Rural entrepreneurship is (Wortman, 1990), “the creation of a new organization that introduces a new product, serves or creates a new product, or utilizes a new technology in a rural environment”. A report published by Collaborative Economics (2005) defines an entrepreneur as “an individual engaged in the process of starting and growing one’s own business or idea”. To ensure the growth of rural entrepreneurship, despite all the inadequacies, the youth in rural areas should assess their strengths and build on them to make rural areas places of opportunities (Patel et al. 2013). Kumar (2016) also identifies that there is a need to promote self-employment for the unemployed rural youth, particularly those below the poverty line, and periodic talent upgradation to keep them well-informed of latest technologies. Once skilled appropriately, the youth would take-off cost-effective micro-enterprises, enriching their own standards of living and thereby adding to the overall national economy.

## **Entrepreneurship Development Programmes**

The Entrepreneurship Development Programmes (EDPs) identifies persons with entrepreneurship abilities and trains them systematically to strengthen their self-confidence, seize a business opportunity and initiate an enterprise. At the heart of this programme is Mc Clelland's 'achievement need theory' stating that entrepreneurial behaviour in individuals is associated with a high need to achieve. The basic approach of EDP is based on the theory that entrepreneurs are not only born but can also be trained and developed. Some individuals, irrespective of their socio-economic class, possess entrepreneurial traits like; the need to achieve, positive self-concept and self-confidence, initiative and independence, risk taking ability, leadership and creativity and problem solving traits with optimism about the future. The EDP strategy believes that such persons can be identified through psychological and behavioural tests, and can be trained to become full-fledged entrepreneurs. The main function of the EDP package is to strengthen the confidence of trainees in their own abilities to start a new business, impart skills and knowledge about finances, technology and managerial aspect of business; provide information and assistance for identifying a project area for formulating and implementing the project and for securing the required financial and technical assistance; and to help them in overcoming the problems of operating a new enterprise. Thus EDP is a result oriented programme in the sense that the budding entrepreneur is expected to set up a unit after the training.

The structure of a typical EDP involves three stages, namely, pre-training, training and follow-up. The pre-training phase is divided into two phases of promotional activities and selection of trainees. Promotional activities primarily aim at getting maximum cooperation from local support systems and maximum response from potential entrepreneurs. These activities involve understanding the local economy and society, establishing rapport with local population, leaders and organizations and establishing credibility of the organizations undertaking EDP training. After this phase, applications are invited from potential entrepreneurs, and some are selected for training after a written test and personal interview. The training consists of initial opportunity inputs (during which the trainees are helped, through interactions and discussions in selecting product) as well as three training modules, namely, achievement motivation, business opportunity guidance

and technical training, and management inputs. The post training stage consists of follow-up activity to help the trainees to set up their own units. During this phase, specific attention is paid to the individual problems of the trainees and efforts are made to resolve them. Follow-up is a crucial part of EDP as it aims at getting higher start-up rates.

The potential of EDP for rural areas is emphasized in various studies and the validity of rural EDPs for promoting rural entrepreneurs has been well established. Careful implementation of EDPs in rural areas including backward and tribal areas can yield highly positive results. There is a need to consider certain specific characteristics of the rural economy and of the rural poor while designing EDPs for rural areas. The government established RSETI in 2009 with the objective to identify, orient and motivate rural youth to take up self employment venture and to impart skill development training and assist the youth to go for micro enterprise as an alternative career.

### **RSETI**

Quoting M.K.Gandhi again, ‘The soul of India lives in its villages’. There is dire need to strengthen the villages through generation of effective livelihood. Due to lack of necessary skills for undertaking particular enterprises and not having capacity to access the formal vocational training institutions as they are short of basic entry qualifications, it is difficult for the rural BPL youth to take up any trade for self employment. Those who are already engaged in some trade or business also have a requisite of some hand holding in the form of periodic doses of skill up-gradation training for making their initiative viable and sustainable in an increasingly competitive environment. Linked to SGSY, an institute that gives basic orientation programmes in entrepreneurship was developed in 2009.

Rural Self Employment Training Institute(RSETI) are district level training institutes established and run by respective Lead Banks with financial support from MoRD, which impart skill development training to rural youth particularly from BPL families. Establishment of Banks-led RSETIs in each of the lead bank districts of our country, with active cooperation from the state governments is an innovative and ambitious project of the Ministry of Rural Development, Government of India, with a view to train unemployed rural youth of Below Poverty Line to become successful entrepreneurs.

## **Genesis of RSETI**

In the year 1982, Sri Dharmasthala Manjunatheswara Educational Trust (SDMET), Syndicate Bank and Canara Bank jointly took a unique initiative to start Rural Development and Self Employment Training Institute (RUDSETIs) under the visionary leadership by Dr. D. Veerendra Hegde to mitigate the problem of unemployment amongst rural youths by imparting skill development training. Encouraged by its successful value addition, MoRD viewed the RUDSETI as a replicable model, and proposed the establishment of similar type of institutions, thus decided to set up a RSETI in each district. RSETIs' vision is the transformation of youth into productive assets by short duration intervention. Its mission is to channelize the youth power into wealth through entrepreneurship and empower youth to share economic progress equitably. The philosophy of RSETI is that the entrepreneurship development can take place by short duration intervention, if appropriately premeditated. The EDPs do not start from "zero" level, as the aspiring trainees would have gained some experience in their real life and this serve as a launching pad for accelerated learning.

## **Key Position of Lead District Banks**

For setting up of RSETIs, state government, in consultation with the banks in SLBC, assign districts to the respective lead banks to set up RSETIs. There is single bank's sponsorship of the RSETI in a district to avoid any overlapping in management. This helps in branding of the RSETIs in future. Land for setting up the RSETIs is allotted to the concerned banks, free of cost, by the state government. The construction of the training centre building for the RSETIs is undertaken by the concerned bank. MoRD, Government of India provides one-time grant assistance to the RSETIs, up to a maximum of Rs. 1.00 crore, for meeting the expenditure on construction of building & furniture. This assistance is provided if bank already has land and wish to start a RSETI there. Till the time a suitable land is identified and the building is constructed, the RSETIs operate from hired premises. It provide support towards cost of training for rural BPL candidates to the sponsor banks depending on the duration. Additional recurring expenditures for the RSETIs, like that of the teaching expenses, trainers' remuneration, logistics, etc., are borne by the sponsoring banks or through other sponsoring organisations like SIDBI or NABARD.

RSETIs are headed by a director on deputation from sponsor bank with rural banking exposures, who preferably has the flair for training with aptitude for rural development activities. Supporting faculties and staff are hired either on deputation from the sponsoring bank or on contract basis. The banks appoint fresh rural development management graduates from organizations like NIRD and IRMA, etc. to assist the director in operationalising the training programmes, though the pay structure has not been found to be market-competitive. The rationale behind assigning the RSETI movement to banks is that banks are already into rural development and can professionally manage the institutes with transparency in accounting procedures.

### **Types of EDPs undertaken by RSETI**

There is common curriculum for all RSETIs with well structured course modules. Interface/experience sharing with successful entrepreneurs and extensive use of audio visual aids are also proposed. Confidence Building in the participants is done through a psychological approach. The services provided includes creating awareness on entrepreneurship, motivating youth to go for self-employment, developing positive attitude in youths, training to acquire hard/soft skill, linkage with Banks for financial help and handholding for establishment and successful running of enterprise. The EDPs undertaken are short term courses, which could be broadly classified as follows:

General EDPs – They comprise aspects like motivation, entrepreneurship, business selection, marketing, management skills and launching formalities.

Agricultural EDPs - They comprise agriculture based EDPs like agricultural and allied activities, horticulture, floriculture, aromatic and medicinal plants, dairying, sericulture, poultry, animal husbandry, nursery management, vermi composting etc.

Process EDPs - Process EDP modules comprise courses, which require lower investments - radio and television repair; pump set repair and motor winding, photography and videography, screen printing and lamination, aluminum fabrication, domestic electrical appliances repairs, mobile repairs, computer hardware, computer DTP etc.

Product EDPs - They comprise courses like dress designing, multi products manufacturing, woolen knitting, bag making, hand embroidery and fabric painting etc.

### **Right candidates - Targets and Methods**

RSETIs offer 30-40 skill development programmes in a financial year in various streams ranging from one to six weeks. It shall train a minimum of 750 candidates in a year. Minimum of 70% candidates should be from rural BPL families. It is expected that at least 70% candidates are settled in self employment. The sponsor Bank other Banks' Branches, other financial institutions, Govt. Departments and NGOs have close liaison with the RSETI in the district for generating applications for different training programmes. The calendar of training programme for the year shall be sent to all the concerned, well in advance. Past trainees of RSETIs serve as carriers of message by way of 'word of mouth'. Proper media coverage is given through the announcement of training calendar in the newspaper, radio & television. Entrepreneurship Awareness Camps are also conducted as a mass motivation method of creating awareness about the business opportunities.

### **The Performance**

The performance of RSETIs functioning throughout India has been evaluated yearly by the government. Table 1 show the highlighting factors which brings to light the significance of the scheme. The various features like number of programmes conducted, number of trainees, genderwise classification, the number of trainees who are got self-employed/wage-employed are depicted in the table. The significant elements are further detailed in graphs later in this paper.

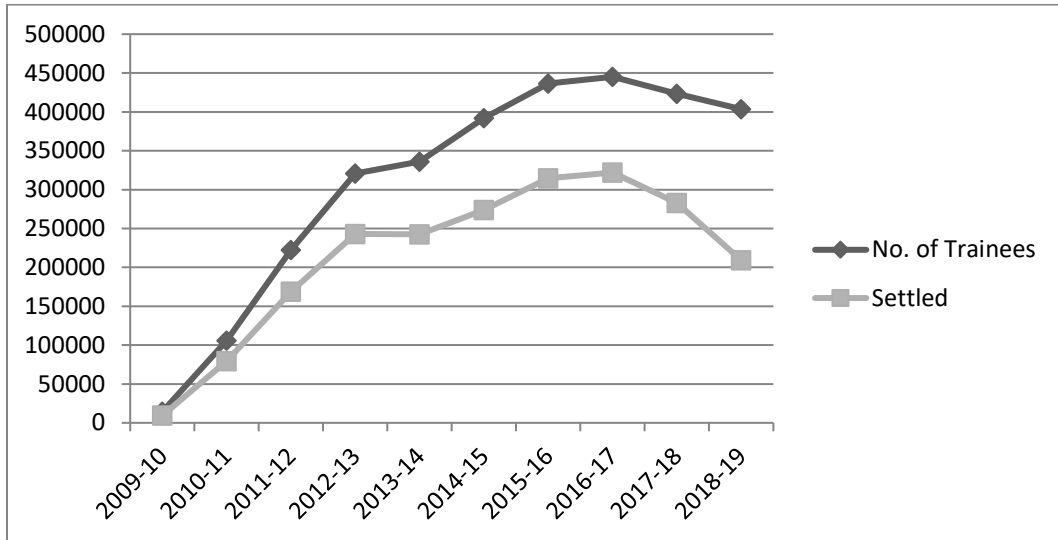
Table 1 - Year-wise Performance of RSETI (All India)

	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19
No. of programmes	551	3743	7750	10828	12062	14156	15911	16246	16280	14623
No. of Trainees	14352	105743	222454	320637	335904	392206	436385	445143	423343	403672
Male	6166	36650	66469	94052	124857	165162	180205	180535	166015	129445
Female	8186	69093	155985	226585	211047	227044	256180	264608	257328	274227
BPL	9246	71438	151979	215499	196286	209345	232252	236808	224620	244267
Settled	9434	79425	168748	243012	242383	273870	314428	321991	282764	209190
Self employed	7877	70861	148426	214455	210602	242773	286116	291481	263800	194048
Availed bank loan	1011	19593	47011	63512	52938	66969	94499	99502	108039	74580

Source: the office of RSETI

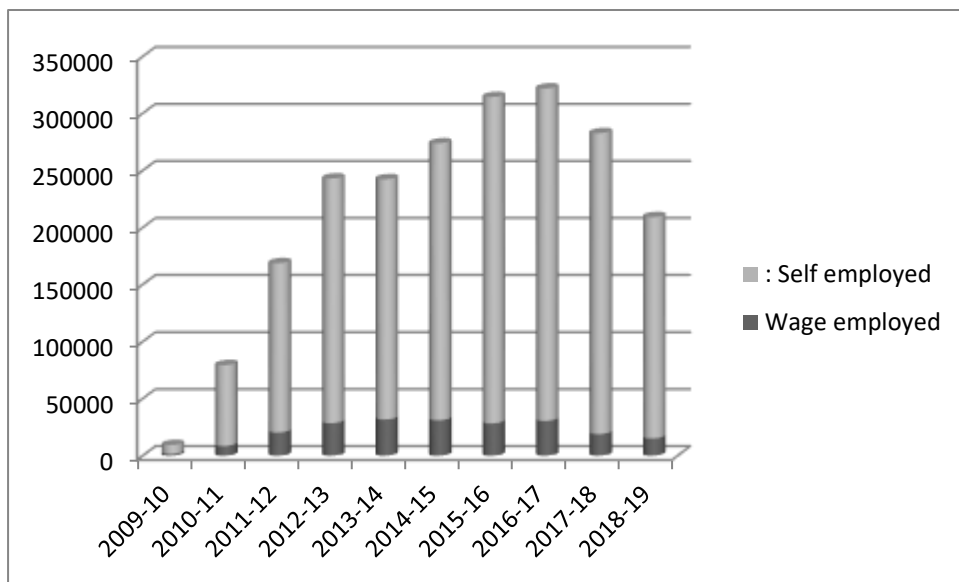
The Table 1 shows a steady increase in all the factors, undoubtedly showing that the RSETI is playing an obvious role in providing EDPs to the rural youth. The RSETIs' unique training model consists of short-term skill development classes for market-linked entrepreneurship development followed by unceasing hand-holding sustenance with bank linkages. By promoting self-employment for the rural youth, RSETIs discourage pressure-immigration to the towns for alternative source of revenue. Figure 2 shows that most of the trainees are settled, in all the years in the past decade. However, as Figure 2 portrays, not all the settled trainees are entrepreneurs, a few are settled with wage employment also. Nevertheless, the aim of promoting rural entrepreneurs is not compromised, as a big majority has proved to have received enough skill and confidence to move to self-employment itself, which could be comprehended from the area of section-bars in Figure 2.

**Figure 1 – Number of trainees and settled**



Source: compiled from data in Table 1

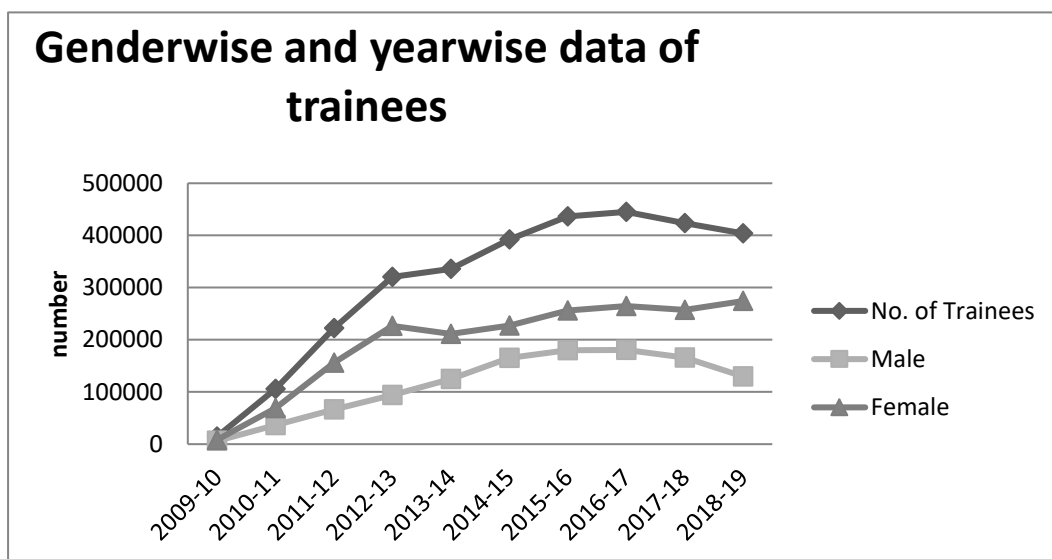
**Figure 2 – Number of trainees and settled**



Source: compiled from data in Table 1

RSETIs are also conducting women-tailored programmes so as to promote women to come to the economic mainstream, and Figure 3 unambiguously points out the success of the same. From 2010-11 onwards, the female trainees outnumber the male counterparts. This is a sign of women-empowerment achieved through RSETIs, which indicates that such government support programmes are conducive to form and nurture women entrepreneurs.

**Figure 3 -Genderwise and yearwise data of trainees**



Source: analysis from compiled data in Table 1

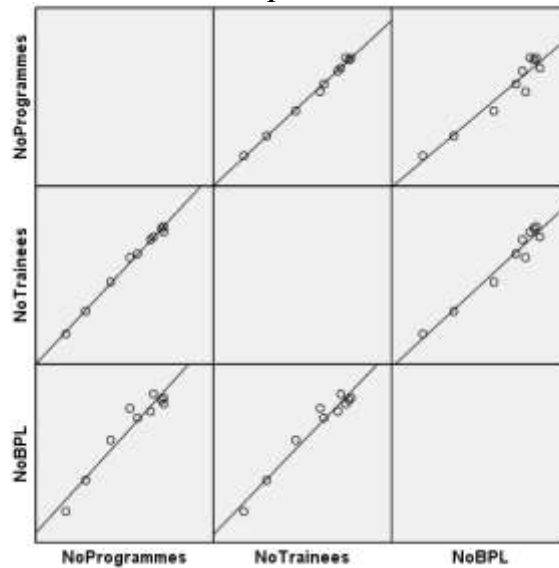
### **Data Analyses – Findings and Discussions**

Data Analyses was done using SPSS and thus checked whether any of the variables like number of Programmes, number of Trainees, or number of Trainees below poverty level would significantly predict the success of the programme, namely, the number of trainees who settled well due to the program.

The number of programmes and the number of trainees ( $r=.997$ ), the number of trainees and the number of trainees who were below poverty level ( $r=.977$ ), as well as the number of programs and the number of trainees who were below poverty level ( $r=.963$ ) were highly correlated, as illustrated in Figure 3 below. Thus, it is sufficient to use any one of the three variables as a predictor for

the outcomes. In order to be unbiased in our selection of the predictor, we will run the backward elimination process to find the predictor/predictors that optimally predicts the outcome variable.

**Figure 3: The correlation between the predictor variables**



Source: analysis from compiled data in Table 1

The backward elimination regression strategy was employed using SPSS. The most significant predictor for the number of trainees who were successfully settled trainees was the number of trainees enrolled in the programme each year ( $F(1,8)=116.9, p<.001$ ). (Refer Table 2 for details). Interestingly, the number of trainees enrolled in the programme is also an effective predictor of the variable, the number of trainees who became self-employed after the training programme ( $F(1,8)=147.8, p<.001$ ). (Refer Table 3 for details). In addition, the number of trainees was able to statistically significantly predict the number of wage-employed trainees too ( $F(1,8)=12.4, p=.008$ ). However, the number of programmes was the statistically significant predictor for the number of trainees who availed bank loans ( $F(1,8)=98.31, p<.001$ ). The details are displayed in the Tables 4, 5, and 6.

**Table 2: Coefficients<sup>a</sup> from the regression analyses for the number of successfully settled trainees**

Model	Unstandardized Coefficients		Std Coefficients	t	p	95.0% CI for B		Correlations			Collinearity Statistics	
	B	SE	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
(Constant)	16342.36	23154.64		.71	.507	-40315.00	72999.72					
1 NoProgrammes	-46.29	32.24	-2.51	-1.44	.201	-125.19	32.61	.96	-.51	-.13	.003	389.68
NoTrainees	2.90	1.52	4.24	1.90	.106	-.83	6.63	.97	.61	.17	.002	632.26
NoBPL	-1.02	.80	-.79	-1.27	.251	-2.97	.94	.94	-.46	-.11	.020	48.80
(Constant)	5140.50	22324.75		.23	.824	-47649.14	57930.14					
2 NoProgrammes	-16.28	22.87	-.88	-.71	.500	-70.35	37.80	.96	-.26	-.07	.006	180.25
NoTrainees	1.26	.85	1.85	1.49	.180	-.74	3.27	.97	.49	.14	.006	180.25
(Constant)	9319.55	20863.89		.45	.667	-38792.66	57431.77					
3 NoTrainees	.66	.06	.97	10.81	.000	.52	.80	.97	.97	.97	1.000	1.00

a. Dependent Variable: number of trainees who are self-Employed

**Table 3: Coefficients<sup>a</sup> from the regression analyses for the number of self-employed**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
(Constant)	12051.07	19726.93		.61	.564	-36218.99	60321.13					
1 NoProgrammes	-29.79	27.47	-1.77	-1.08	.320	-97.00	37.43	.97	-.40	-.09	.003	389.68
NoTrainees	2.12	1.30	3.41	1.64	.153	-1.05	5.30	.97	.56	.14	.002	632.26
NoBPL	-.80	.68	-.68	-1.17	.285	-2.47	.87	.94	-.43	-.10	.020	48.80
(Constant)	9614.060	19842.92		.49	.643	-37307.00	56535.12					
2 NoTrainees	.740	.25	1.19	2.98	.020	.15	1.33	.97	.75	.25	.044	22.57
NoBPL	-.257	.47	-.22	-.55	.600	-1.37	.852	.942	-.203	-.05	.044	22.571
(Constant)	4821.15	17020.13		.28	.784	-34427.34	44069.63					
3 NoTrainees	.61	.05	.97	12.16	.000	.49	.72	.97	.97	.97	1.00	1.000

a. Dependent Variable: number of trainees who are self-Employed

**Table 4: Coefficients<sup>a</sup> from the regression analyses for the number of wage-employed- Trial 1**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% CI for B		Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
(Constant)	4291.29	4644.27		.92	.391	-7072.84	15655.41					
1 NoProgrammes	-16.50	6.47	-8.72	-2.55	.043	-32.33	-.68	.75	-.72	-.44	.003	389.684
NoTrainees	.78	.31	11.07	2.54	.044	.03	1.53	.78	.72	.44	.002	632.264
NoBPL	-.22	.16	-1.63	-1.35	.226	-.61	.18	.79	-.48	-.23	.020	48.797
(Constant)	1903.49	4538.77		.42	.688	-8828.99	12635.98					
2 NoProgrammes	-10.11	4.65	-5.34	-2.17	.066	-21.10	.89	.75	-.64	-.39	.006	180.249
NoTrainees	.43	.17	6.10	2.49	.042	.02	.84	.78	.69	.46	.006	180.249

a. Dependent Variable: number of trainees who are Wage-Employed

**Table 5: Coefficients<sup>a</sup> from the regression analyses for the number of wage-employed- Trial 2**

Model	Unstandardized Coefficients		Std Coefficients	t	p	95.0% CI for B		Correlations			Collinearity Statistics	
	B	SE	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1 (Constant)	4498.41	5301.32		.85	.421	-7726.47	16723.28					
NoTrainees	.06	.02	.78	3.52	.008	.02	.09	.78	.78	.78	1.00	1.00

a. Dependent Variable: number of trainees who are Wage-Employed

**Table 6: Coefficients<sup>a</sup> from the regression analyses for the number of trainees who availed bank loans.**

Model	Unstandardized Coefficients		Standardized Coefficients	t	p	95.0% CI for B		Correlations			Collinearity Statistics	
	B	SE	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
(Constant)	-3082.30	8751.86		-.35	.737	-24497.34	18332.73					
1 NoProgrammes	20.41	12.19	3.29	1.67	.145	-9.42	50.23	.96	.56	.17	.003	389.68
NoTrainees	-.63	.58	-2.73	-1.09	.317	-2.04	.78	.95	-.41	-.11	.002	632.26
NoBPL	.18	.30	.41	.59	.577	-.56	.92	.91	.23	.06	.020	48.80
(Constant)	-1117.69	7705.14		-.15	.889	-19337.45	17102.08					
2 NoProgrammes	15.14	7.89	2.44	1.92	.097	-3.52	33.80	.96	.59	.18	.006	180.25
NoTrainees	-.34	.29	-1.49	-1.17	.282	-1.03	.35	.95	-.40	-.11	.006	180.25
(Constant)	-4062.92	7442.20		-.55	.600	-21224.65	13098.82					
3 NoProgrammes	5.96	.60	.96	9.92	.000	4.573	7.345	.96	.96	.96	1.000	1.00

a. Dependent Variable: Number of beneficiaries who availed Bank Loan

## CONCLUSION

The principal reason behind the success of RUDSETI model was the unflinching commitment of the sponsors to the cause of entrepreneurial development and the same shall continue in the RSETIs also. To reap a blessed harvest from the untapped human resource of rural India requires innovative and creative ideas like RSETI to be implemented. The findings will help the stakeholders to know various positive aspects and the need of scaffolding the rural entrepreneurship. The most important thing to do is to enrol more number of right candidates among the BPL youth to be trained into RSETI. A mass motivation-drive at grass-root level is essential. It is sure that the motivation from the positive results from such government initiatives will pave way for further increment in rural entrepreneurship, which in turn will lead towards contribution to national

income and higher human capital utilisation. It will be supportive for the numerous agencies to frame suitable plans and right policies to boost the rural entrepreneurship in India which may help to make the Indian rural economy as a critical force in worldwide scenario. Further study could be done, in-depth at the state-wise level, as the picture may vary from the whole country data, thus pointing out the specific needs and success stories.

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## **Challenges of Co-operative Banking – Profitability study of Alappuzha District Co-operative Bank Ltd**

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### **ABSTRACT**

*The financial situation of cooperative banks in India cannot be claimed to be sound at present. Many banks have become insolvent and others are on the verge of mergers or acquisitions. However, cooperative banks have made a commendable progress in extending its geographical spread and functional reach, still there is a huge decline in productivity, efficiency, erosion of profitability, unrealisable debts and increase in unviable branches in spite of Government help. Today, the cooperative credit institutions are facing a tough challenge to deliver on high expectations in a fiercely competitive credit environment. This Study is based on the Profitability of Alappuzha District Co-operative Bank Ltd. in this regard. It has used different ratios to analyse the Profitability position of the Bank. The study is based on both Primary and secondary data. The secondary data collected from the Annual Reports for a period of 10 years from 2003-04 to 2012-13 have been analysed with the help of Accounting ratios and Averages. By analysing the Profitability, it reveals the unsatisfactory position of the banking business.*

**Keywords:** *Profitability, Deposits, Borrowings, Spread, Return on Assets, Return on Equity.*

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### **INTRODUCTION**

Profitability reveals the bank's ability to earn a satisfactory profit and return on investment. The ratios are an indicator of good financial health and how effectively the bank managing its assets. Analysis of profits is used by the managers of the bank who employ ratios to help analyse, control, and thus improve the firm's operations; the credit analysts, such as bank loan officers or credit managers, who analyze ratios to help ascertain a bank's ability to pay its

debts; and shareholders, who are interested to know the bank`s efficiency and growth prospects.

### **Review of Literature**

1. Shachi Pareek (2012) has analysed the Profitability performance as a technique through which the overall efficiency of a financial institution can be analyzed. It is concerned with the income and expenditure analysis. It is carried out using two sets of ratios viz, Spread and Burden Ratios. Analysis of these two categories of ratio reveals the ability of banks to make profits. The Urban Co-operative Banks (UCBs) occupy a significant place in the Indian Co-operative Banking structure. But these banks are not able to increase their size due to lack of public confidence.
2. Feroze P.S. (2012) in his study employs Data Envelopment Analysis (DEA) to measure the efficiency of District Co-operative Banks in Kerala during 2005-2009. The empirical results of the study reveal that the level of efficiency in DCBs is 74 per cent and the magnitude of inefficiency is 26 per cent. 6 DCBs obtain efficiency score equal to 1 and formed the efficiency frontier. The sources of inefficiency in DCBs stem from both managerial inefficiency and inappropriate size. The study suggests potential improvements in the efficiency of inefficient DCBs in terms of potential reduction in inputs and potential addition to outputs.
3. Seema Sant; P.T Chaudhari (2012) in their study of The Profitability Of Urban Cooperative banks evaluates the performance of Urban Cooperative banks for the period 2004-2009. Financial ratios are employed to measure the profitability, liquidity and credit quality performance of Ten Urban Cooperative banks from Jalgaon and Greater Mumbai The study found that overall bank performance increased considerably in the years of the analysis. A significant change in trend is noticed at the onset of the global financial crisis in 2007, reaching its peak during 2008-2009. This resulted in falling profitability, less liquidity and deteriorating credit quality in the Indian Banking sector.

## **Research Gap**

By evaluating the review of earlier studies it points that a lot of studies about the District Cooperative Banks in India and Kerala has been done. The studies were based on the dimensions of Profitability, performance appraisal and cost effectiveness and credit plus approach. Hence, the study aims to analyse the solvency, profitability and operational efficiency of DCB and also the recovery of loans and advances. To examine these objectives the researcher focused on Alappuzha District Cooperative Bank Ltd. because by analyzing the annual reports of ADCB Ltd. the profit position of the bank has found to be fluctuating with an increase in overdues and NPA. There the researcher found a gap to analyse the Profitability position of ADCB Ltd. for a period of 10 years from 2003-04 to 2012-13 with the help of Accounting ratios.

## **Statement of the Problem**

The Alappuzha District Cooperative Bank Ltd. (ADCB Ltd.) was registered on 1st September 1958, with its head office at Allappuzha under Thirukochi Co-operative Societies Act 1952. The ADCB Ltd. is at the middle level of the three tier co-operative credit structure in Alappuzha District. At the time Individuals and societies were the members of the bank but that time due to the amendment in rules and regulations, individuals restricted from membership of the bank. At present, State government and co-operative societies are the shareholders of the bank. The review of literature also revealed that most of the banks in the Cooperative sector failed due to the increase in the overdues and Non performing Assets of the bank. In the case of Alappuzha District Cooperative bank Ltd. also the profit of the bank fluctuates year after year and the overdues and Non Performing Assets also increase. An overview of financial data of ADCB Ltd. during the period from 2003-04 to 2012-13, revealed that during this ten year period, six years the Bank was working on loss. It may be due to increase in cost of operation and increase in Non Performing Assets of the bank. In this situation it is felt necessary to conduct a study on the Profitability position of ADCB Ltd.

### **Objectives of the Study**

The present study on financial performance of Alappuzha District Cooperative Bank Ltd. is undertaken with the following specific objectives.

1. To analyse the profitability position of the ADCB Ltd.
2. To suggest suitable measures for the performance of ADCB Ltd.

### **Methodology**

Both Primary and Secondary data were collected and used for the study.

#### **Secondary Data**

Secondary Data required for the study were collected from the Published Annual reports of Alappuzha District Cooperative Bank Ltd. during the financial year ending 2003-04 to 2012-13.

#### **Primary Data**

Based on the analysis of secondary data personal interview was conducted with the Chief Accountant and Superintendents in Loans, Recovery and Planning sections in the ADCB Ltd. to get clarifications to arrive at meaningful inferences.

#### **Period of the Study**

In this study ten years financial data of ADCB Ltd., during the period from 2003-04 to 2012-13, were collected and used.

#### **Tools for Analysis**

The Secondary data collected were analysed with the help of Accounting ratios and Averages.

#### **Analysis of Profitability**

Profitability reflects the final result of banking operations. Profit earning is considered essential for the survival of the business. In the words of Lord Keynes, "Profit is the engine that drives the business enterprise". Banks need profit not only for its existence but also for expansion and diversification. Being a ratio, Profitability is a meaningful measure and can be used as an effective standard to

analyses the overall efficiency of an organization. Profitability ratio analysis is widely used by managers, creditors and investors, and its operations. To assess the profitability position of the bank five ratios have been computed for ten years period ranging from 2003-04 to 2012-13.

### 1. Ratio of Profit to Total income

Profit denotes the Net profit shown on the debit side of profit & loss account year after year and the Total income is the income received by the bank in the form of Interest on Loans & Advances, Interest on Investments, Brokerage, Commission & Exchange and other receipts. So the Total Income includes the amount shown on the credit side of Profit & loss account after deducting the losses if any.

$$\text{Ratio of Profit to Total income} = \frac{\text{Profit}}{\text{Total Income}} \times 100$$

<b>Table 1</b>			
<b>Ratio of Profit to Total Income</b>			
<b>(2003-04 to 2012-13)</b>			
<b>(Rs. in Lakhs)</b>			
<b>Year</b>	<b>Profit/Loss</b>	<b>Total Income</b>	<b>Ratio(%)</b>
2003-04	19.24	5626.11	0.34
2004-05	-585.31	4618.40	-12.67
2005-06	110.24	7459.01	1.48
2006-07	352.71	5663.26	6.23
2007-08	-575.44	6474.52	-8.89
2008-09	-54.76	7810.00	-0.70
2009-10	-480.71	9833.15	-4.89
2010-11	-1861.54	11313.91	-16.45
2011-12	750.08	14966.57	5.01
2012-13	-261.65	16640.08	-1.57
<b>Average Ratio</b>			<b>-3.71</b>

Source: Compiled from Annual Reports of ADCB Ltd.

Table 1 reveals the ratio of Profit to Total Income. In the year 2003-04 the bank shows a profit of Rs. 19.24 lakhs but in the year 2012-13 it became a loss of Rs. 261.65 lakhs. The Total income of the bank increased from Rs. 5,626.11 lakhs

in 2003-04 to Rs. 16,640.08 lakhs in 2012-13. The ratio in 2003-04 is 0.34% and in the year 2012-13 it is -1.57%. The overall performance of the ratio shows a fluctuating trend. The average ratio for the ten years is -3.71%. By analysing the performance of the bank in the year 2011-12 it shows an increasing trend compare to other years. This is because the NPA arrear collection was in an increasing position in that year but due to several internal issues that is termination of managing committee and the rule of arbitrator which further decrease the profitability of the bank.

## 2. Ratio of Profit to Total Deposits and Borrowings

Profit is considered as a percentage of Total Deposits. People deposit their amount only if they receive a safe return. Deposits include savings deposit, Current Deposit & Fixed Deposit and Borrowings means the borrowings of the bank from RBI, from State Cooperative Bank and Subsidiaries and from State Government.

Ratio of Profit to Total Deposits and Borrowings

$$= \frac{\text{Profit}}{\text{Total Deposits \& Borrowings}} \times 100$$

<b>Table 2</b>					
<b>Ratio of Profit to Total Deposits and Borrowings</b>					
<b>(2003-04 to 2012-13)</b>					
Year	Profit/Loss	Deposits	Borrowings	Total	Ratio (%)
	1	2	3	2+3	
2003-04	19.24	35475.44	1793.01	37268.5	0.05
2004-05	-585.31	37882.25	3801.13	41683.4	-1.40
2005-06	110.24	45137.11	5117.17	50254.3	0.22
2006-07	352.71	51709.46	8162.13	59871.6	0.59
2007-08	-575.44	65027.82	7022.01	72049.8	-0.80
2008-09	-54.76	83371.55	7881.85	91253.4	-0.06
2009-10	-480.71	114946.90	1088.04	116035	-0.41
2010-11	-1861.54	121337.71	10241.14	131579	-1.41
2011-12	750.08	135817.67	13513.52	149331	0.50
2012-13	-261.65	152709.67	20126.51	172836	-0.15
Average Ratio					-0.29

Source: Compiled from Annual Reports of ADCB Ltd.

Table 2 Ratio of Profit to Total Deposits and Borrowings depicts that the profit position of the bank is in a fluctuating trend. In the year 2003-04 the bank had Rs. 19.24 lakhs profit which became a loss of Rs. 261.65 lakh in the year 2012-13. But the Deposits and Borrowings of the bank shows an increasing trend. The deposits increased from Rs. 35,475.44 lakhs in 2003-04 to Rs. 1, 52,709.67 lakhs in 2012-13. The Borrowings also increased from Rs. 1,793.01 lakhs in 2003-04 to Rs. 20126.51 lakhs in 2012-13. The ratio of Profit to Deposits and Borrowings also showed a fluctuating trend. The ratio in the year 2003-04 was 0.05% which decreased to -0.15% in 2012-13. The average ratio for the period is -0.29%. The analysis reveals that the bank utilized its Deposits for the issue of Loans but the recovery measures should be efficiently implemented otherwise it would affect the profit position of the bank due to the creation of provisions for non performing assets.

### **3. Ratio of Profit to Spread**

Profit is the Net profit for the year whereas Spread is the difference between the interest earned which is an income of the bank to interest paid which is an expense. While calculating Spread the non interest items are not included.

$$\text{Ratio of Profit to Spread} = \frac{\text{Profit}}{\text{Spread}} \times 100$$

<b>Table 3</b>					
<b>Ratio of Profit to Spread</b>					
<b>(2003-04 to 2012-13)</b>					
<b>(Rs. in Lakhs)</b>					
<b>Year</b>	<b>Profit/Loss</b>	<b>Interest Earned</b>	<b>Interest Paid</b>	<b>Spread (IE - IP )</b>	<b>Ratio (%)</b>
2003-04	19.24	4,010.93	2,750.52	1,260.41	1.53
2004-05	-585.31	4,037.49	2,510.22	1,527.27	-38.32
2005-06	110.24	4,237.73	2,806.60	1,431.13	7.70
2006-07	352.71	4,251.37	3,102.94	1,148.43	30.71
2007-08	-575.44	5,458.90	4,257.56	1,201.34	-47.90
2008-09	-54.76	6,660.57	5,693.62	966.95	-5.66
2009-10	-480.71	9,262.63	7,254.48	2,008.15	-23.94
2010-11	-1861.54	10,966.03	9,188.31	1,777.72	-104.72
2011-12	750.08	13,717.13	11,194.07	2,523.06	29.73
2012-13	-261.65	15,933.76	13,296.75	2,637.01	-9.92
<b>Average Ratio</b>					<b>-16.08</b>

Source: Compiled from Annual Reports of ADCB Ltd.

Table 3 Ratio of Profit to Spread points that the Interest earned increased from Rs. 4010.93 lakhs in 2003-04 to Rs. 15,933.76 lakhs in 2012-13. The Interest paid increased from Rs. 2,750.52 lakhs in 2003-04 to Rs. 13,296.75 lakhs in 2012-13. So the difference between Interest earned and Interest paid that is Spread shows a fluctuating trend but it is positive. That is the Bank has enough income to make its payments. But then also the bank is not in a profitable position because the loan given by the bank to kudumbasree for the construction of houses that is upto Rs. 2 Crores which collected at a concessional rate that is notice charges and 3% of original rate were deducted from the rate of loans to be collected, as per the norms of the state government, made the bank in a loss position.

#### **4. Ratio of Return on Assets**

Assets are the items shown on the Asset side of the Balance sheet excluding the accumulated losses if any. The items include Cash, Investments, Investments out of Principal Subsidiary State Partnership Fund which is the share of Central Cooperative Banks and Primary Agricultural Societies, Loans and Advances, Interest Receivable, Bills Receivable, Premises, Furniture & Fixtures

and Other Assets less Accumulated losses if any. Profit means the Net profit shown on the Debit side of Income Statement.

$$\text{Ratio of Return on Assets} = \frac{\text{Profit}}{\text{Assets}} \times 100$$

<b>Table 4</b>			
<b>Ratio of Return on Assets</b>			
<b>(2003-04 to 2012-13 )</b>			
<b>(Rs. in lakhs)</b>			
<b>Year</b>	<b>Profit</b>	<b>Total Assets</b>	<b>Ratio(%)</b>
2003-04	19.24	43336.28	0.04
2004-05	-585.31	49063.03	-1.19
2005-06	110.24	57147.12	0.19
2006-07	352.71	67304.44	0.52
2007-08	-575.44	78572.51	-0.73
2008-09	-54.76	97780.97	-0.06
2009-10	-480.71	121914.65	-0.39
2010-11	-1861.5	136973.61	-1.36
2011-12	750.08	155215.01	0.48
2012-13	-261.65	179680.45	-0.15
<b>Average Ratio</b>			<b>-0.26</b>

Source: Compiled from Annual Reports of ADCB Ltd.

Table 4 Ratio of Return on Assets depicts that the Total Assets increased from Rs. 43,336.28 lakhs in 2003-04 to Rs. 1, 79,680.45 lakhs in 2012-13. The Total Assets show an increasing trend throughout the period. The Profit position of the bank shows a fluctuating trend. More years of the bank are in Loss. The ratio decreases from 0.04% in 2003-04 to -0.15% in 2012-13. The average ratio for the period is -0.26%. This position of the bank is due to the issue of loans at concessional rate but the state government denied from the reimbursement of such loans.

## **5. Ratio of Return on Equity**

Equity means the Networth of the Bank. The Networth includes Sharecapital , Reserves and Surplus excluding Accumulated Losses if any. The formula used to calculate the Networth of the bank is

$$\text{Ratio of Return on Equity} = \frac{\text{Profit}}{\text{Networth}} \times 100$$

$$\text{Networth} = (\text{Sharecapital} + \text{Reserves \& Surplus}) \pm \text{Accumulated Profit / Loss}$$

<b>Table 5</b>						
<b>Ratio of Return on Networth</b>						
<b>(2003-04 to 2012-13)</b>						
(Rs. in Lakhs)						
Year	Profit/Loss	Sharecapital	Reserves & Surplus	Accumulated Profit/Loss	Networth	Ratio(%)
		1	2	3	(1+2 ± 3)	
2003-04	19.24	612.29	2430.94	32.34	3075.57	0.63
2004-05	-585.31	643.48	2086.51	11.14	2741.13	-21.35
2005-06	110.24	711.1	2192.05	-475.06	2428.09	4.54
2006-07	352.71	729.52	2310.52	-122.35	2917.69	12.09
2007-08	-575.44	723.28	2685.48	-697.79	2710.97	-21.23
2008-09	-54.76	761.05	2858.15	-752.56	2866.64	-1.91
2009-10	-480.71	750.76	3312.94	-1233.27	2830.43	-16.98
2010-11	-1861.54	806.98	3770.08	-3094.82	1482.24	-125.59
2011-12	750.08	1608.39	3576.74	-2344.73	2840.4	26.41
2012-13	-261.65	1631.17	4318.18	-2606.38	3342.97	-7.83
AverageRatio						-15.12

Source: Compiled from Annual Reports of ADCB Ltd.

Table 5 points that the Net worth of the bank in the year 2003-04 is Rs. 3,075.57 lakhs but in the year 2012-13 it increase to Rs. 3,342.97 lakhs. But the overall performance of the bank shows a decrease till the year 2010-11 that is Rs. 1,482.24 lakhs but then it increase. The Share capital increase from Rs 612.29 lakhs in 2003-04 to Rs 1,631.17 lakhs in 2012-13. The Reserves & Surplus also shows an increasing trend from Rs. 2,430.94 lakhs in 2003-04 to Rs. 4,318 lakhs in 2012-13. The average ratio for the period is -15.12%. For each loans issued to the societies an amount equal to 2% of loans should be taken in the form of shares by the societies, which increase the amount of share capital. Due to increase in Establishment cost that is the computerization of the bank, building construction and increase in the salary scale of the employees which affect decrease in the profit of the concern.

### **Findings of the study**

- The ratio of Profit to Total Income shows a fluctuating trend. The average ratio for the ten years is -3.71%. By analysing the performance of the bank in the year 2011-12, shows an increasing trend compared to other years. This is because the NPA arrear collection was in an increasing position in that year, but due to several internal issues that is termination of managing committee and the rule of Arbitrator which due to further decrease in the profitability of the bank.
- The ratio of Profit to Deposits and Borrowings also shows a fluctuating trend. The average ratio for the period is -0.29%. The analysis reveals that the bank utilised its Deposits for the issue of Loans but the recovery measures were not efficiently implemented, and it affects the profit position of the bank. It increases nonperforming assets and forced the bank to provide additional provisions.
- Ratio of Profit to Spread points the Bank have adequate income to cover its payments. But the bank is not in a profitable position because the loan of Rs. 2 Crores was given to kudumbasree for the construction of houses were collected in a concessional interest rate as per the instructions of the state government. The 3% concession from the actual interest rate and concession in short collection notice charges and delay of repayment left the bank in loss position.
- Ratio of return on assets depicts that the position of the bank in fluctuation. The average ratio for the period is -0.26%. This position of the bank is due to the issue of loans at concessional interest rate but the state government denied the reimbursement of such loans.
- The Average Ratio of Return on Net worth for the period is -15.12%. For each loan issued to the member societies were made an increase of 2% share capital on behalf of the respected member society. But due to increase in Establishment cost and administrative cost were affect the profit position of the Bank was affected.

## CONCLUSION

Alappuzha District Cooperative Bank Ltd. is a bank which is situated at the coastal region. The bank functions for the upliftment of the member societies and individuals. This determination made the bank to issue different kinds of loans. But delay in the repayment or non recovery of loans place the bank in diminution. The bank should not decide to pursue the debt of member societies and individuals. The retrieval measures adopted by the bank should force the individuals and member societies to pay back the loans. This will help the bank to be in a profitable state.

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## **Attitude of employees towards merger of dcbs with kscb to kerala bank with special reference to ernakulam district**

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### **ABSTRACT**

*The Kerala Govt.'s long pending dream of setting up its bank, by merging District Co-operative bank is all set to become a reality with RBI giving a final nod for the move. Co-operative bank merges with KSCB for forming the so called Kerala Bank. Through the scheme of amalgamation Kerala bank will be able to provide all the services which are offered by nationalized banks and it will also become the second largest bank in Kerala after SBI. In this study we focus on the attitude of employees in co-operative banks towards the forthcoming Kerala bank. One of the biggest challenges for the upcoming entity will be in relation to human resource issues. The problem of integrating the staff is likely to become cumbersome. There are bound to be questions over job security, transfers, and promotions of employees. The study recommends that due diligence should be adopted to improve the confidence level of employees and wipe out the fear and discomfort of anxiety about the upcoming venture.*

**Keywords:** Kerala Bank, District Co-operative Banks, Kerala State Co-operative bank, Employees.

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### **INTRODUCTION**

The Kerala Bank is all set to become a reality. The Reserve Bank of India has given the final nod to the Kerala Government to set up a bank of its own by merging the district cooperative banks to the state cooperative bank. The move has the potential to transform the banking sector of the state. The Kerala bank will be the largest banking network in the State, the formation of which was one of the promises in the election manifesto of the Left Democratic Front (LDF).

The District Cooperative Banks of all the districts in the state, barring the Malappuram District Cooperative Bank had approved the Governments amalgamation scheme. Kerala Bank is the state's only own bank since the State Bank of Travancore cease to exist. The advantage in the initial phase for Kerala Bank, is that an amalgamation of the District Cooperative Banks, the investment base will be transferred into new bank intact. Kerala has one of the most established and strong networks when it comes to cooperative banking systems the country.

In the beginning itself, there will be a wide network under Kerala bank as it would be functioning along with the Primary Cooperative Societies. The Cooperative sector in the state has gained a lot of trust and support of the people over the years. People are convinced that there is no risk in investing in Kerala Bank- the deposits of the cooperative banks would come to the Kerala bank. There is a trust based for the cooperative movement as a whole and its strong client base would also work in favor of the Kerala Bank. Once it has become a single bank the economies of scale will work to bank's advantage. Multiple banking operations will be done away with. There will be a common management, single software and only one contact to deal with various agencies. Further, issuance of credit or debit cards will become easier and so will the arrangements with other banks. With a single bank dealing with the customers will also become much easier.

## **STATEMENT OF THE PROBLEM**

Banks are the most important service sector in the economy advancement in technology has resulted in innovation of alternative banking channels. An employee is an important factor in each and every bank. Their physical and mental efforts are used in the day to day working of banks. The study seeks to know the attitude of employees towards the formation of Kerala bank.

## **SCOPE OF THE STUDY**

The study on attitude of employees towards the merger of DCB's with KSCB to Kerala Bank is limited to Ernakulam district only. The study aims to bring out various opportunities and challenges going to be faced by the employees during formation of Kerala Bank. The study also reveals whether the employees are happy with its formation.

## **OBJECTIVES OF THE STUDY**

- Attitude of employees towards the formation of so called Kerala Bank
- Opportunities and challenges to be faced by employees during the formation stage

## **RESEARCH METHODOLOGY**

To perform the present research work the study has concentrated on both primary and secondary data.

### **Sampling technique**

For collecting primary data from the employees of cooperative banks in Ernakulum District, purposive sampling and snowball sampling methods are adopted.

### **Sample size**

Sample size is 30

### **Data collection**

The primary data of the research was collected through a structured questionnaire. Various sources like data published by the cooperative banks, information collected from print media like newspapers and journals, information available in the internet etc are collected.

## **LIMITATION**

- The area of the study is limited to the geographical limits of Ernakulam district.
- The findings may differ with higher sample size.
- The employees attitude and opinion may change so that the future relevance of study cannot be assured.
- Reliability of the study depends greatly on the information provided by the respondents. The personal bias of the respondent is another limit factor.

**ANALYSIS AND INTERPREATION**

**Table 1: Analysis of Demo-graphic Factor**

<b>Demo graphic Factors</b>	<b>Variable</b>	<b>No. of respondents</b>	<b>Percentage</b>
<b>Gender</b>	Male	14	47
	Female	16	53
<b>Age</b>	20-30	14	46
	31-40	11	37
	41-50	3	10
	Above 50	2	7
<b>No. of years Service</b>	Below 5	18	60
	5-10	7	24
	10-20	4	13
	Above 20	1	3

Source: primary data

The above table shows that out of 30 respondents 14 are male and rests are female. Most of the respondents belong to the age group of 20 to 30 .majority of the employees comes under the below 5 year service in co operative sector.

**Table no 2: Awareness about Kerala Bank**

<b>Level of Awareness</b>	<b>No. of Respondents</b>	<b>Percentages</b>
Fully Aware	8	27
Moderately	15	50
Not much	7	23

Source: primary data

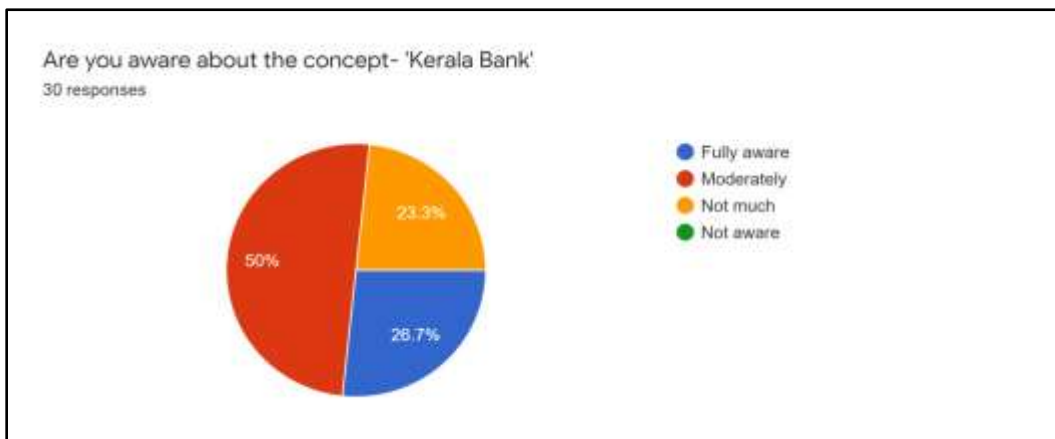


Figure no: 1

Majority of the respondents are moderately aware about the concept of Kerala bank i.e. 50%. 27% are fully aware and 23% are not much aware.

**Table no: 3 Attitude towards formation of Kerala Bank**

Attitude	No. of Respondents	Percentages
Yes	27	90
No	3	10

Source: primary data

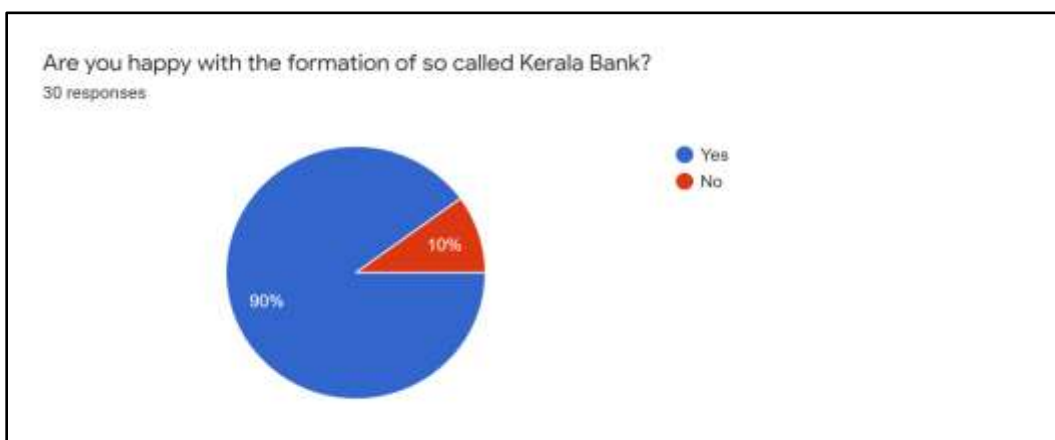


Figure no: 2

90% of the respondents are happy with the formation of Kerala bank.

**Table no: 4 Analysis of Various opportunities expected**

<b>Opportunities</b>	<b>No. of Respondents</b>	<b>Percentage</b>
Professionalized working environment	11	37
Better pay and benefits	9	30
Job security and advancement	6	13
Better management and culture	4	20

Source: primary data

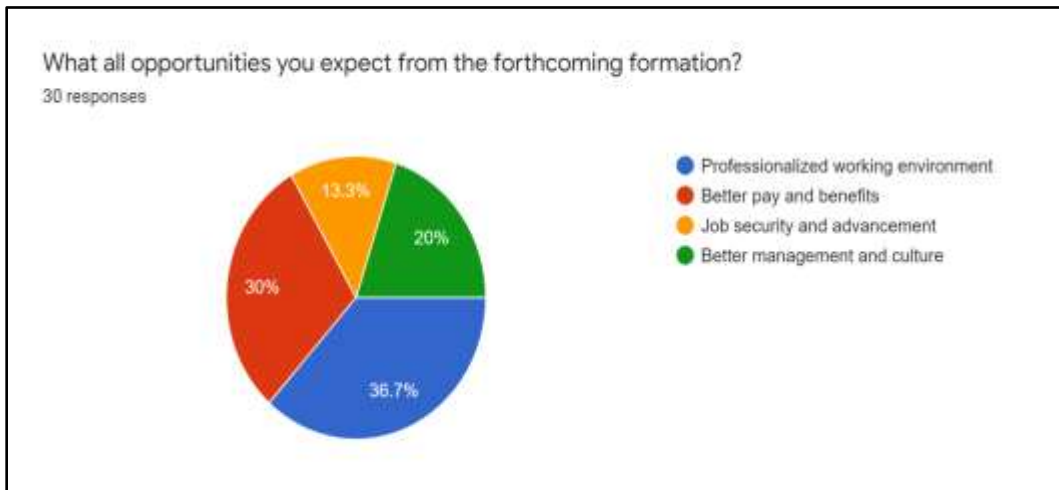


Figure no: 3

37% of the respondents consider professionalized working environment is the opportunity available for them with regards to Kerala bank. 30% considers better pay and benefits. 20% considers better management and culture and only 13% have an opinion of job security and advancement.

**Table no: 5 Analysis of additional support**

<b>Additional Support</b>	<b>No. of Respondents</b>	<b>Percentage</b>
Skill development programme	11	37
Technological advancement sessions	9	30
Culture of continuous learning	7	23
Higher compensation	3	10

Source: primary data

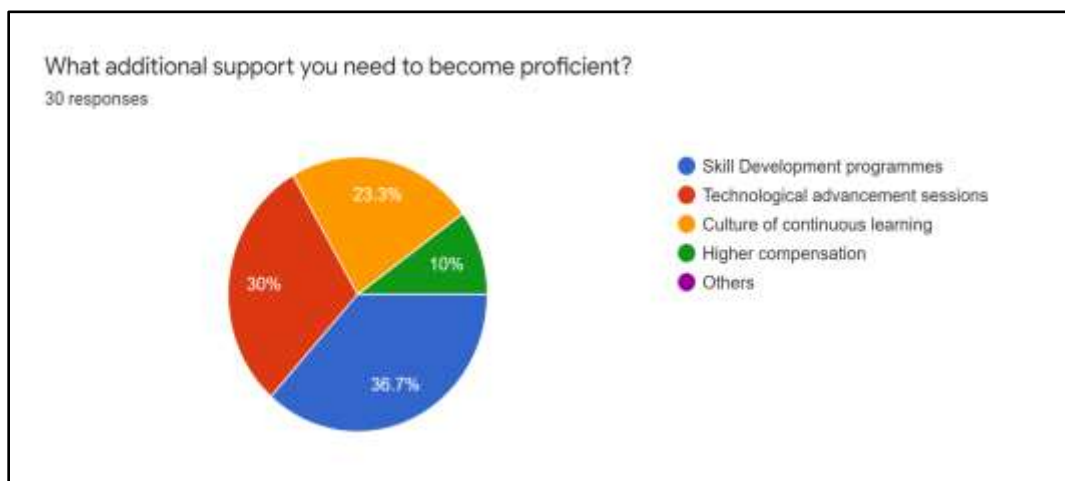


Figure no: 4

37% of respondents said that they need skill development programs to become proficient, 30% need technological advancement sessions.

**Table no: 6 Analysis of Major challenges**

Challenges	No. of Respondents	Percentage
Increase in workload	17	37
Difficulty in adapting new work environment	11	57
Transfer	2	6

Source: primary data

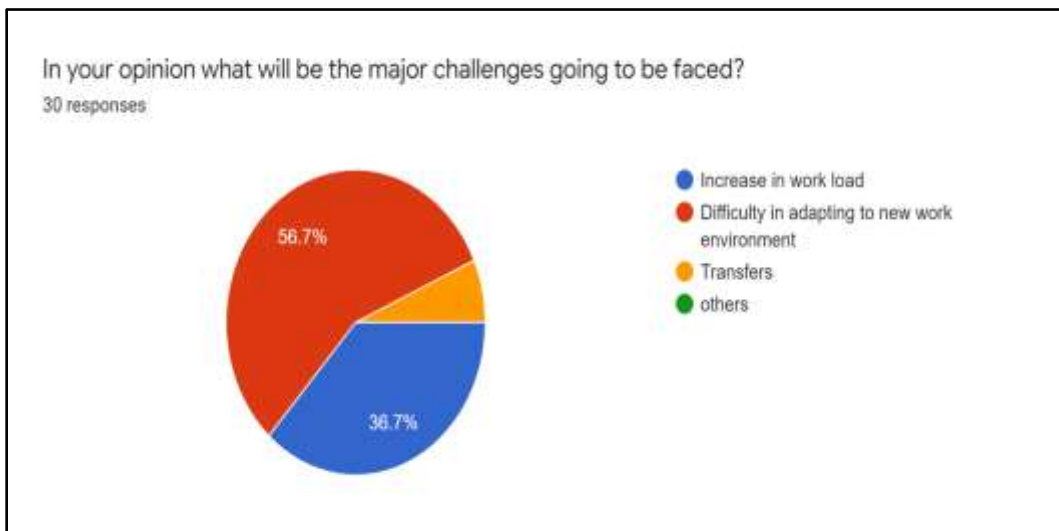


Figure no: 5

Most of the respondents said that difficulty in adapting new work environment is considered the major challenge they are going to face i.e. 57%. 37% considers increase in workload is the major challenge, only 7% considers transfer as a major challenge.

**FINDINGS**

- Only 27% are fully aware of the concept of Kerala bank, 50% are moderately aware and 23% are not much aware.
- 90% of the respondents are happy with the formation of bank.

- 37% of respondents consider professionalized working environment is the opportunity available for them after the formation of Kerala bank. 30% considers better pay and benefit.
- Majority of the respondents have an opinion that they have the skill to be proficient at the new bank.
- For becoming proficient, 37% of respondents said that they need skill development program to become proficient at work, 30% need technological advancements.
- Most of the respondents said that difficulty in adapting to new work environment is the major challenge they are going to be faced i.e. 57%

### **SUGGESTIONS**

- Proper awareness programs should be conducted among the employees.
- Skill development programs and technological sessions included should be in their work schedule to enhance their knowledge and skills.
- Make the employees comfortable in the new work environment.

### **CONCLUSION**

With the formation of Kerala bank, it will become the largest banking network in the state. Experts claimed that objective of the formation of Kerala bank was to strengthen the co-operative sector. Our study reveals that majority of the respondents are happy with the formation of Kerala bank by merging District Co-operative banks with Kerala state Co-operative bank. They feel that the so called amalgamation will enable a more professionalized working environment and strengthen their skills and abilities. In their opinion the major problem to be faced is to adapt to the new environment. If the government can overcome these challenges effectively, Kerala bank may become one of the most promising venture which cater to the needs of the public as well as strengthen its own workforce.

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## **A study on the service quality of SBI with special reference to ernakulam district**

**Fifty Joseph<sup>1</sup>, Vishnu P.M<sup>2</sup>**

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Cochin-2*

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### **ABSTRACT**

*Banking sector has a leading role in the economy. So it gives financial support to other sectors in the economy. In the current era, banking sector has more importance than other sectors. And in this sector, one of the leading public sector banks is State Bank of India. The study has been undertaken to evaluate the customer satisfaction of service quality provided by SBI in Ernakulam city. During this period, it is found that customers are moderately satisfied with banking services. Now a day, banking sector is facing intense competition. Therefore in order to gain better position, SBI has to improve the satisfaction level of customers. The study was able to understand the various functions and services provided by SBI. And it is revealed that almost all customers are aware about online and offline services. The study helps in solving the problems faced by the customers. The findings of the study suggest that banks have to understand their own strength, weakness, opportunities and threats.*

**Keywords:** *Customer Satisfaction, Online And Of Line Services*

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As an increasing number of Indian Bank look at the innovative ways, such as online banking, to make a customer's banking experience more convenient, efficient and effective, it becomes even more important to ascertain the customers' perception of the overall service quality and their satisfaction with the current on line banking. There are tremendous changes occurring in the field of banking mainly State Bank of India which has played a pivotal role in

establishing the organised banking services sector across India. SBI has thus played a key role in the economic development of India. They provide a wide variety of online and offline services like internet banking, ATM services, portfolio management, State Bank electronic payment system, electronic fund transfer, smart gold, mobile banking, small business credit card, SBI festival loan, SBI car loan, SBI education loan, SBI housing loan, domestic business, E-Banking, lending, service for domestic customer, etc. The research problem can be broadly stated as:

Old method of banking transactions are time consuming and subject to time limit. This system of transaction is not suitable for the modern times. So there are tremendous changes occurring in the field of banking. The customers have become dynamic and their perceptions too are dynamic. Due to the financial inclusion, technological advancement in the market, there is a need to re-categorize the various factors of service quality and to study the impact of new categories on the customer satisfaction. Service quality plays a vital role of banking sector. The bank has differed one bank with another bank with quality of good service. Specifically the study highlights the importance of service quality of SBI

### **OBJECTIVES OF THE STUDY**

- To study the services and functions provided by SBI.
- To analyse the socio-economic status of the customer and their level of awareness.
- To study about the satisfaction level of customer towards the online and offline services of SBI.
- To understand the problems faced by customers.

### **RESEARCH METHODOLOGY**

The study is mainly based on primary data and secondary data. The primary data is collected using structured questionnaires which include both profile of the customers and their perception. The secondary data collected required for the study will be collected from journals, reports on trends, newspapers, magazines, government publications, books and internet. Different scales will be used for data analysis. So the collected data is analysed using simple statistical tools like tables, graphs, percentages. Chi-square test is also used.

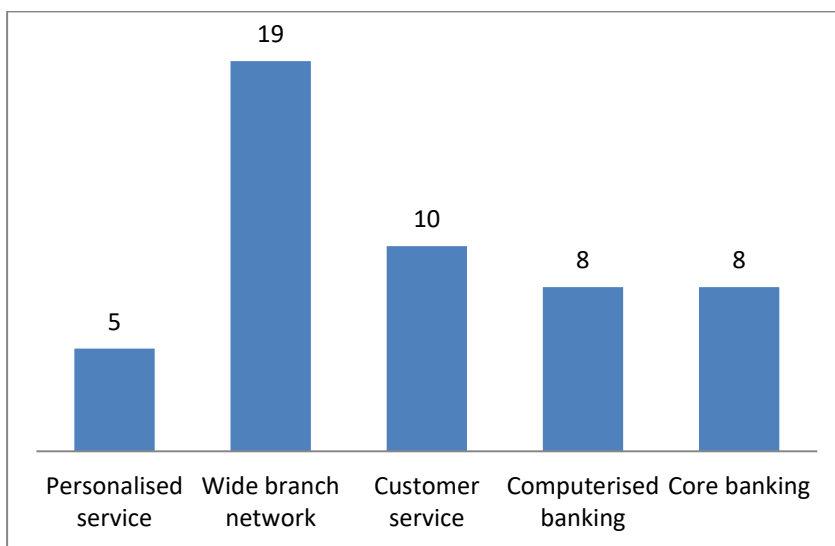
**ANALYSIS AND INTERPRETATION OF DATA**

**TABLE 4.1  
PERCEPTION TOWARDS SBI**

<b>Perception</b>	<b>Number of respondents</b>	<b>Percentage</b>
Personalised service	5	10
Wide branch network	19	38
Customer service	10	20
Computerised banking	8	16
Core banking	8	16
<b>Total</b>	<b>50</b>	<b>100</b>

Source: survey data

FIGURE: 4.1



SOURCE: PRIMARY DATA

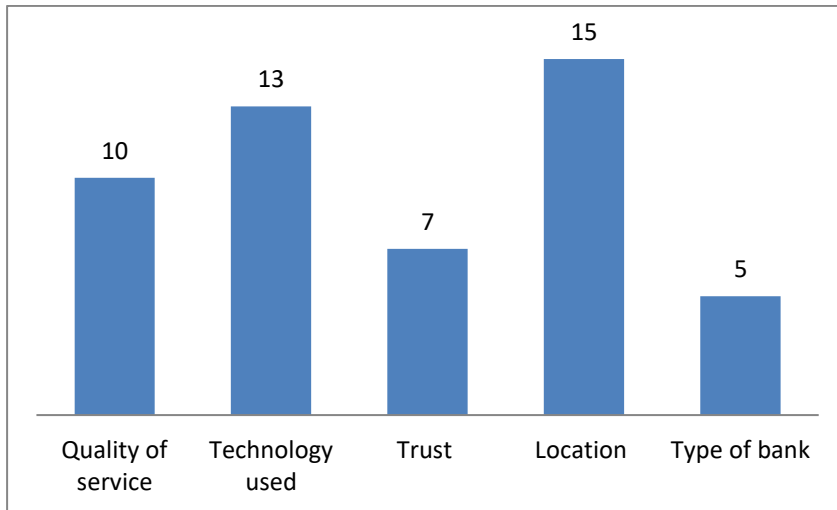
From the data given above, it is found that majority of respondents that is, 38% of them choose SBI as the wide branch of network as it enhances the banking quality of customers and speedy processing of the banking transactions. Secondly, 20% of them prefer customer service because the bank provides better services to customers for attracting them. Only few of them prefer personalised services.

**TABLE 4.2**  
**MOST VALUABLE ATTRIBUTE OF THE BANK**

Attribute	Number of respondents	Percentage
Quality of service	10	20
Technology used	13	26
Trust	7	14
Location	15	30
Type of bank	5	10
<b>Total</b>	<b>50</b>	<b>100</b>

Source: survey data

FIGURE: 4.2



**INTERPRETATION**

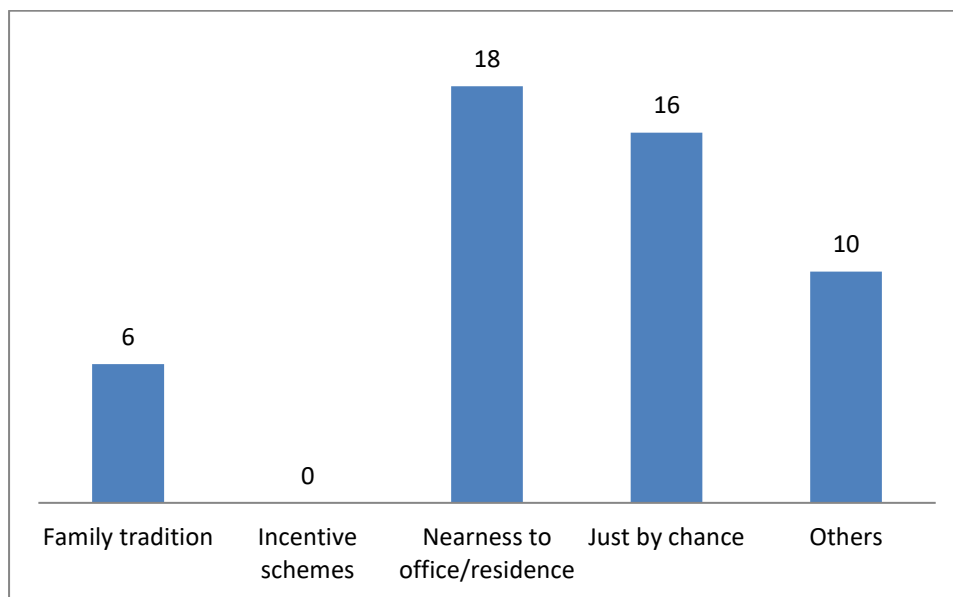
The above table and figure reveal that 30% of respondents consider location as their most valuable attribute of the bank. 26% consider technology used. As far as, 20% concerned quality of service as the most valuable attribute. 14% and 10% of respondents value trust and type of bank respectively.

**TABLE 4.3**  
**REASONS FOR CHOOSING THE BANK**

Reasons	Number of respondents	Percentage
Family tradition	6	12
Incentive schemes	0	0
Nearness to office/residence	18	36
Just by chance	16	32
Others	10	20
<b>Total</b>	<b>50</b>	<b>100</b>

Source: survey data

FIGURE: 4.3



**INTERPRETATION**

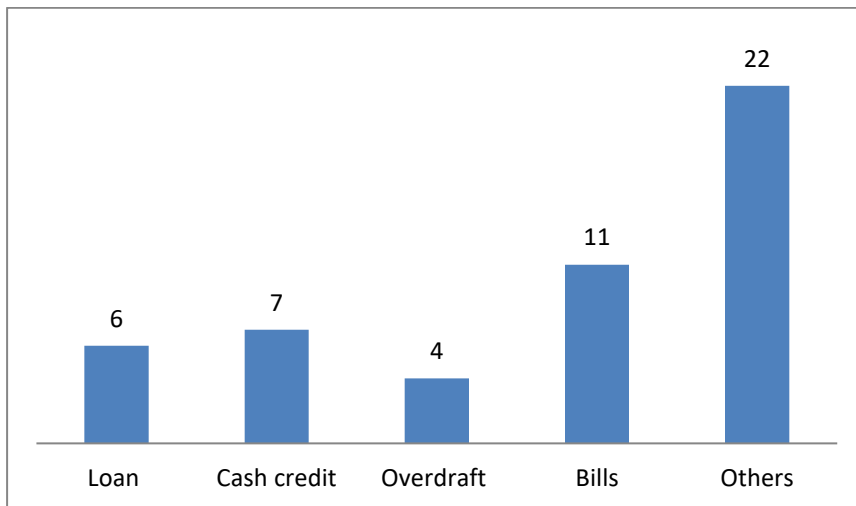
From the above table, it is found that 12% of respondents perceive family tradition as the reason for choosing the bank. 32% of respondents choose the bank just by chance and for 36% of the respondents, the main reason for choosing the bank is nearness to office/ residence. The remaining 20% consider reasons other than the above for choosing the bank.

**TABLE 4.4**  
**CURRENTLY USING FACILITY**

Facility	Number of respondents	Percentage
Loan	6	12
Cash credit	7	14
Overdraft	4	8
Bills	11	22
Others	22	44
<b>Total</b>	<b>50</b>	<b>100</b>

Source: survey data

FIGURE:4.4



**INTERPRETATION**

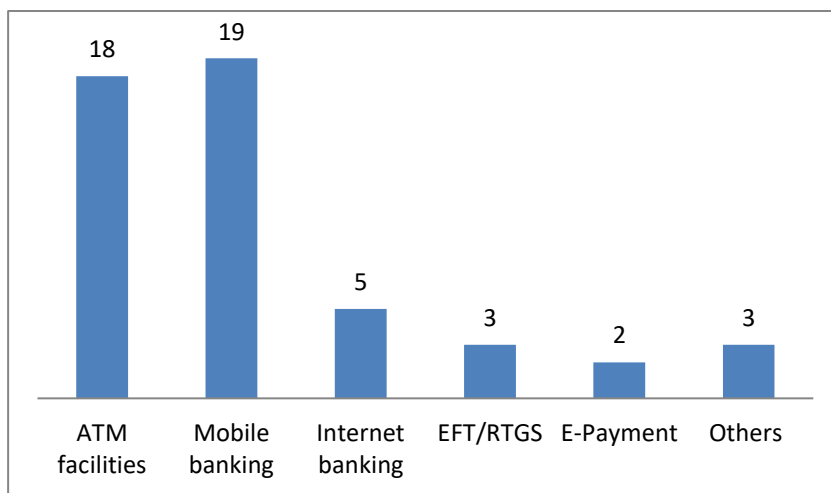
From the above diagram, 12% and 14% of respondents currently enjoy loan and cash credit respectively with this bank while 8% and 22% of respondents enjoy the facilities of overdraft and bills respectively. Majority of the respondents are enjoying various other facilities rather than the above

**TABLE 4.5**  
**MOST PREFERRED ONLINE SERVICES**

Online service	Number of respondents	Percentage
ATM facilities	18	36
Mobile banking	19	38
Internet banking	5	10
EFT/RTGS	3	6
E-Payment	2	4
Others	3	6
<b>Total</b>	<b>50</b>	<b>100</b>

Source: survey data

FIGURE: 4.5



**INTERPRETATION**

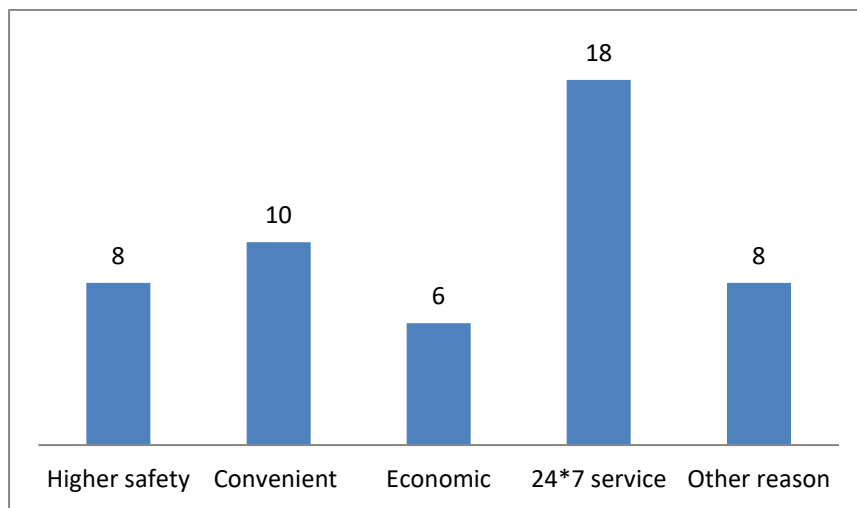
It has been understood that out of the total respondents, 38% prefer mobile banking while, 36% prefer ATM facilities. 5 respondents prefer internet banking. For 6% of the respondents, the most preferred online service is EFT/RTGS. Respondents preferring online services with regard to E- payment show a percentage of 4. The remaining 6% prefer certain other online services than the above.

**TABLE 4.6**  
**FACTORS ENCOURAGE TO USE ONLINE SERVICES**

<b>Factors</b>	<b>Number of respondents</b>	<b>Percentage</b>
Higher safety	8	16
Convenient	10	20
Economic	6	12
24*7 service	18	36
Other reason	8	16
<b>Total</b>	<b>50</b>	<b>100</b>

Source: survey data

FIGURE:4.6



**INTERPRETATION**

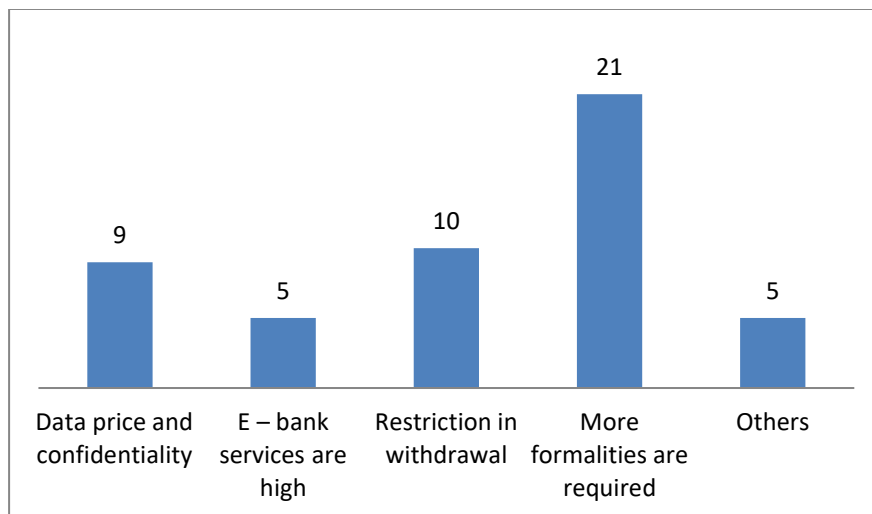
From the data collected, it is clear that majority of the respondents use online services because it provides 24\*7 services. 12% of the respondents consider online services as economic. Higher safety and convenience are the various other factors which encourage respondents towards online services. 16% of respondents have their own other reasons to use online services.

**TABLE 4.7**  
**MAJOR PROBLEMS WHILE USING SBI SERVICE**

<b>Problems</b>	<b>Number of respondents</b>	<b>Percentages</b>
Data price and confidentiality	9	18
E – bank services are high	5	10
Restriction in withdrawal	10	20
More formalities are required	21	42
Others	5	10
<b>Total</b>	<b>50</b>	<b>100</b>

Source: survey data

FIGURE: 4.7



**INTERPRETATION**

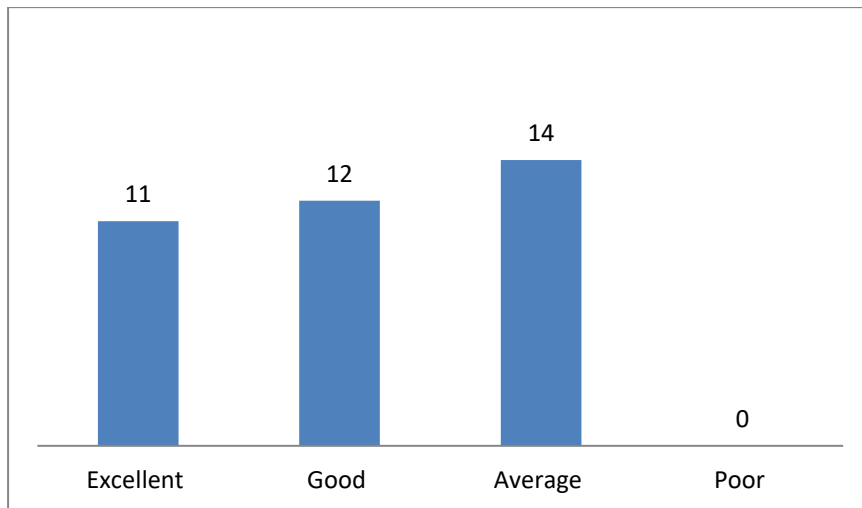
As per the above table, 42% of respondents face problems relating to complex formalities while using SBI service. 20% of respondents face the problems arising from restrictions in withdrawal. High E – bank services and data price and confidentiality are the major other problems faced by the respondents while using SBI services.

**TABLE 4.8**  
**LEVEL OF SATISFACTION TOWARDS ONLINE BANKING SERVICES**

Level of satisfaction	Number of respondents	Percentage
Excellent	11	22
Good	12	24
Average	14	28
Poor	0	0
<b>Total</b>	<b>50</b>	<b>100</b>

Source: survey data

FIGURE: 4.8



### INTERPRETATION

It is clear from the above table that majority of the respondents that is, 28% have average level of satisfaction towards online banking services. For 24% the level of satisfaction is good, while for the remaining 22%, satisfaction level is excellent.

### FINDINGS

- The study reveals that majority of respondents have been the customer of bank for above 5 years.
- Majority of the customers maintain savings account with SBI.

- Most of the customers choose SBI as wide branch of network as it enhances the banking quality of customers and speedy processing of the transactions..
- Majority of the customers are familiar with the use of computerised banking while, few of them are experts with it.
- Highest percentage of the customers is frequent visitors of the branch.
- The main reason for customers to visit the bank is to make deposits.
- The study revealed the fact that almost all the customers are aware of online and offline services.
- It is found that there is no significant association between customer satisfaction and socio economic status of the customers.
- And also it is found that there is no significant association between customer satisfaction and problems faced by the customers.
- From the study, it is found that mobile banking and ATM facilities are most preferred online services by the customers. Only lowest percentage of them uses E- Payment facilities.
- 24\*7 services and convenience are the major factors that mainly encourage customers to use online services.
- Highest percentage of customers that is, 40% give more importance to various other offline facilities like for making deposits, enquire about balance rather than loans, bill discounting etc.
- Various problems faced by the customers while using SBI services are;
  - ❖ More formalities
  - ❖ Restriction in withdrawal
  - ❖ Data price and confidentiality
  - ❖ E – bank services are high
- All the customers are not having good opinion regarding various recreation facilities provided by the bank
- Majority of the customers have moderate level of satisfaction towards online and offline banking services.
- So most of them have moderate satisfaction level towards overall services of the bank.

Majority of the customers are not interested to recommend SBI to others.

## **SUGGESTIONS**

- Banks should provide loans at the low interest rate and should be given with ease without much formality.
- While dealing with customers, the staff should be cooperative, friendly and must be capable of understanding the problems of customers. So the customers feel satisfied.
- In order to have confidence on customer, the bank has to consciously cultivate the habit of treating their customers as king.
- Prompt dealing with permanent customers and speedy transaction without harassing the customer would enhance the image of banks.
- The charges for savings account opening are high, so they should also be reduced.
- Customers often complain that full information regarding services of the bank is not provided to them. Thus the bank should properly disclose the features of the products and services both online and offline to the customers.
- SBI should streamline its programmes in such way that more emphasis is given on online banking facilities than offline. It will help the customers to do their transactions without physically visiting the bank.
- SBI should keep its app up to date.

## **CONCLUSION**

Banking sector has a leading role in the economy. So it gives financial support to other sectors in the economy. In the current era, banking sector has more importance than other sectors. And in this sector, one of the leading public sector bank is State Bank of India. The study has been undertaken to evaluate the customer satisfaction of service quality provided by SBI in Ernakulam city. During this period, it is found that customers are moderately satisfied with banking services. Now a day, the banking sector is facing intense competition. Therefore in order to gain better position, SBI has to improve the satisfaction level of customers. The study was able to understand the various functions and services provided by SBI. And it is revealed that almost all customers are aware about online and offline services. The study helps in solving the problems faced by the customers. The findings of the study suggest that banks have to understand their own strength, weakness, opportunities and threats. And in case there is any

threats and weakness, they should take immediate measures to overcome them. The study also suggests that the banks must probably exploit all its available strength and opportunities in an effective manner.

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## **Lifestyle Intervention Reduce in the Incidence of Diabetes**

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### **ABSTRACT**

*Diabetes affects approximately 8 percent of adults in the United States. Some risk factors elevated plasma glucose concentrations in the fasting state and after an oral glucose load, overweight, and a sedentary lifestyle are potentially reversible. We hypothesized that modifying these factors with a lifestyle-intervention program or the administration of metformin would prevent or delay the development of diabetes.*

**Keywords:** *diabetes, metformin, participants, lifestyle.*

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### **METHODS**

We randomly assigned 3234 non diabetic persons with elevated fasting and post-load plasma glucose concentrations to placebo, metformin (850 mg twice daily), or a lifestyle-modification program with the goals of at least a 7 percent weight loss and at least 150 minutes of physical activity per week. The mean age of the participants was 51 years, and the mean body-mass index (the weight in kilograms divided by the square of the height in meters) was 34.0; 68 percent were women, and 45 percent were members of minority groups. We conducted a clinical trial involving persons at 27 centers who were at high risk for diabetes. The methods have been described in detail elsewhere,<sup>6</sup> and the protocol is available. The institutional review board at each center approved the protocol, and all participants gave written informed consent.

### **Participants**

Eligibility criteria included an age of at least 25 years, a body-mass index (the weight in kilograms divided by the square of the height in meters) of 24 or higher (22 or higher in Asians), and a plasma glucose concentration of 95 to 125 mg per deciliter (5.3 to 6.9 mmol per liter) in the fasting state ( $\leq 125$  mg per

deciliter in the American Indian clinics) and 140 to 199 mg per deciliter (7.8 to 11.0 mmol per liter) two hours after a 75-g oral glucose load. These concentrations are elevated but are not diagnostic of diabetes according to the 1997 criteria of the American Diabetes Association.<sup>11</sup> Before June 1997, the criterion for plasma glucose in the fasting state was 100 to 139 mg per deciliter (5.6 to 7.7 mmol per liter), or  $\leq 139$  mg per deciliter in the American Indian clinics. Eligible persons were excluded if they were taking medicines known to alter glucose tolerance or if they had illnesses that could seriously reduce their life expectancy or their ability to participate in the trial. Recruitment was designed to enroll approximately half the participants from racial or ethnic minority groups. A four-step screening and recruitment process was developed to identify eligible participants.<sup>6, 12, 13</sup>

### **Interventions**

Eligible participants were randomly assigned to one of three interventions: standard lifestyle recommendations plus metformin (Glucophage) at a dose of 850 mg twice daily, standard lifestyle recommendations plus placebo twice daily, or an intensive program of lifestyle modification. The study initially included a fourth intervention, troglitazone, which was discontinued in 1998 because of the drug's potential liver toxicity.<sup>6</sup> The results in the troglitazone group are not reported here. Treatment with metformin was initiated at a dose of 850 mg taken orally once a day, with placebo tablets also given once a day initially. At one month, the dose of metformin was increased to 850 mg twice daily, unless gastrointestinal symptoms warranted a longer titration period. The initiation of treatment with half a tablet was optional. Adherence to the treatment regimen was assessed quarterly on the basis of pill counts and structured interviews. The standard lifestyle recommendations for the medication groups were provided in the form of written information and in an annual 20-to-30-minute individual session that emphasized the importance of a healthy lifestyle. Participants were encouraged to follow the Food Guide Pyramid<sup>14</sup> and the equivalent of a National Cholesterol Education Program Step 1 diet,<sup>15</sup> to reduce their weight, and to increase their physical activity.

The goals for the participants assigned to the intensive lifestyle intervention were to achieve and maintain a weight reduction of at least 7 percent of initial body weight through a healthy low-calorie, low-fat diet and to engage in

physical activity of moderate intensity, such as brisk walking, for at least 150 minutes per week. A 16-lesson curriculum covering diet, exercise, and behavior modification was designed to help the participants achieve these goals. The curriculum, taught by case managers on a one-to-one basis during the first 24 weeks after enrollment, was flexible, culturally sensitive, and individualized. Subsequent individual sessions (usually monthly) and group sessions with the case managers were designed to reinforce the behavioural changes.

## RESULTS

The average follow-up was 2.8 years. The incidence of diabetes was 11.0, 7.8, and 4.8 cases per 100 person-years in the placebo, metformin, and lifestyle groups, respectively. The lifestyle intervention reduced the incidence by 58 percent (95 percent confidence interval, 48 to 66 percent) and metformin by 31 percent (95 percent confidence interval, 17 to 43 percent), as compared with placebo; the lifestyle intervention was significantly more effective than metformin. To prevent one case of diabetes during a period of three years, 6.9 persons would have to participate in the lifestyle-intervention program, and 13.9 would have to receive metformin. Our results support the hypothesis that type 2 diabetes can be prevented or delayed in persons at high risk for the disease. The incidence of diabetes was reduced by 58 percent with the lifestyle intervention and by 31 percent with metformin, as compared with placebo. These effects were similar in men and women and in all racial and ethnic groups. The intensive lifestyle intervention was at least as effective in older participants as it was in younger participants. The results of our study extend previous data showing that lifestyle interventions can reduce the incidence of diabetes<sup>7,8</sup> and demonstrate the applicability of this finding to the ethnically and culturally diverse population of the United States. The risk reduction associated with the lifestyle intervention in our study was the same as that in a study conducted in Finland,<sup>8</sup> and was higher than the reductions associated with diet (31 percent), exercise (46 percent), and diet plus exercise (42 percent) in a study in China.<sup>7</sup>

Our lifestyle intervention was systematic and intensive, with the study participants receiving detailed, individualized counseling. The study, however, was not designed to test the relative contributions of dietary changes, increased physical activity, and weight loss to the reduction in the risk of diabetes, and the effects of these components remain to be determined.

The incidence of diabetes in our placebo group (11.0 cases per 100 person-years) was higher than we had anticipated<sup>6</sup> and was higher than the incidence in observational studies,<sup>21</sup> perhaps owing to the greater frequency of glucose testing or to the selection of persons at higher risk in our study. The incidence of diabetes in the placebo group was similar among racial and ethnic groups despite differences in these subgroups in observational, population-based studies.<sup>10</sup> Racial and ethnic-group differences in the incidence of diabetes were presumably reduced in our study by the selection of persons who were overweight and had elevated fasting and post-load glucose concentrations — three of the strongest risk factors for diabetes.

Previous studies have not demonstrated that drugs used to treat diabetes are effective for its prevention, perhaps because of small samples and the lack of data on adherence to the prescribed regimens.<sup>5</sup> In contrast, metformin was effective in our study, although less so than the lifestyle intervention. Metformin was less effective in persons with a lower base-line body-mass index or a lower fasting plasma glucose concentration than in those with higher values for these variables. The reduction in the average fasting plasma glucose concentration was similar in the lifestyle-intervention and metformin groups, but the lifestyle intervention had a greater effect than metformin on glycosylated hemoglobin, and a larger proportion of participants in the lifestyle-intervention group had normal post-load glucose values at follow-up. These findings are consistent with the observation that metformin suppresses endogenous glucose production, the main determinant of fasting plasma glucose concentrations.<sup>22</sup>

## **Outcome Measures**

The primary outcome was diabetes, diagnosed on the basis of an annual oral glucose-tolerance test or a semiannual fasting plasma glucose test, according to the 1997 criteria of the American Diabetes Association: a value for plasma glucose of 126 mg per deciliter (7.0 mmol per liter) or higher in the fasting state or 200 mg per deciliter (11.1 mmol per liter) or higher two hours after a 75-g oral glucose load.<sup>11</sup> In addition to the semiannual measurements, fasting plasma glucose was measured if symptoms suggestive of diabetes developed. The diagnosis required confirmation by a second test, usually within six weeks, according to the same criteria. If diabetes was diagnosed, the participants and their physicians were informed and glucose-tolerance tests were discontinued, but

fasting plasma glucose was measured every six months, with glycosylated hemoglobin measured annually. As long as the fasting plasma glucose concentration was less than 140 mg per deciliter, participants were asked to monitor their blood glucose and to continue their assigned study treatment. If the fasting plasma glucose concentration reached or exceeded 140 mg per deciliter, the study medication was discontinued and the participant was referred to his or her physician for treatment. Measurements of glucose and glycosylated hemoglobin (HbA<sub>1c</sub>) were performed centrally. All tests were performed without interrupting the assigned treatment, except that placebo or metformin was not taken on the morning of the test. The investigators and the participants were unaware of the results of these measurements and were informed only if the results exceeded the specified threshold for a change in the treatment.

Self-reported levels of leisure physical activity were assessed annually with the Modifiable Activity Questionnaire.<sup>16</sup> The physical-activity level was calculated as the product of the duration and frequency of each activity (in hours per week), weighted by an estimate of the metabolic equivalent of that activity (MET) and summed for all activities performed, with the result expressed as the average MET-hours per week for the previous year. Usual daily caloric intake during the previous year, including calories from fat, carbohydrate, protein, and other nutrients, was assessed at base line and at one year with the use of a modified version of the Block food-frequency questionnaire.<sup>17</sup>

### **Statistical Analysis and Early Closure**

Random treatment assignments were stratified according to the clinical center. Assignments to metformin and placebo were double-blinded. The study design and analysis followed the intention-to-treat principle. Nominal (unadjusted) P values and confidence intervals are reported.

The blinded treatment phase was terminated one year early, in May 2001, on the advice of the data monitoring board, on the basis of data obtained through March 31, 2001, the closing date for this report. By then, we had obtained evidence of efficacy on the basis of 65 percent of the planned person-years of observation. To maintain a type I error level of 0.05 for significance in pairwise comparisons of the risk of diabetes between groups, with adjustment for repeated interim analyses, the group-sequential log-rank test<sup>18</sup> required a P value of less

than 0.0159. For pairwise comparisons of other outcomes, a Bonferroni-adjusted criterion of  $P < 0.0167$  was used. The study design provided 90 percent power to detect a 33 percent reduction from an incidence of 6.5 cases of diabetes per 100 person-years, with a 10 percent rate of loss to follow-up per year.

The time to the outcome was assessed with the use of life-table methods.<sup>19</sup> Modified product-limit curves for the cumulative incidence of diabetes were compared with the use of the log-rank test. The estimated cumulative incidence at three years and the Greenwood estimate of the standard error were used to calculate the number of persons who would need to be treated in order to prevent one case of confirmed diabetes during a period of three years and the associated 95 percent confidence interval. Risk reduction, heterogeneity among strata, and interactions between treatment assignments and covariates were assessed by proportional-hazards regression. Fixed-effects models with the assumption of normally distributed errors<sup>20</sup> were used to assess differences over time in body weight and plasma glucose and glycosylated hemoglobin values among the three groups.

## CONCLUSIONS

Lifestyle changes and treatment with metformin both reduced the incidence of diabetes in persons at high risk. The lifestyle intervention was more effective than metformin.

Type 2 diabetes mellitus, formerly called non-insulin-dependent diabetes mellitus, is a serious, costly disease affecting approximately 8 percent of adults in the United States.<sup>1</sup> Treatment prevents some of its devastating complications<sup>2,3</sup> but does not usually restore normoglycemia or eliminate all the adverse consequences. The diagnosis is often delayed until complications are present.<sup>4</sup> Since current methods of treating diabetes remain inadequate, prevention is preferable. The hypothesis that type 2 diabetes is preventable<sup>5,6</sup> is supported by observational studies and two clinical trials of diet, exercise, or both in persons at high risk for the disease<sup>7,8</sup> but not by studies of drugs used to treat diabetes.<sup>5</sup>

The validity of generalizing the results of previous prevention studies is uncertain.<sup>9</sup> Interventions that work in some societies may not work in others,

because social, economic, and cultural forces influence diet and exercise. This is a special concern in the United States, where there is great regional and ethnic diversity in lifestyle patterns and where diabetes is especially frequent in certain racial and ethnic groups, including American Indians, Hispanics, African Americans, Asians, and Pacific Islanders.<sup>10</sup>

The Diabetes Prevention Program Research Group conducted a large, randomized clinical trial involving adults in the United States who were at high risk for the development of type 2 diabetes. The study was designed to answer the following primary questions: Does a lifestyle intervention or treatment with metformin, a biguanide antihyperglycemic agent, prevent or delay the onset of diabetes? Do these two interventions differ in effectiveness? Does their effectiveness differ according to age, sex, or race or ethnic group?

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## NUTRITION FOR HEALTHY AGEING

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### ABSTRACT

*WHO defines healthy ageing as “the process of developing and maintaining the functional ability that enables well being in older age”. Aging is linked to a variety of changes in the body including muscle loss, thinner skin and less stomach acid production. Low stomach acid can affect the absorption of nutrients in our body. Eating healthy becomes especially important as you age. That’s because aging is linked to a variety of changes including nutrient deficiency, poor health outcomes and decreased quality of life. Studies states that 20% of elder people have suffered with atrophic gastritis, a condition in which chronic inflammation has damaged the cells that produces stomach acid. Older adults may need fewer calories to maintain their weights but they need foods which are rich with nutrients. If the elder people continue to eat the same of calories per day as they did during younger age, it could easily gain extra fat. This case is especially true in postmenopausal women as the decline in estrogen level seen during this time. The most important nutrients for elder adults are Protein, Vitamin D, Calcium, Vitamin B12, Potassium and Magnesium. Loss of muscle mass and strength will lead to Sarcopenia in elder adults. Constipation is also a common health problem among elder adults as they take more medication. Eating fibrous food is the remedy for this problem. It passes through the gut undigested, helping form stool and promote regular bowel movements. Calcium and Vitamin D are most important nutrition for bone health. Vitamin D helps to absorb Calcium and Calcium help too build and maintain healthy bone. Vitamin B12 is essential for making Red blood cells and maintaining healthy brain function. Potassium, Omega3, Magnesium, Iron and Water are also important nutrients for healthy ageing.*

**Keywords:** Nutrition, Diet, Vitamin, Ageing, Healthy ageing, Sarcopenia, Osteoporosis.

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## INTRODUCTION

Ageing is the process of becoming older. In human ageing represents the accumulation of changes in a human being over time, encompassing physical, psychological and social changes. World Health Organization (WHO) defines healthy ageing “as the process of developing and maintaining the functional ability that enables well being in older age”. Ageing is linked to a variety of changes in the body, including thinner skin and less stomach acid. Low stomach acid production will lead to less absorption of Nutrients such as Iron, Vitamin B12, and Magnesium. Ageing is linked to variety of changes including nutrient deficiencies, decreased quality of life and poor health outcomes. Atrophic gastritis is a major problem for elder people in which chronic inflammation has damaged the cells that produce stomach acid. Another problem that the elder people facing is that they cannot sense hunger and thirst because of the reduction in their body’s ability to recognize hunger and thirst. Since the older adults are doing fewer activities, high chance of accumulation of fat will be there. Even high medication also will lead to extra fat in the body. And this case is especially true for postmenopausal women, as the decline in estrogen level seen during this time may promote belly fat storage. Therefore for healthy good nutrition, diet and exercises are must for healthy ageing.

Nutrition affected our life before we born and will affect our life till we die. The definition of nutrition by the Council on Food and Nutrition of the American Medical Association is that nutrition is the science of food the nutrients and the substances therein, their the organism ingests, digests, absorbs, transports, utilizes and excretes food substances. Nutrients are chemicals which have some specific function in our body. We should consume it through the diet. We know that mainly 6 classes of nutrients are there:- Water, Carbohydrates, Protein, Lipids (fatty acid), Vitamins and Minerals. Water, Carbohydrate, Protein and Lipids are known as macro nutrients in which our body needs these nutrients in a large amount where as minerals and vitamins are known as Micro nutrients in which our body need it in lesser amount on daily basis.

## **IMPORTANT NUTRIENTS FOR ELDER ADULTS**

Most important nutrients that an elder adult must include in his diet as follows

### **1. PROTEIN**

It is common to lose muscle strength as we age. In that an adult loses 3-8% of their muscle mass each decade after age 30. This loss of mass and strength is known as Sarcopenia. So it's a must to include more protein in diet for elder adults. Protein is known as the building blocks of muscle mass. It is composed of amino acids which are organic compound made up of Carbon, Hydrogen, Nitrogen, Oxygen and Sulfur. Protein digestion begins in the stomach by the enzyme pepsin. Pepsinogen is converted into Pepsin by the hormone Gastrine. The protein status of human is most commonly determined via nitrogen balance. Most of the body's nitrogen is found in protein.

The 1989 Recommended Dietary Allowance (RDA) for protein is 0.75g/kg body weight for adults. Younger individual require more protein per kg body weight than adults. Power and endurance athlete appear to need 1.2 to 1.5 g/kg body weight. Endurance athletes need little more protein than power athlete as they retain some of their protein in their muscles. People with Sarcopenia may need 1.2 to 1.5 g/kg protein a day.

Recommended Protein rich foods sources: Fish, Beans, Peas, Whole grain cereals, Eggs, Poultry, and Tofu.

### **2. VITAMIN D**

Another major problem found in elder adult is Osteoporosis, a condition in which bones become weak and brittle. The leading cause of Osteoporosis is lack of Vitamine D and certain hormones particularly estrogen in women and androgen in men. Women especially those older than 60 years of age, are frequently diagnosed with the disease. Menopause is accompanied by lower estrogen levels and increases a women risk for Osteoporosis.

Vitamin D is also known as Antirachitic vitamin. Lack of Vitamin D may lead to Rickets in children, Osteoporosis in adults and Osteomalacia. Individuals

whose skin are exposed to sufficient sunlight are able to synthesis sufficient Vitamin D to meet their needs. The 1997 adequate intake for Vitamin D given by National Research Council, USA is 5 microgram daily for individual below the age of 51, 10 microgram daily for those 51 to 70 years and 15 microgram for those over 70 years.

Recommended Vitamin D rich foods: Fatty fish and fish liver oils, Dairy products and margarines are fortified with vitamin D as are many of the cereals and chocolate mixes, Egg yolk, liver, sardines.

### **3. CALCIUM**

Calcium is the most abundant mineral in the body, accounting 2% of the adult body weight. Over 99% of body's Calcium is found in bones and teeth. So it is clear that Calcium is an important nutrient for the strength of bones and teeth. Blood Calcium levels are controlled by Vitamin D. Calcium present in bones and teeth as hydroxyapatite. The hydroxyapatite provide strength and rigidity to bones and helps the bones to support the weight of the body. Calcium is stored in Sarcoplasmic reticulum of muscle cells until needed it for muscular contraction. Calcium plays a role in skeletal, muscular and cardiac muscle contraction.

The 1997 Adequate intake (AI) for men and women aged 19 to 50 years is 1000 mg daily while that for 51+ years is 1200 mg. Calcium intake of Women by National institute for Health recommended is that women aged 25-50 years and Men 25-65 years should consume 1000mg daily. Women 51 to 65 years taking estrogen consume 1000 mg and those not taking estrogen consume 1500 mg daily and Men and Women over 65 years should consume 1500mg daily.

Recommended Calcium rich food sources: Dairy products, Chinese Cabbage, Kale, Broccoli, Greens, Bony Fish, calcium fortified Orange juices.

### **4. VITAMIN B12**

Atrophic gastritis and Constipation is another common problem in the elder adults. Also elder adults feel tiredness and gastro intestinal abnormalities regularly. The deficiency of Vitamin B12 may lead to tiredness, gastrointestinal problem, leukopenia and megaloblastic macrocytic anemia. Vitamin B12 found in foods usually is attached to polypeptides which are hydrolyzed in the stomach

and duodenum. The median Vitamin B12 intake of adults 20-59 years 4.83 and 3.03 micro gram daily

Recommended Vitamin B12 rich food sources: Food containing animal protein, organ meat, beef, lamb, sea foods, eggs, sea vegetables.

## **5. POTASSIUM**

Fluid balance is also a major problem found in elder adults. As we age, kidney functions change. When the blood flow start decreasing, the kidneys ability to filter the incoming blood also decreases. Potassium is needed for the maintenance of fluid balance in our body. Also Potassium is using for the prevention and treatment for hypertension. Lack of Potassium may lead to weakness, anorexia, nausea, listlessness, muscle cramps, irrational behavior.

By 1989 Recommended Dietary Allowances (RDA), for individual 18+ years of age is need 2000mg.

Recommended potassium rich food sources: Fruits and vegetables are rich in Potassium, Prunes and raisins, dry fruits are also rich in Potassium.

## **6. MAGNESIUM**

Magnesium is incorporated into hydroxyapatite crystals in the skeletal system. Magnesium is needed for for the functioning of over 300 enzymes, including those involved in anaerobic and aerobic energy generation and the synthesis of fatty acids and protein. Magnesium plays an important role in normal cardiac function. Calcium functions as stimulator of muscular contraction, while magnesium functions as relaxer. Magnesium also functions inn neural transmission. So it is important for an elder adult to consume it in a prescribed level.

The 1997 RDA for magnesium is 310 and 400 mg for men and women aged 19 to 30 years and 320 and 420 for men and women 31+ years and for 20 to 59 years 326 and 230 respectively.

Recommended Magnesium rich foods: Green Leafy Vegetables, unpolished grains, nuts, seeds, spinach, salmon etc.

## **7. WATER**

No other compound is more important than water. Without it there would be no life in any kind. Water transfers nutrients to the cells throughout our body. Water is essential for removing the wastes from our blood and out of our body through the kidneys. Water regulates our body temperature through sweating. So it's a must to drink enough water at any age. For a sedentary adult, 300 to 400 ml of water is provided each day from metabolic reactions. Physically active individual should consume 1.5 ml per kcal. Water is important for athletic performance as well as life itself.

Iron, omega3 (fatty acids) are also good nutrients for healthy ageing as iron functioning as the Oxygen and electron carrier in our body and Omega3 is important for preventing and managing heart disease.

## **CONCLUSION**

Good nutrition and moderate exercise are important for healthy ageing. Along with nutrition exercise also needed to control the body weight. It is usual that when we age our body function slows down. So it is important to do some physical activity and to have some important nutrients in our diet in order to maintain a good healthy body. It's important for an elder adult to include Protein, Vitamin D, Vitamin B12, Calcium, Magnesium, Potassium, Iron in their daily diet and it is important to drink much Water to stay healthy and feel happy throughout the life.

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