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Research Article

Growth of Aluminum Doped Zinc Oxide Nanostructure Thin Films by Nonconventional Sol-Gel Method

Maher Alrefaee, Udai Pratap Singh, Susanta Kumar Das✉

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Citations: 4

Abstract

The present work demonstrates the growth of undoped and Al doped ZnO (AZO) thin films by using nonconventional sol-gel method. The structural, morphological, optical, and electrical properties of obtained thin films are studied. X-ray diffraction (XRD) analysis confirms hexagonal wurtzite structures for both undoped and doped thin films. The crystallite size is found between 15 and 30 nm. Scanning electron microscope (SEM) images show that the films have approximately uniform morphologies, consisting in several flower-like aggregates with nanosized multipetals. From the optical properties, it is found that with the increase in the doping concentration, there is a decrease in the absorption coefficient in the visible wavelength range. It is also noticed that the increase in doping concentration causes an increase in bandgap (E_g) and a decrease in extinction coefficient. Urbach energy decreases with increase in the doping concentration. In the Hall effect study, it is observed that the conductivity and carrier concentration increase sharply with increasing the aluminum quantity. The causes and significance of these observations are discussed.

Conflict of Interest

The authors declare no conflict of interest.

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Research Article

USB Digital Microscope Endoscope Camera – An Effective Tool for Quick Morphological Characterization of Laser-induced Microstructures

P. Chandrakanta Singh, Susanta Kumar Das 

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Abstract

In this work, the authors have reported the investigation on the use of USB camera for morphological characterization to optimize the processing parameters in laser microstructuring of Si surface. For this, microstructures are generated on a monocrystalline silicon (Si) surface using nitrogen nanosecond laser. The wavelength, pulse energy, and pulse duration of the laser are of 337 nm, 170 μ J, and \sim 3.5 ns, respectively. The USB Digital Microscope Endoscope (UDME) Camera is used to capture the images of microstructures generated on the Si surface. It is a compact, portable, easy to handle, and inexpensive camera calibrated by ImageJ software. It has been used for two purposes, first, for conforming whether the microstructures are formed on the surface of Si or not in given laser processing parameters and determining the dimensions of the laser textured region. The second information is used for deciding the overlapping condition. This overlapping is mostly essential for growth of microstructures in large area surface of Si through raster scanning mode. Field emission scanning electron microscopy is done to cross verify the results obtained in UDME Camera.

Conflict of Interest

The authors declare no conflict of interest.

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Theoretical simulation on SHG in broad wavelength range using ZnO nanorods

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ABSTRACT

In present work, we have done detail theoretical simulation studies in broad wavelength range of 800 nm to 4000 nm for SHG with ZnO nanorods. The Fresnel transmission factors for fundamental and SHG radiation can affect the SHG process. So the variation of these parameters was studied within the aforementioned wavelength range. These transmission factors were found to be in the range of 0.661–0.674 and 1.66–1.75 for fundamental and SHG radiation respectively. Refractive indices also control the behaviour of SHG process. So detail investigation on it is also done for the entire wavelength range of 800 nm–4000 nm by taking the Sellmeyer's Equation. Effect of these aforementioned parameters on efficiency of the second harmonic generation process is also studied.

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1. Introduction

The Zinc oxide (ZnO) nanorods show very high second order optical nonlinearity and SHG behaviour. ZnO nanorods have also shown other advantages like high chemical stability, high damage threshold and low cost [1–4]. So this material is very promising for characterization of laser pulses [5]. The SHG in ZnO nanorods generally takes place through non-phase matching process. So SHG of laser pulses of broad wavelength range can be done through a single sample of it. However so far in all the previous works no effort has been done in this regards. In present work we have reported the detail investigation on theoretical studies on SHG of laser pulses in broad wavelength range with ZnO nanorods. Particularly it is to note that parameters like refractive indices, Fresnel transmission factors of fundamental and SHG radiations affect the efficiency of SHG in ZnO nanorods. So, the theoretical estimation of these parameters is done for the said wavelength range. Effect of these aforementioned parameters on efficiency of the second harmonic generation process is also studied.

2. Theoretical study procedure details

The efficiency of SHG in ZnO nanorods are estimated from the relation

$$E = \left(\frac{P_{shg}}{P_{fw}} \right) \times 100 = \left(512 \frac{\pi^3}{A} \right) d_{eff}^2 T_{\omega}^4 T_{2\omega} P_{fw} \frac{\sin^2 \psi}{\psi^2} \times 100 \quad (2.1)$$

$$\psi = \left(\frac{2\pi L}{\lambda} \right) (n_{\omega} \cos \theta_{\omega} - n_{2\omega} \cos \theta_{2\omega})$$

n_{ω} = refractive index for fundamental wavelength

$n_{2\omega}$ = refractive index for second harmonic wavelength

λ = wavelength of fundamental laser radiation

L = thickness of the sample

θ_{ω} and $\theta_{2\omega}$ = propagation angle of fundamental and SHG radiation inside the material

T_{ω} and $T_{2\omega}$ = Fresnel field transmission factors for fundamental and SHG angles of refraction in the ZnO nanorods

A = Area of focused laser beam

Here d_{eff} value is defined as

$$d_{eff} = d_{311} (\sin \theta_{2\omega} \cos^2 \theta_{\omega} + \cos \theta_{2\omega} \sin 2\theta_{\omega}) + d_{333} \sin \theta_{2\omega} \sin^2 \theta_{\omega} \quad (2.2)$$

With d_{311} , d_{333} = two individual nonzero nonlinear coefficients of ZnO (point group 6 mm) [3].

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Angular birefringence phase matching behaviour of Lithium Triborate (LBO) crystal for second harmonic generation in broad wavelength range

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ABSTRACT

Second Harmonic Generation (SHG) is a nonlinear optical process in which the frequency of the incident radiation gets doubled. There are various types of applications of SHG such as ultra-short pulse measurement, high resolution optical microscopy, characterization of the structure of 2D materials and its physical properties like the thickness of interlayer stacking, stacking angle between different layers, the grain boundary etc. It has also been used to determine the structure of Langmuir-Blodgett films of low symmetry. For SHG, various commercial nonlinear optical (NLO) crystals are generally used. Lithium Triborate (LBO) is one of the best NLO material among them due to its wide transparency range (160–2600 nm), high damage threshold (19 GW/cm² @1064 nm, 1 ns) and high second order nonlinear coefficient. It has also the ability to establish birefringence phase matching condition for efficient SHG for different wavelengths. The crystal can be used for generation for SHG in broad wavelength range through angular phase matching method. For this, in this work detail investigation has been made to find out the optimum wavelength range that can be used for efficient SHG. This has been done by finding the variation of phase matching angle, second order nonlinearity etc. with respect to wavelength using the SNLO software. Both Type I and Type II phase matching has been considered for various planes of the crystal.

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Selection and peer-review under responsibility of the scientific committee of the 3rd International Conference on Processing and Characterization of Materials 2021 (ICPCM 2021).

1. Introduction

Second Harmonic Generation (SHG) is a nonlinear optical process in which the frequency of the incident radiation gets doubled. There are various types of applications of SHG such as ultra-short pulse measurement, high resolution optical microscopy in biological and medical field, useful to visualize human dermal collagen fiber in biological tissues in vivo [1], used to characterize the structure of 2D material and its physical properties like the thickness of interlayer stacking, stacking angle between different layers, the grain boundary etc. [2]. Other applications also include to determine the structure of Langmuir-Blodgett films of low symmetry [3]. For SHG, various commercial nonlinear optical (NLO) crystals are generally used. Lithium Triborate (LBO) is one of the best NLO material among them due to its wide transparency range (160–2600 nm), high damage threshold (19 GW/cm² @1064 nm,

1 ns) and high second order nonlinear coefficient. It has also the ability to establish birefringence phase matching condition for efficient SHG in different wavelengths like at 1064 nm (Nd:YAG laser), 1047 nm (Nd:YLF laser), 700–800 nm (Ti:Sapphire laser) etc. [4]. Temperature phase matching has been done for multiple wavelengths for SHG or SFG generation [5]. Angular phase matching can also be used for SHG of multiple wavelengths using LBO in broad wavelength range. For doing such work one need to know its behaviour in detail. Therefore, we have done here detail theoretical investigation on this regard. Particularly it is to note, previously study has been already done on the angular phase matching and effective nonlinear coefficient variation with the various wavelengths of fundamental wave in XY-plane only [6]. But no work till now has been done on this regard showing the variation of them with respect to the YZ and ZX plane. So here we have put a detail focus on the variation of all these properties with respect to these planes. A comparative analysis has also been done on these parameters with respect to various planes (see Tables 1–3).

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Efficient photocatalytic dye decomposition using TiO₂ nanostructured thin film grown by non-conventional sol-gel technique

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ABSTRACT

In this work, TiO₂ nanostructured thin films were grown by the cheap and easy non-conventional sol-gel method. The grown thin films were also used for efficient photocatalytic dye decomposition. For this, first 4.5 ml of acetic acid was mixed with 5 gm of TiO₂ powder. The mixture was stirred for 30 min after adding deionized water (40 ml) and 5 drops of nitric acid. Then the mixture was heated at 100 °C for two hours to get a gel. Then the paste was coated over a glass substrate and beakers by doctor's blade method to get the thin films. The morphological and structural characterization of the thin films were done by scanning electron microscope (SEM) and X ray diffraction analysis. From the SEM the average diameter of the nanoparticles are estimated to be about 68 nm. The prepared thin films were used for efficient photocatalytic decomposition of Methylene Blue dye.

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1. Introduction

Photocatalysis is one of the advanced oxidation processes for the acceleration of chemical reaction accompanying light and catalysis [1]. It has numerous promising applications such as hydrogen(H₂) fuel generation by water splitting, CO₂ reduction reactions[2], water purification by dye decomposition[3] and waste product management from chemical industries and sterilization of medical instruments by bactericidal effects [4] etc. The photocatalysis process, in general are of two kinds viz homogeneous and heterogeneous process. The heterogeneous photocatalysis process is quite effective, efficient and advantageous as compared to homogeneous photocatalysis process for all above mentioned applications. Titanium dioxide seeks attention for these applications due to its low cost, non-toxicity, recyclability, stability etc. It is a semiconductor having wide energy band gap (3.23 eV for anatase and 3.02 eV for Rutile) exhibiting photocatalysis activity. Anatase phase (3.23 eV) is more promising for photocatalytic activity as compared to rutile phase (3.02 eV). In this work, we have demonstrated photocatalytic degradation of Methylene Blue (MB) dye using TiO₂ nanostructured thin film prepared by non-conventional sol-gel method [5]. TiO₂ photocatalysis research

shows that photocatalytic performance is very much dependant on structure of TiO₂ material, mainly its surface area. The performance improvement can be done by varying the size, specific surface area, pore volume, pore structure and crystalline phase [6]. It is well known that spheres with zero dimensionality has high specific surface area, which is helpful in higher rate of photocatalytic decomposition of organic pollutants [7]. Nano and microstructured TiO₂ spheres are well studied for photocatalytic applications because of their large specific surface area and increased light harvesting capability due to increased access of light into the interior allowing multiple diffractions and reflections [8,9]. Usually the TiO₂ nanostructures used for such applications are prepared by sol-gel or hydrothermal process by starting from a titanium alkoxide [7] as precursor. But in this present work we have tried to demonstrate the photocatalytic degradation of Methylene Blue (MB) dye using TiO₂ nanostructured thin film prepared by non-conventional sol-gel method, where the commercially available TiO₂ powder is taken as the starting material.

2. Experimental details

2.1. Material preparation and its characterization

For this work, TiO₂ powder, nitric acid and acetic acid were taken as the precursors. In the very first step, TiO₂ powder was

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Mechanical and thermal properties of plasma irradiated GO/Glass fibre/epoxy hybrid composite

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ABSTRACT

Thermo-mechanical properties of glass fibre based polymer (GFRP) composites play a vital role on achieving ultimate curing property for light-weight corrosion-free applications. Plasma radiation containing ions, charge particles and neutral atoms can penetrate up to certain depths of polymer composite resulting in improvement in post-curing strengthening. Also, incorporation of few weight percent of carbon based nano fillers can cause increase in interfacial properties up to considerable extent. Keeping this in mind, the present work is approached to fabricate conventional glass fibre/epoxy and graphene oxide (0.5 wt%) filled glass fibre/epoxy (GO/Glass Fibre/Epoxy) hybrid composite and to treat such sample to plasma radiation. Graphene oxide (GO) powder was synthesized by modified Hummer's method. The as-synthesized GO was confirmed through XRD and Raman spectroscopy. Both the composites were exposed to plasma irradiation (30 W) for 5, 10, 15, 20, 25 and 30 min. Inter laminar shear strength (ILSS) values were determined through 3-point bend test of the irradiated composite specimens. With increase in plasma treatment periods, ILSS was increased with higher rate for GO/Glass Fibre/Epoxy composite. Low temperature differential scanning calorimetry (DSC) test of the plasma irradiated composites reveals increase in glass transition temperature (T_g) values with increase in plasma irradiation periods. T_g is found maximum for GO/Glass Fibre/Epoxy composite at 25 min of plasma irradiation. SEM fractograph of both the composite specimens reveals various types of failure modes. In the fractographic image of plasma treated GO/Glass Fibre/Epoxy composite, adequate extent of interfacial adhesion between GO and epoxy resin was observed.

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1. Introduction

Glass fibre reinforced polymer (GFRP) composite is one of light-weight and corrosion-free material with some distinct advantages of high specific strength, high fatigue endurance with easy design technique [1–3]. Unlike some conventional materials like iron and steel, GFRP composites exhibit excellent toughness with certain limits of plastic deformation point [4–5]. Body parts and structural components of aerospace, marine, civil infrastructure are made of such light-weight GFRP composites for excellent performance and minimal catastrophic damage [6–7].

During practical use of GFRP composites, the thermosetting polymer composite can deteriorate through thermomechanical

degradation with respect to dynamic change in hygroscopic stress and temperature fluctuations [7]. Plasticization and swelling are some commonly degrading phenomena causing reduction of performance index of polymer composites [8,9]. Irrespective of these difficulties, spontaneous plastic deformation with strain misfit between polymer and fibre impose potential threat for the conventional GFRP laminated composite [10]. Also, generation of residual stress across interface is a stimulating factor for decrease in thermomechanical integrity of laminar GFRP composites [11]. All these problems can be resolved up to certain considerable extent by improving the properties related to polymer and/or fibre. Polymer based properties can be improved by imposing better curing techniques. Polymeric properties can also be improved by implementing post curing strengthening through exposure of fibrous polymer composite to high energetic electromagnetic radiations [12]. Fibre related properties can be improved by enhancing interfacial bond-

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Moisture effects leading to T_g depression in GFRP composites: An analysis

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ABSTRACT

Eighteen ply hand laid-up, epoxy resin-E-glass composite samples were exposed to different ageing environments. These included hydrothermal immersion, hygrothermal treatment and ageing processes carried out in the open, outdoors. Low temperature Differential scanning calorimetry (DSC) was employed to compute the Glass Transition Temperature (T_g) of the treated test specimens. These T_g values were compared with the as-cured T_g values of the samples. A T_g depression was observed in samples treated in all the ageing processes, higher depressions being associated with higher periods of exposure. Severe ageing conditions outdoors, accounted for the highest T_g depressions.

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1. Introduction

Structure of matrix consisting of polymeric chains, defects in the polymer pertaining to pores and voids and existence of micro-channels along the fibre-matrix interface as a consequence of poor interfacial-bonding, make moisture gain by glass fibre reinforced polymer (GFRP) composite a complex process [1–5]. Nevertheless, moisture uptake by the polymeric matrix is mostly in the form of water molecules attached to the matrix by hydrogen bonds. Also, water can enter the composite by capillary action through cracks/channels present in the matrix. Quantitatively, epoxy resin matrix absorbs about 3–4 % of its own weight [6] of the moisture. The absorbed moisture destabilizes polymer chain structure, thus, injuring it. The consequential processes of plasticization and swelling degrade the composite material by lowering its chemical, mechanical and thermo physical characteristic properties [7–11]. Moisture is also the root-cause of thermo-oxidative degradation of the fibre-matrix interface, thereby weakening the interface [12]. The hygro-elastic swelling stresses as a result of moisture entry break the polymeric chain increasing internal voids/free volume in the polymeric matrix leading to an early glass-transition phenomenon. Thus, it is inferred, moisture gain

in GFRP composites lowers the T_g of the polymeric matrix. The T_g alterations in GFRP composites is moisture-gain-dependent and can be expressed in terms of moisture gain as follows [13]:

$$T_{gw} = (0.005M_r^2 - 0.1M_r + 1)T_{g0} \quad (1)$$

Where:

T_{gw} – The T_g of the material gains when it gains weight in the ‘wet’ condition due to M_r moisture pickup.

M_r – The weight gain by the polymer as a result of exposure to moisture.

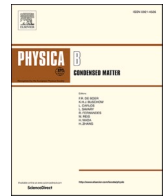
T_{g0} – T_g of the polymer as the reference point.

To be more specific, diffusion of moisture into the polymeric matrix chain structure makes the polymeric micro-molecules to be forced apart leading to chain expansions and separations which in turn lead to the reduction of the secondary inter molecular adhesive forces. The matrix becomes soft and fluffier. The transition of the rigid, glassy, amorphous phase in the matrix to a rubbery, ductile phase, is now more eminent.

The glass transition temperature of a polymer can be defined as the temperature range within which the polymeric material transforms from a glassy, rigid state to a soft, rubbery and ductile state. The T_g , in general, is measured in terms of stiffness or elastic modulus of the material. Below T_g the polymer is rigid and above T_g it becomes rubbery and ductile. Glass transition temperature of a polymeric material, therefore, is an important parameter for final-

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Electron-phonon interaction and elastic anomaly in heavy fermions (HF) systems with finite wave vector 'q' and finite 'T' analysis

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ABSTRACT

In this paper, we have used the Periodic Anderson Model (PAM) for the half-filled band and introduced electron-phonon interaction in the normal state of the HF system. Using Zubarev type double time temperature dependent Green function the sound velocity and the reduced value of the elastic constant $\tilde{C} = C/C_0$ is evaluated in presence of electron-Phonon interaction to explain the experimental anomalies seen at various temperature. The calculated renormalized elastic constants are analyzed for different system parameters like effective coupling strength 'g', the position of f-level 'd' and the onsite coulomb interaction 'U' and the wave vector 'q'. The results obtained are found to give good agreement with the general features observed experimentally for CeAl₃ HF system.

1. Introduction

Heavy fermion system shows very interesting anomalies in field behavior of the lattice properties, like elastic constants, thermal expansion and magneto-striction due to the influence of the quasi-particle phonon-interaction in heavy fermion system [1]. It was shown that for temperature less than spin fluctuation temperature T^* , the change of sound velocity depends strongly on the detail shape of the quasiparticle density of states [2,3]. Measurements of longitudinal and shear elastic constants in polycrystalline CeAl₃ shows that at low temperature a strong softening for the longitudinal elastic constants was observed and even stronger softening occurs at very low temperature [4]. Experimental results indicate that the coupling of elastic strains and long wave length phonons to the quasi-particle bands is very important and this mechanism has been proposed to be the driving force of superconductivity in some heavy fermion (HF) compounds like CeCu₂Si₂ [5]. Experiments on elastic constants found that the systems, particularly UPt₃, CeAl₃ show a sharp depression or a dip in the longitudinal modes of elastic constant at extremely low temperature, while the transverse modes pass through the maximum [2,6,7]. Whereas in some other systems like CeCu₆, CeRu₂Si₂ where such a dip or minimum is neither distinct nor present. All these outcomes show that the coupling of heavy electron with the longitudinal microscopic phonon plays a vital role within the microscopic structure of the HF state. To explain the origin of this difference in the behavior of the elastic constant both low and high temperature attempts have been made through electron-phonon coupling mechanisms considering RKKY interaction

and Kondo Effect through different approaches Wojciechowski et al. [8], Where they used the concept of Gruineincen parameter coupling to explain the different phonon anomalies associated with elastic constant. In doing so these authors considered the volume dependence of the hybridization strength and the position of the f-level in the electron-phonon term. In addition, they have also taken into account an additional term coming from the implicit volume dependence of the renormalized hybridization strength through the number of 4f electron per site. In this paper we have explained the temperature dependence of elastic constant by taking electron-phonon interaction in the normal state of the HF system and have used the periodic Anderson Model (PAM) and Zubarev Tech nique [9,11]. Here, following Fulde et.al [12] to understand microscopically, we have considered the interaction in following way i.e. (i) the usual interaction between phonons and the electrons in the f bands as well as (ii) the interaction arising from that of the hybridization band. In the present work we have to calculate the renormalized phonon self-energy which get modified through the different electron response functions corresponding to conduction electrons, f-electrons and f-d mixing densities. The elastic constants which related to the real part of the self-energy are also affected by this interaction. We have performed the numerical analysis in long wave-length with finite-q and finite temperature limit and also in the static limit. The plan of the rest of the paper is as follows. The formalism and calculations are given in sec.2. In section 3 we discuss the results. Finally, we conclude in sec.4.

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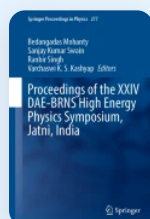
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Power Asymmetry in Planck Full–Mission CMB Temperature Maps

| Conference paper | First Online: 06 October 2022

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**Proceedings of the XXIV DAE–BRNS
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[Srikanta Panda](#) , [Pavan K. Aluri](#), [Pramoda Kumar Samal](#) & [Pranati K. Rath](#)

 Part of the book series: [Springer Proceedings in Physics](#) ((SPPHY, volume 277))

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Abstract

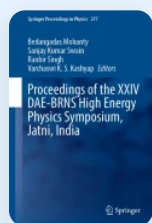
In the cosmological standard model, CMB is expected to show no symmetry preferences. Here we probe the presence of any parity preferences, particularly those of (a)symmetry in power (C_l) between even and odd multipole of CMB angular power spectrum from the Planck 2015 full-mission CMB data from ESA's Planck probe. Further we also assess any specific preference for mirror parity asymmetry as well, by comparing the power contained in $l + m = \text{even or odd mode combinations}$. In this work we found the odd

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Signal of Statistical Anisotropy in PLANCK Cosmic Microwave Background Polarization Maps

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[Proceedings of the XXIV DAE-BRNS High Energy Physics Symposium, Jatni, India](#)

[Pramoda Kumar Samal](#) , [Pranati K. Rath](#), [Srikanta Panda](#), [Pavan K. Aluri](#) & [Debesh D. Mishra](#)

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Abstract

We apply our symmetry-based Power tensor technique to test statistical isotropy in PLANCK polarization maps, viz., COMMANDER and NILC. Our preliminary analysis detects many statistically anisotropic multipoles in foreground cleaned full sky maps over



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- I. Introduction
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Abstract:

In the last few years, piezo ceramics and single crystals have been widely explored due to their significant electromechanical properties. A huge number of lead based and lead free piezo systems with doping effects were investigated during this period as supported from the various publications. The piezoelectric materials with perovskite structure exhibit the highest electromechanical coupling factor and piezoelectric coefficient due to existence of monotropic phase boundary (MPB) and tailor properties between soft and hard piezoelectric response. The piezoelectric material can be soft or hard depending upon the doping material, i.e., isovalent, acceptor and donor dopant. In general, electromechanical properties can be improved in lead-based piezoelectric materials by adding doping materials, where the dopant substitute either on A or B position of the ABO₃ perovskite structure. At this moment it is necessary to publish a review article to give the researcher a proper direction of future research for the further development of the piezosystem and selection of doping materials.

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Contents



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A brief review on the status of binary and ternary relaxor-PT materials

Bomkesh Bhoi, Pranati Purohit ✉

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Abstract

Compare lead zirconate titanate (PZT), a new generation relaxor-PT material that shows significantly improved properties with very high electromechanical coupling and piezoelectric coefficients, which makes them optimistic piezoelectric materials for various applications like sensors, transducers, and actuators. In this paper, we discuss the status of binary relaxor-PT materials such as lead zinc niobate - lead titanate (PZN-PT), lead magnesium niobate - lead titanate (PMN-PT), lead scandium niobate - lead titanate (PSN-PT), lead indium niobate - lead titanate (PIN-PT), and lead nickel niobate - lead titanate (PNN-PT) and ternary relaxor-PT materials lead indium niobate - lead magnesium niobate - lead titanate (PIN-PMN-PT), lead indium niobate - lead zinc niobate - lead titanate (PIN-PZN-PT), lead zinc niobate - lead magnesium niobate - lead titanate (PZN-PMN-PT), and lead scandium niobate - lead magnesium niobate - lead titanate (PSN-PMN-PT).

Introduction

After the discovery of piezo-electric materials they are extensively used for energy harvesting in electronic devices i.e., embedded electronics, implantable biomedical devices, wireless sensors, and portable electronics. Piezoelectric materials possess a unique material property of many single-crystalline materials, which can be categorised by their

Influence of Research Infrastructure, Teachers' Motivation and Career Opportunity on Students' Attitude towards Research

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Keywords

Research attitude, Teacher's motivation, Research infrastructure, Career opportunity

JEL Classification

I22, I23, I24, I28

Abstract: Research skill and temper not only helps in rational decision making but also facilitates positive change in every dimension of social life and such attitude must develop from the undergraduate level. In the light of this, the present research work tried to assess the factors which stimulate students' temper towards research. The influence of teacher's motivation and research infrastructure on students' attitude towards research is studied along with the mediation effect of career opportunity. Data are collected through scheduled questionnaire method from B. Com and M. Com final semester students from different colleges of western Odisha. Structural equation model is applied to study such effect. It is found that teacher's motivation and research infrastructure have no direct effect but has mediated effect on student's attitude. So, the policy makers should focus providing career opportunity to the students in research to ignite research attitude among them from the graduate level.

1. Introduction

Research skill and knowledge has become indispensable in every field nowadays and students being the future are in need to develop rational attitude towards it. Research experience has prodigious value in students' life and helps them in various fields (Petrella and Jung, 2008). But it has been witnessed that many students at graduate and post-graduate level assume that research is unnecessary and they somehow complete their project papers. Most of them prepare projects but only few of these go for publication (Saini *et al.*, 2020). Their attitude can be turned positively towards research by assigning research homework which is interesting and related to their practical life (Emsen *et al.*, 2011).

Moreover, students should be provided with grants to get motivated to participate in more numbers and more seriously (Ünver *et al.*, 2018; Purani, 2014). Teachers also have an important role in shaping and motivating students attitude towards research (Okyere, 2013). It is also a fact that peer groups have a significant impact on the attitude of the young students (Guimond, 1999). Though some studies

Corporate Social Responsibility Practices in India: A Bibliometric Analysis

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Abstract: Corporate social responsibility has become crucial to any company's strategic decision-making and has attained a level of significance. Government cannot succeed in its mission to improve society on its own. As a result of globalization, Liberalism, and outsourcing as well as due to the changing environment, corporates have established separate CSR wings to promote sustainable development. This paper explains regarding the corporate social responsibility practices framework in India. Bibliometric analysis has been applied for such purposes. Defining terms, choosing the database, collecting research papers, improving search results with acceptance and rejection standards, and compiling and analysing data are all steps that were involved in conducting such an analysis. The research database Dimension has been to compile articles from 2013 to 2023. Keywords like "Corporate Social Responsibility", "Practices" and "India", etc. are used for searching papers. The analysis of data is done using the R software tool Biblioshiny. The study will help in encouraging and promoting corporate social responsibility activity more in the Future.

Keywords: Corporate Social Responsibility, Sustainable Development, CSR Activity, Companies, Changing Environment.

JEL Codes: M140, G22, F64

1. INTRODUCTION

In an amendment to the Companies Act, 2013 in April 2014, India became the first nation in the world to mandate corporate social responsibility (CSR). As part of any CSR compliance, businesses can allocate a portion of their earnings to causes like hunger, gender equality, poverty, and education. Corporate Social Responsibility (CSR) and Sustainable Development (SD) are currently becoming more widely known. As a result, all kinds of organizations are working together to guarantee that sustainable development is not overlooked as they

Developing a Research Methodology with the Application of Explorative Factor Analysis and Regression

Dr Priyabrata Panda¹, Sovan Mishra², Dr Bhagabat Behera³

Abstract

Developing a methodology for an article or thesis has immense importance. Jharotia & Singh (2015) said that methodology eases the work plan of a thesis. Patel & Patel (2019) added that research methodology is the mean to resolve research issues scientifically. The principal purpose of this research work is to develop a methodology when factors are generated after applying explorative factor analysis and regression is to be applied to such factors. This current work also enlightened data screening process and normality assumption. It will help the researchers who are conducting perception studies, behavioural studies etc. with categorical data.

Keywords: Explorative Factor Analysis, Regression, Methodology, Data Screening, Normality

Date of Submission: 22-03-2021

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I. Introduction

The methodology segment of a thesis or article has immense importance as it helps to proceed for further analysis. Jharotia & Singh (2015) emphasised that methodology defines work plan for completion of research. Patel & Patel (2019) added that research methodology is the way to solve research problem scientifically. This part of a research work includes a series of activities in sequence like formulation of statement of the problem, comprehensive design of a research includes its scope, required data, sampling design etc. Crafting a research methodology chapter largely depends on the type and nature of research. This chapter for time series data is different from panel data. This work is specifically designed for a research work which applied linear regression after generating factors from explorative factor analysis with the help of principal component analysis. The research methodology chapter of an ongoing Ph D thesis of Mishra (2021) has been taken as a background for this research work.

II. Objective of the Study

The main purpose of the study is to develop a methodology of a research work which applies regression on factors extracted from principal component analysis under explorative factor analysis. Data screening and assumption testing are also highlighted.

III. Research Design

Research design answers what, why, where and how (Kothari, 2004). It narrates about the data, type of research, variables, sample etc. which are enumerated below.

Type of Research

Empirical research differs from exploratory research. Researcher has to mention about the type of research here.

Nature of Data

Primary data and or secondary data are applied for hypothesis testing. Moreover, objective of a research specifies the type of data which are to be used. The researcher should theoretically justify the requirement of data in accordance with objectives.

Source of Data

The sources of data must be reliable. Government sources are said to be authentic. CMIE database is widely used by different researchers. Primary data must be collected from targeted population with comprehensive scheduled questionnaire.

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Stock Market Reaction to Covid Pandemic: A Comparison Between Bombay Stock Exchange and Bovespa Indices

Priyabrata Panda, Sovan Mishra, Rajlaxmi Barik, Dhiroj Kumar Panda

Abstract

The present study analyses the behaviour of Bombay Stock Exchange index of India and Bovespa Index of Brazil in three situations viz. normal period i.e., before pandemic; non normal period i.e., during pandemic and economic restrictions; new normal phase i.e., with pandemic but with reduced economic restrictions. An attempt is made to compare the three groups within the countries and each phase of economy between the countries. Data have been collected from the websites of concern stock exchanges. Kruskal Wallis test along with ARIMA model is applied for data analysis. Normality and Stationarity are examined before applying such techniques. The result reflects that there is no difference in behaviour of such index in Brazil. This study can help the underwriters the

Introduction

Outbreak of novel Corona virus disease (COVID-19) is seriously hit the global economy. The pandemic have severely weakened the global economy as well as the performance of stock market and has caused fear and panic among stock market stakeholders. The consequences of the infectious disease are considerable and have been directly affecting stock market worldwide (Liu.*et al.*, 2020). Unprecedented shock of epidemic not only affects the health of public but also halt the world's economy. Evaluating and Understanding the economic impact of COVID-19 has become an important topic to discuss. There is a link between stock market and economy. There is a simultaneity relationship between the both. Violent fluctuations in the stock price will have far reaching ramification and serious consequences for the economy as a whole (Jincy.*et al.*, 2019). Indian stock market is a highly volatile sensitive and reactive to the unanticipated shocks and changes (Vijaya, 2016). The present study examines two stock indices i.e., BSE stock exchange of India and Bovespa stock exchange of Brazil. India took second place and confirmed 9677203 cases and Brazil occupied third place by confirming 6603540 cases. The current ravaging outbreak of COVID-19 is a proof that good health is the prime engine of economic activities and economic growth (Meer *et al.*, 2003). Hence this research paper focuses to explore the auto regressive behaviour of stock market indices of the two top countries which experienced maximum confirmed cases that is the 2nd (India) and the 3rd (Brazil) in normal, non-normal and new normal to take best investment decision in the regime of COVID – 19.

Worldwide different sectors are greatly affected due to lockdown with

Impact of Pandemic on the Financing of MSME Sector in Odisha with Reference to SBI

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Keywords

Pandemic, Opportunity, Financial accommodation, Banks, Covid-19

JEL Classification

G2, H3, I5, L8

Abstract: The Covid-19 pandemic has been a tough challenge for the entire industrial sector. Many industries suffered a lot due to the lockdown and many lost their jobs. The business organisations could not afford to pay salaries to the staff members due to lack of revenue, and, hence, with the downfall of industries, the personal growth of individuals was also stuck. The State Bank of India provided has remarkably supported in this aspect. This paper mainly focuses on the steps taken by the State Bank of India for the growth of entrepreneurship in the country. This paper also aims at identifying the areas considered by the State Bank of India in this direction. Though it is a theoretical paper, it deals primarily with various schemes offered by the State Bank of India for entrepreneurship development and highlights the logical grounds on the basis of which provision for appropriate financial accommodation can be made. This is a policy cum review paper and hence, no tool and technique have been used.

1. Introduction

To speed up the industrialisation process and to increase the GDP we require a maximum number of manufacturing units to be established in the country. For this, we need to encourage the youths of the country to come up and start their own enterprises because it will not only help in the contribution towards GDP but also towards the Gross National Income of the country (Cornia and Kiiski, 2001). As it leads to employment generation to a lot of people, that's why it provides livelihood to a huge mass of the population. Hence the need for entrepreneurship has been felt greatly in the current era.

Entrepreneurship is the process through which a person starts a new enterprise by taking risks for earning profit and surviving in the market. The person who starts the enterprise can be called as an

Rationale of the Government and other Institutional Support for Promotion of the MSME Sector in the Economic Development of Odisha

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Abstract

Entrepreneurship is an important tool for the economic growth of the nation as well as for the employment generation of the society. The Micro, Small and Medium Enterprises serve as an important weapon to accelerate the growth of entrepreneurship in the country. The MSMEs have large employment potential, are working at the root level for the economic growth of the nation. The lower capital requirement of this sector is an added advantage for an economy like that of India which is characterised by scarcity of capital and surplus cheap labour. With around 63.4 million units throughout the geographical expanse of the country, MSMEs contribute 6.11 per cent of the manufacturing GDP and 24.63 per cent of the GDP from service activities as well as 33.4 per cent of India's manufacturing output. The Governments both at the national level as well as in the state have taken lot of important measures in this regard. The Government of India passed Micro, Small and Medium Enterprises Development Act in 2006 to facilitate the growth of this sector. Along with the Government of India the commercial banks, microfinance and NGOs have also a great contribution for promotion of this sector. However, as a sequel to the new economic policies in the LPG (Liberalisation, privatisation and globalisation) environment, reservations for the MSME sector have been withdrawn. They need to perform and compete with the units in the large-scale sector. In such a challenging business environment, where efficiency, performance and competitive strength are the criteria of long-term sustainability and profitable existence for all kinds of business enterprises, small and large alike, what is the rationale of support of the government, financial institutions and other technical agencies for the promotion of the units in the MSME sector? This study seeks to find an answer to this question by analysing the growth trend of MSME in Odisha. The study is based on secondary data which have been collected from different sources viz. research papers, journals, MSME Department, Government of Odisha and India.

Introduction:

MSME stands for Micro, Small, and Medium Enterprises. In accordance with the Micro, Small, and Medium Enterprises Development (MSMED) Act in 2006, the enterprises are classified into two divisions.

Manufacturing enterprises – engaged in the manufacturing or production of goods in any industry
Service enterprises – engaged in providing or rendering services. **The new MSME definition – turnover to define MSMEs**

Investments will no longer characterize MSMEs.



Interbasin water transfer in a changing world: A new conceptual model

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Abstract

Water scarcity is a global issue, affecting in excess of four billion people. Interbasin Water Transfer (IBWT) is an established method for increasing water supply by transferring excess water from one catchment to another, water-scarce catchment. The implementation of IBWT peaked in the 1980s and was accompanied by a robust academic debate of its impacts. A recent resurgence in the popularity of IBWT, and particularly the promotion of mega-scale schemes, warrants revisiting this technology. This paper provides an updated review, building on previously published work, but also incorporates learning from schemes developed since the 1980s. We examine the spatial and temporal distribution of schemes and their drivers, review the arguments for and against the implementation of IBWT schemes and examine conceptual models for assessing IBWT schemes. Our analysis suggests that IBWT is growing in popularity as a supply-side solution for water scarcity and is likely to represent a key tool for water managers into the future. However, we argue that IBWT cannot continue to be delivered through current approaches, which prioritise water-centric policies and practices at the expense of social and environmental concerns. We critically examine the Socio-Ecological Systems and Water-Energy-Food (WEF) Nexus models as new conceptual models for conceptualising and assessing IBWT. We conclude that neither model offers a comprehensive solution. Instead, we propose an enhanced WEF model (eWEF) to facilitate a more holistic assessment of how these mega-scale engineering interventions are integrated into water management strategies. The proposed model will help water managers, decision-makers, IBWT funders and communities create more sustainable IBWT schemes.

Keywords

interbasin water transfer, water resources management, integrated water resources management, socio-ecological systems, water-energy-food nexus

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Changes in physicochemical, heavy metals and air quality linked to spot *Aplocheilus panchax* along Mahanadi industrial belt of India under COVID-19-induced lockdowns

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Abstract Positive effects of COVID-19-induced lockdowns on environment are well documented although pre-planned experiments for such analyses and appearance of fish species are lacking. We hypothesize that spotting the fish *Aplocheilus panchax* along the industrial belt of Mahanadi River near Cuttack in a never seen manner could be due to the regenerated environment. Heavy metals, water and air qualities along with spotting *A. panchax* in up, mid and downstream of Mahanadi River near Jagatpur industrial basins were analysed during pre-(end of March 2020) and after 60 days of lockdowns (last week of May 2020). An overall 45, 61, 79, 100, 97 and 90% reduction of Fe, Cu, Ni, Cd, Pb and Zn was recorded in the studied area after lockdowns,

respectively. Similarly, dissolved oxygen and pH were elevated by 26 and 7%, respectively. Water temperature, conductivity and total dissolved solute levels were reduced by 7, 46 and 15%, respectively, which were again elevated during post-lockdowns during 2021 as observed from the Landsat-8 OLI satellite data. Air NO₂, SO₂, NH₃, PM_{2.5}, PM₁₀ and CO levels were alleviated by 58.75, 80.33, 72.22, 76.28, 77.33 and 80.15%, respectively. Finally, for the first time, about 12 *A. panchax* fish per 100 m shore line in the area were spotted. The observed lockdown-induced environmental healing at the studied area could contribute to the appearance of *A. panchax* in the study site and therefore a stringent environmental audit is suggested during post-COVID-19 periods to make the regenerated environmental status long lasting in such habitats.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s10653-022-01247-3>.

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Keywords *Aplocheilus panchax* · COVID-19-induced lockdown · Environmental regeneration · Fish reappearance · Heavy metal pollution · Stringent global environmental audit



Public perception on municipal solid waste management: a case of India

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Abstract

The present work aimed to study the overall perception, awareness, practice, and willingness on solid waste management of the residents of an industrial district in India. The results suggest that the awareness regarding SWM was mostly impacted by the region of inhabitant with urban dwellers remaining aware about the ill-effects of solid waste (88.67%), the timing of garbage cleaning (53.91%), and regularity in solid waste cleaning (68.36%) than their counterparts in the rural sector with 79.91, 34.11, and 45.79%, respectively. The practice, however, showed variability with gender determining the use of separate bins (51.87% males and 67.69% females), region determining burning of plastic (17.97% urban and 37.85% rural), gender (56.44% males and 75.11% females), and region (73.44% urban and 56.07% rural) determining the use of community bins and education (OR = 2.917; CI = 1.258 – 6.764) for reuse of wastes. Similarly, willingness also showed variability in results with gender determining the use of paper bags (85.06% males and 94.76% females), occupation determining the community participation (OR = 3.557, CI = 1.162 – 10.890), gender determining the installation of composting plant (75.93% males and 82.28% females) and age determining the financial contribution (OR = 1.995, CI = 1.039 – 3.831). The result obtained suggests that the overall public perception of solid waste among the residents is not satisfactory. In addition, the government should take steps to engage the general people in addressing local and regional solid waste challenges.

Keywords Solid waste practices · Urban waste · Waste management · Willingness to pay

Introduction

The emergence of a throw-away society has not only caused an insurgency in the economic sector but also has multiplied the solid waste output. The shift from a need-based society to a luxury-based society has put additional pressure on the overall management of solid wastes. In consequence, the economics of demand–supply and associated product-cost has largely ignored the externalities that are incurred through the effects of municipal solid waste to the community as a whole (Douti et al. 2017). The absolute role of municipal solid waste management (SWM) and handling is, thus,

played single-handedly by the government (through municipalities) which, on most occasions, fails to address the real ground problem (Miezah et al. 2015). On the hind side, protection of the environment through sustainable SWM is the need of the hour since it is a basic human right to live in a clean environment.

The ill effects of solid wastes may be acute, bringing sudden infectious diseases or prove to be chronic, leading to carcinogenic and mutagenic disorders, besides causing other routine damages to the environment (Sankoh et al. 2013; Masters and Ela 2014). Unattended and poorly managed solid wastes pose severe threats to soil and water. While open burning of MSW can lead to the production of greenhouse gases, the leachate released can be toxic to the soil microbial process and can penetrate to groundwater disrupting the quality of water (Alyaseri 2021; Choudhury et al. 2021). The release of heavy metals from the MSW causing metal pollution in soil and water is inevitable (Ahmad et al. 2021). Further, these heavy metals showcase toxic effects on plants and animals and have also been reported to bio-accumulate in the environment. Besides this, the open

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AN EXPONENTIAL RATIO-TYPE ESTIMATOR FOR ESTIMATING POPULATION VARIANCE WITH ITS EFFICIENCY

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Abstract: In the present study, we have proposed a new exponential ratio-type estimator for estimating population variance using auxiliary information based on simple random sampling. The expression for the bias and mean square error of the proposed estimator has been derived up to the first order of approximation. The proposed estimator has been compared with the usual Isaki (1983), Kadilar and Cingi (2006), Upadhyaya and Singh (1999) and Bahl and Tuteja (1991) unbiased estimators. The theoretical findings are supported by an empirical study. An efficiency of the newly proposed estimator in comparison to the existing estimators is also obtained through simulation study. The graphical layout is also carried out on the basis of Percent Relative Efficiency and mean square error.

Key words: Simple random sampling, Variance estimation, Mean square error, Simulation study.

Cite this article

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1. Introduction

Variations are clearly visible in our daily life. In survey sampling the estimation of finite population variance plays an important role. The suitable use of auxiliary information in probability sampling results in considerable reduction in the variance of the estimator of population parameters viz., population mean, median, variance, regression coefficient etc. Ratio method of estimation is quite effective, if there exists a positive correlation between auxiliary variable (X) and study variable (Y). Using simple random sampling without replacement let us draw a sample of size n from its

population. Let, $s_y^2 = \sum_{i=1}^n (y_i - \bar{y})^2 / (n-1)$ and

$s_x^2 = \sum_{i=1}^n (x_i - \bar{x})^2 / (n-1)$ be the sample variances and

$S_y^2 = \sum_{i=1}^N (y_i - \bar{Y})^2 / (N-1)$ and $S_x^2 = \sum_{i=1}^N (x_i - \bar{X})^2 / (N-1)$

the population variances of y and x , respectively. Let, $C_y = S_y / \bar{Y}$ and $C_x = S_x / \bar{X}$ be the coefficients of variation of y and x , respectively and ρ_{yx} the coefficient of correlation between y and x .

Let $s_y^2 = S_y^2(1 + e_0)$, $s_x^2 = S_x^2(1 + e_1)$, such that

$E(e_0) = E(e_1) = 0$, $E(e_0^2) = \frac{1}{n}(\lambda_{40} - 1)$, $E(e_1^2) = \frac{1}{n}(\lambda_{04} - 1)$

and $E(e_0 e_1) = \frac{1}{n}(\lambda_{22} - 1)$. Where, $\lambda_{pq} = \frac{\mu_{pq}}{\mu_{20}^{p/2} \mu_{02}^{q/2}}$

and $\mu_{pq} = \frac{1}{N} \sum_{i=1}^N (y_i - \bar{Y})^p (x_i - \bar{X})^q$; (p, q) being non-negative integers.

2. Existing Estimators

The variance of the usual unbiased estimator s_y^2 under SRSWOR is expressed as

EFFECTS OF SOCIAL NETWORKING SITES ON STUDENTS' PSYCHOSOMATIC HEALTH IN WESTERN ODISHA UNIVERSITIES DURING COVID- 19 PANDEMIC : A STATISTICAL ANALYSIS

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ABSTRACT

Background: Social networking sites, the driver of every minute information has established a tremendous pace among the youths. No doubt it has given a great platform for any individual to exchange ideas and grab information from worldwide. Smartphones and internet connections are all requirements, and everything is just with a click of a button. It has been observed that the younger generation is very much prone to social networking sites. Social media and students have developed such a bond that has resulted in numerous benefits, but every object has its pros. and cons. Social networking sites (SNSs) has both positive and negative impact on the day-to-day life of university students and that finally shows the consequences on their psychosomatic health and academic performance (AP) and academic life. **Aim:** This research study aims to examine how the COVID-19 outbreak influenced university students' psychosomatic health issues in western Odisha. The investigation will focus on determining the most preferred social media platforms for university students in western Odisha and explore the effect of students' dependence on social media and how it might be affecting their psychosomatic health. **Methods and Materials:** The study will be both qualitative and quantitative based on primary data collected through a questionnaire. The main purpose of this research is to explore and analyze the basic concept underlying social networking sites as well as their applicability, usage, and impact on students' psychosomatic health. For ease of data comparison descriptive statistics, bar diagrams, pie charts, and frequency count were used as to draw valid statistical inference about the population, testing of hypothesis, t-test, Man Whitney U test, Chi-square tests have been employed as valid statistical tools to achieve the desired objectives. **Conclusion:** The study reveals that the respondents mainly suffer from headaches, Anxiety, and Acidity by continuous use of social networking sites through mobile phones. WhatsApp is found to be the most preferred platform. The study also reveals that females are more susceptible to psychosomatic health diseases than their male counterparts and there exists a significant association between psychosomatic health and total time spent and active period on social networking sites.

Keywords: Covid-19 Pandemic, Social Networking Sites, Psychosomatic health, University student.

INTRODUCTION

Internet and Social Networking Sites (SNSs) have revolutionized communications to such an extent that it is now our preferred medium

of everyday communication. In the 1980s and 1990s, the internet widened in scope to encompass the Information Technology (IT) capabilities of universities and research

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A statistical SWOT up on garbled agricultural disparity at grassroot levels: A statistical analysis at block levels of Sambalpur district

Suru Munda, Dr. Rajendra Gartia, Dr. Digambara Chand, Pritipadma Sahu and Deepak Kumar Behera

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Abstract

Agriculture is the strength of Indian economy which provides employment for approximately 65% of the workforce across the country. Regional inequality due to the unequal level of agricultural developments remains a major problem in India and Odisha in particular. In the present study, an attempt has been made to study the regional inequality in agricultural development among the nine blocks of Sambalpur district. The study utilizes published data obtained from Statistical Abstract of different districts in Western Odisha and 'District Outlines' published annually by the Directorate of Economics and Statistics (DES), Government of Odisha, for the year 2015-2016. Using technique of Principal Component Analysis (PCA), Seven Principal component were extracted which were found to be normally distributed by Kolmogorov Smirnov test. The three Quartiles Q_1 , Q_2 and Q_3 of the Normal probability distributions are used to classify the nine blocks into four homogeneous groups namely Meteoric, Progressive, Mediocre and Laggard on the basis of their composite index scores. The analysis finds that three blocks namely Dhankauda, Jamankira and Jujumura have the highest level of agricultural developments and are the Meteoric while two blocks namely Bamra and Naktideul have the lowest level of development and can be categorised as Laggard blocks. Kuchinda and Maneswar blocks are relatively less developed than Dhankauda, Jamankira and Jujumura and can be categorised as Progressive blocks while Rengali and Rairakhol are relatively more developed than the Laggard blocks and less developed than the Progressive blocks in terms of agricultural developments and may be treated as Mediocre blocks.

Keywords: Principal component analysis, Kolmogorov Simonov test, meteoric, progressive, mediocre and laggard

Introduction

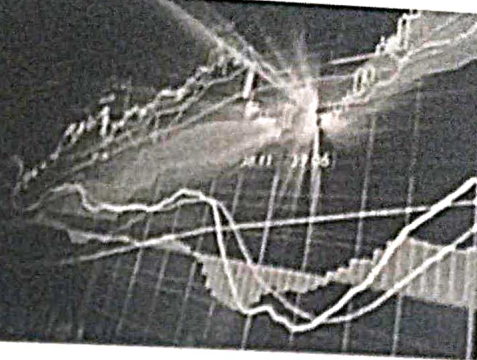
The First Agriculture Policy, that came into force in 1996, conferred the status of industry on agriculture, has been revised twice post globalisation during 2008 and 2013 making it more inclusive and comprehensive, of late has undergone a major metamorphosis with its orientation towards market linkage and expected to bring a substantial change in farmer's income through realisation of better prices, Government launched Samrudhi Agriculture Policy 2020 for the State of Odisha.

A flagship scheme Mukhyamantri Krushi Udyog Yojana (MKUY) of State Government has been launched during 2018 to provide single window facilities for promoting commercial agriculture/ horticulture/ animal husbandry/ fisheries units.

NAFIS-2016-17 (NABARD All India Rural Financial Inclusion Survey) was undertaken by NABARD in all states on sample basis for the reference year 2015-16. As per that survey result the estimated average monthly income of an agricultural household for Odisha was INR 7731/- and the same for India was INR 8931/-for 2015-16.

The state Odisha comprising of 30 districts ranks 9th by area and 11th by population has an agricultural-based economy. However, the state faces many developmental problems in terms of regional inequality. Due to several economic, agricultural and social barriers, all regions in Odisha do not share development benefits equally.

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Sector wise gross value added (GVA) in Odisha: A statistical analysis

Pritipadma Sahu and Dr. Rajendra Gartia

Abstract

Gross value added (GVA) is an economic productivity metric that measures the contribution of a corporate subsidiary company, or municipality to an economy, producer, sector, or region. GVA is the output of the country less the intermediate consumption, which is the difference between gross output and net output. It is important because it is used to adjust GDP, which is key indicator of the state of a nation's total economy. The Odisha's economy is composed of mixture of economic activities related to 17 sectors i.e. Agriculture, Forestry, Fishing, Livestock, Mining and Quarrying, Manufacturing, Construction, Electricity, Gas, Water Supply & Other Utility Services, Transport by other means, Railway, Communication, Services related to Broadcasting Trade, Hotels and Restaurant, Financial services, Storage, Public Administration and Defence, and Other services. The present research study is a macro level attempt towards analyzing the regional variation in the growth of gross value added and comparing the sector wise contributions to the overall GVA of the state during the study period from 2011 to 2022. Pareto analysis which is a statistical technique in decision making will be used for the selection of a limited number of sectors i.e. Vital Few Sectors (VFS) that produce significant effect. It uses the Pareto principle (also known as the Juran's 80/20 rule) the idea that efforts may be focused on these VFS that contribute 80 percent of total state GVA so that the remaining Trivial many Sectors (TMS) having contribution to 20 percent can automatically be benefitted in terms of raising the GVA level. The degree of Inequality among the VFS sectors is measured by the computation of Gini concentration ratio or Gini Coefficient. By considering the degree of inequality among VFS sectors the policy implications can be formulated to overcome the inequality level. The Pareto analysis and Gini Coefficient describes the sector wise contribution to overall GVA of Odisha and also these estimates helps in drawing up suitable planning, programs and policy implementation. The broad policy objectives Thus, formulation of broad policy objectives is necessary for the under developed sectors i.e. Trivially Many Sectors (TMS) sectors. The best and appropriate development program can be formulated to remove inter sector wise disparities contributing to GVA.

Keywords: Gross value added (GVA), pareto analysis, vital few sector (VFS), trivial many sector (TMS), gini coefficient

Introduction

GDP is a very strong measure to gauge the economic health of a country and it reflects the sum total of the production of a country and as such comprises all purchases of goods and services produced by a country and services used by individuals, firms, foreigners and the governing bodies. It is used as an indicator by almost all the governments and economic decision-makers for planning and policy formulation. When government officials plan for the future, they consider the various economic sectors' contribution to the GDP. But, now the GDP of Indian economy and state economy is calculated in terms of GVA rather than considering GDP for better measurement of economy. The difference between GVA and GDP is that GVA is the value added to the product to enhance the various aspects of the product whereas GDP is the total amount of products produced in the country. GVA is the output of the country less the intermediate consumption, which is the difference between gross output and net output. GVA is important because it is used in the calculation of GDP, a key indicator of the state of a nation's total economy. It can also be used to see how much value is added (or loss) from a particular region, state, or province. At the national level, GVA is sometimes favored as a measure of total economic output and growth over GDP or (GNP). GVA is related to GDP

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GENERALIZED RATIO ESTIMATORS IN TWO-PHASE SAMPLING WITH TWO AUXILIARY VARIABLES

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ABSTRACT

This paper considers estimation of a finite population mean under two-phase sampling procedure involving two auxiliary variables with the assumption that population mean of the first (main) auxiliary variable is unknown whereas population mean of the second (additional) auxiliary variable is known accurately. This issue has been addressed by bringing out two generalized ratio-type estimators constituting two separate families/classes of estimators of course not necessarily disjoint. Some optimum properties of the proposed generalized estimators have been investigated and sufficient conditions for their superiority over the classical two-phase ratio estimator have been reported. After identifying some ratio/ratio-type estimators as specific cases of the said generalized estimators, both analytical and empirical comparisons among various estimators have been undertaken to show the effectiveness of the proposed estimation technique.

KEYWORDS: Auxiliary Variable, Ratio Estimator, Two-Phase Sampling

Article History

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INTRODUCTION

Let the study variable y and an auxiliary variable x be defined on a finite population U of N units with $(y_i, x_i), i = 1, 2, \dots, N$ as their observed values on the i th unit. When the correlation coefficient between the two variables has a high positive value and no prior information is available on the population mean $\bar{X} = \frac{1}{N} \sum_{i=1}^N x_i$, then one of the most advantageous estimation strategy for the population mean $\bar{Y} = \frac{1}{N} \sum_{i=1}^N y_i$ is the classical ratio estimator in conjunction with two-phase or double sampling. Here, for our purpose, let the two-phase sampling methodology be described in the following manner:

- In the first phase, a large initial sample (called first phase sample) $s_1 (s_1 \subset U)$ of n_1 units is taken from the population by simple random sampling without replacement (SRSWOR) to obtain an acceptable estimate of \bar{X} by measuring the values of x for all the n_1 sampled units.
- In the second phase, a sub-sample (called second phase sample) $s_2 (s_2 \subset s_1)$ of n_2 units is again selected from s_1 by SRSWOR to measure the main characteristic under study y for each of these n_2 units.



A CHAIN PRODUCT-TYPE EXPONENTIAL ESTIMATOR FOR POPULATION MEAN IN DOUBLE SAMPLING

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ABSTRACT

This paper deals with the estimation of a finite population mean in two-phase sampling in the presence of two auxiliary variables. An efficient product-type exponential estimator is proposed and the properties of the proposed estimation procedure have been examined up to first order of approximation. The proposed estimator is more reliable as compared to the other consisting existing estimators for different parameter values.

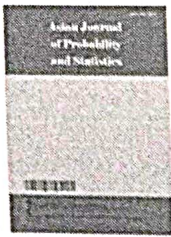
Keywords: Two-phase Sampling, Auxiliary variables, Study variable, Bias, Mean Square Error, Percent Relative Efficiency.

1. Introduction

Consider a finite population $U = (U_1, U_2, \dots, U_N)$ of N units. Let \bar{X} , \bar{Y} and \bar{Z} denote the population means, C_x , C_y and C_z denote the coefficients of variation, ρ_{yx} , ρ_{yz} and ρ_{xz} denote the correlation coefficients. Let Y be the study variable and X and Z be the auxiliary variables with corresponding values y_i , x_i and z_i ($i = 1, 2, \dots, N$). The problem is to estimate \bar{Y} in the presence of two auxiliary variables x and z .

Let $S_y^2 = \sum_{i=1}^N (y_i - \bar{Y})^2 / (N - 1)$ and $S_x^2 = \frac{\sum_{i=1}^N (x_i - \bar{X})^2}{(N-1)}$, $S_z^2 = \sum_{i=1}^N (z_i - \bar{Z})^2 / (N - 1)$ and Let $C_y = S_y / \bar{Y}$, $C_x = S_x / \bar{X}$ and $C_z = S_z / \bar{Z}$ be the coefficients of variation of y , x and z respectively. $f_1 = \left(\frac{1-f}{n} \right)$, $f_2 = \left(\frac{1-f'}{n'} \right)$, $f_3 = \left(\frac{1-f''}{n} \right)$,

where $f = \frac{n}{N}$, $f' = \frac{n'}{N}$ and $f'' = \frac{n}{n'}$



On A Method of Bias Reduction in the Product Method of Estimation

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Abstract

In this paper, we focused our attention on the creation of an almost unbiased predictive product estimator after estimating and correcting bias of the classical product estimator under predictive approach. Considering mean square error as the performance measure, superiority of the proposed estimator has been analyzed compared to the classical product estimator and Robson's [1] unbiased product estimator under (i) a finite population set-up, (ii) an infinite population set-up assuming bivariate normal distribution between the variables, and (iii) the assumption of a super-population model.

Keywords: Almost unbiased product estimator; predictive approach; super-population model.

1 Introduction

Let y and x denote the survey variable and an auxiliary variable taking values y_i and x_i respectively on the i th unit of a finite population $U = \{1, 2, \dots, i, \dots, N\}$ of N units. Define $\bar{Y} = \frac{1}{N} \sum_{i=1}^N y_i$, $\bar{X} = \frac{1}{N} \sum_{i=1}^N x_i$ as the population means and $S_y^2 = \frac{1}{N-1} \sum_{i=1}^N (y_i - \bar{Y})^2$, $S_x^2 = \frac{1}{N-1} \sum_{i=1}^N (x_i - \bar{X})^2$ as the population variances of y and x , and $S_{yx} = \frac{1}{N-1} \sum_{i=1}^N (y_i - \bar{Y})(x_i - \bar{X})$ as the population covariance between y and x . Assume that a

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A study of efficacy for empowering women through SHG

Prasanta Sahoo and Dr. Ranjan Kumar Sahoo

Abstract

There are a few elements for the advancement of a nation and the women's Self-help Group (SHG) is one of the most important elements of them. Women are the key to the economical turn of events and personal satisfaction in the family. They are drawing in themselves in various profitable activities like handicraft, aquaculture, hand-loom, collective cultivating, making and selling snacks, and a lot more which brings financial independence and prosperity to their families. There are many factors of women empowerment like age, education, self-dependence, gender discrimination, economic activities, social activities, decision making, etc. Self-help groups play a vital role in the development of the nation. This research work focuses on the impact of education for strengthening women's self-help groups in the Balangir district of Odisha. Through multinomial logistic regression outcomes of the study reveal that educational status is the footprint of social empowerment of women SHG of the district. Also, perceive the correlation between the number of SHG promoters and the number of household mobilization. The present study focuses on sample categorical data which were collected by multi-stage sampling technique to know which category has more dominating power in the race of women empowerment through SHG.

Keywords: Women empowerment, SHGs, education, household mobilization

Introduction

India's economy is one of the world's fastest-growing economies. The different factors are responsible for economic growth and self-help groups (SHGs) are one of the most important factors of them. Nowadays, women's empowerment is one of the best segregated and classified matters to be discussed in India. Women empowerment means the all-round development of women politically, socially, economically. Women's empowerment is most essential for concluding imperishable development. The United Nations Development Programme (UNDP) has deduced two considerable directions to empowerment. The first is social mobilisation and collective agency, as impoverished women frequently lack the fundamental capacities and self-confidence to overcome the problems and constraints that they face. Change agents are frequently required to intentionally catalyse societal mobilisation. Second, economic security must accompany and support the process of social mobilisation. The underprivileged will not be able to mobilise as long as they are impoverished and their livelihoods are in jeopardy (UNDP 2001). According to many authors empowerment means freedom socially, economically, and politically. Even though women largely participate in different income generated activities for giving financial help to their families, in rural areas, women are the most disadvantaged people. Many researchers focus on the eradication of poverty they all found that although various factors are responsible and out of these factors one of the most influencing factors is a self-help group. SHG helps to empower women and engage them in different gainful activities. It is visible that women empowerment and poverty are inversely related to each other i.e., more empowerment of women directly impacts on eradication of poverty. Many scholars accept that women's empowerment is one of the significant endowments of development.

Objectives

The objectives of the present research are as follows;

- To focus on the demographic profile of the Balangir district of Odisha.
- To study the measure of association between several SHG promoters and the number of household mobilization.

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A Study on The Contribution of Women's Participation in SHG on Monetary Prosperity Utilizing Measurable Models.

Prasanta Sahoo¹, Dr. Ranjan Kumar Sahoo² & Saradaprasan Jena³

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Abstract: - Financial advancement of the individuals is supposed to be achieved when society works on the nature of individuals' life through expanding per capita pay, decreasing destitution, upgrading individual monetary open doors and so forth. Women Self-help Groups are changing the monetary situation through the normalization exertion in the rural areas. After joining self-help groups, they are engaging themselves in different income-generating activities which helps them to become self-independence. Their income level also increases as well as savings also increases. The present study is a reality tracking down exercise to compare the income level as well as savings of women before and after joining SHGs. The present research work comprises both primary and secondary data. The primary data are collected through the mailed questionnaire method and analysed by using suitable statistical models. The results of the research work found that women are more self-reliant and benefit monetarily because they participated in self-help groups.

Key Words: - Self-reliant, SHG, Economic empowerment, wellbeing.

Introduction: -

In the early decades, the idea of women's improvement was thoroughly out of the psyche. Women's condition was hopeless since they were dependent upon numerous financial, political, and social limitations. The circumstance was more basic in the provincial and in reverse regions. The job of women in monetary advancement is connected with the objective of a thorough financial turn of events. Because of the improvement of new arrangements and projects, the situation with women has been changed as they help destitute women. The strengthening approach is the latest and it is pointed toward enabling ladies through confidence and interior strength. Self-help groups Bank-Linkage Program has likewise arisen as a powerful system to assist with arriving at monetary administrations to the unreachable unfortunate women section of the general public.

The monetary advancement of the individuals is supposed to be accomplished when the general public works on the nature of individuals' life through expanding per capita pay, lessening neediness, upgrading individual monetary open doors, better instruction, further developed wellbeing and sustenance, preservation of normal assets, a cleaner climate, and a more extravagant social life. The improvement of new approaches programs and even activities worked with changes in the situation with ladies by giving help to the low pay ladies. This worry for low-pay ladies' necessities has concurred generally with acknowledgement of their significant job being developed. The strengthening approach is the latest and is pointed toward enabling ladies through more noteworthy confidence and inner strength. The legislature of India has started, through its approach of enabling the ladies, arrangement of self-bunch gave to focus on

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ARTICLE

Synthesis of carboxylic graphene oxide-carboxymethyl chitosan composite and its applications toward the remediation of U^{6+} , Pb^{2+} , Cr^{6+} , and Cd^{2+} ions from aqueous solutions

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Abstract

The current research work deals with the synthesis of a novel composite material of carboxylic graphene oxide-carboxymethyl chitosan (COOH-GO-CMC) composite by ultrasound and microwave-assisted processes. The composite was characterized by Fourier Transform Infra-red spectroscopy, X-ray Powder Diffraction, Raman Spectroscopy, Scanning Electron Microscopy, and X-ray Photoelectron Spectroscopy. The synthesized composite was used to remove heavy toxic metal ions (HTMIs) such as uranium (U^{6+}), lead (Pb^{2+}), chromium (Cr^{6+}), and cadmium (Cd^{2+}) ions from aqueous solutions. The HTMIs removal study was carried out to verify the effects of pH, contact time, amount of adsorbent dose, initial concentration, and temperature. The linear and non-linear Langmuir and Freundlich adsorption isotherms were fitted to the data of removal studies, and it was observed that the linear Langmuir adsorption isotherm ($R^2 > 0.99$) was the best-fitted model. The maximum adsorption capacities of COOH-GO-CMC were found to be 74.62, 416.66, 76.92, and 53.47 $mg\ g^{-1}$ for U^{6+} , Pb^{2+} , Cr^{6+} , and Cd^{2+} ions, respectively. The kinetics studies, including four types of models (linear and nonlinear pseudo-first-order, linear and nonlinear pseudo-second-order, Intraparticle diffusion, and Elovich kinetic models), were tested, and the results showed that the linear pseudo-second-order kinetics model ($R^2 > 0.99$) was the best-fitted model. The thermodynamic studies reveal that the adsorption of HTMIs is a spontaneous ($\Delta G < 0$) and exothermic ($\Delta H < 0$ and $\Delta S > 0$) process in nature.

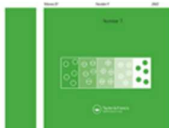
KEYWORDS

adsorption isotherm, carboxymethyl chitosan, graphene oxide, heavy metal ion removal

1 | INTRODUCTION

Any metallic element with a comparatively high density that is toxic or poisonous even at low concentrations is referred to as "heavy metal." Heavy metals are defined as metals with an atomic number greater than 20 and an

atomic density greater than $4\ g\ cm^{-3}$, or 5 times the density of water.^[1] As a result of rapid industrialization, hazardous contaminants are discharged in large quantities into different water bodies. As these contaminants are non-degradable, toxic, cancer-causing agents, and difficult to remove from water, heavy toxic metal ions

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Microwave-assisted preparation of carboxylic graphene oxide-chitosan composite for adsorption of uranium and heavy toxic metals in water samples

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Microwave-assisted preparation of carboxylic graphene oxide-chitosan composite for adsorption of uranium and heavy toxic metals in water samples

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ABSTRACT

In this study, the microwave-assisted novel composite of carboxylic graphene oxide-chitosan (COOH-GO-CTS) was prepared by using carboxylic functionalized graphene oxide (COOH-GO). The prepared composite was characterized by FTIR, SEM, XRD, XPS and Raman spectroscopy successfully. The composite was used as an adsorbent material for the removal of heavy metals such as uranium (U), lead (Pb), chromium (Cr), and cadmium (Cd). Batch adsorption was carried out to study the effects of pH of the medium, initial concentration of heavy metals, amount of adsorbent dosage, contact time, and temperature. The removal percentages for U, Pb, Cr, and Cd were observed to be 92.4, 94.6, 90.2, and 90.6% at 5, 5.5, 3, and 5 pH, respectively. Adsorption isotherms were performed for Langmuir and Freundlich adsorption, and it was observed that the Langmuir adsorption isotherm well fitted ($R^2 > 0.99$) the present adsorption study. The maximum adsorption capacities of the composite for U, Pb, Cr, and Cd were found to be 64.93, 384.61, 68.49, and 49.50 mg g⁻¹, respectively. The heavy metal adsorption kinetics were also performed, and it was observed that the pseudo-second order was well fitted ($R^2 > 0.99$) the present study. Further, the thermodynamic studies confirmed the adsorption of the heavy metals to be endothermic and spontaneous in nature.

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Heavy metal removal;
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Introduction

As a civilization, more energy is required for human beings. The world's energy demand has rapidly increased in the past few decades due to the development of civilization in the world.^[1] Among various energy forms like light, heat, gravitational, electrical, sound, mechanical, chemical, atomic and nuclear energy, nuclear energy plays a vital role in the modern era. Uranium is one of the major key raw materials for radioactive disintegration in nuclear fission.^[2] During the disintegration process, many types of radioactive isotopes, and heavy toxic metals are released from the nuclear plant to the wastewater. The high amounts of uranium and heavy toxic metals in the water samples are very risky for human health and all other living organisms. Permissible limits for U, Pb, Cr, and Cd in drinking water are 30 µg L⁻¹, 0.01 mg L⁻¹, 0.05 mg L⁻¹, and 0.003 mg L⁻¹, respectively^[3] as recommended by the WHO (World Health Organization). Uranium ions are released into the environment as a result of uranium mining and geological disposal of radioactive waste.

Uranium is harmful to the liver, lungs, kidneys, and central nervous system. The creation of complexes with proteins and phospholipids in the cells has been linked to the harmful effects of uranium in the organs.^[4,5] Due to the high concentration of uranium, serious health issues like nephrotoxic and cancer risk in the human body arise.^[6] Lead is a hazardous element found in the Earth's crust and its broad use has caused massive environmental damage, human exposure, and serious public health issues in many parts of the world. Chromium is a metallic element with no odor and no taste that can be found in rocks, plants, soil, and volcanic dust. The trivalent and hexavalent species of chromium are the most common types of chromium found in natural waterways. Cr(VI) is 100 times more hazardous than Cr(III), with significant carcinogenic, mutagenic, and teratogenic effects on biological systems.^[7] Further, Cadmium as an impurity in the zinc of galvanized pipes or cadmium-containing solders in fittings, water heaters, water coolers, and taps can cause contamination of drinking water.^[3]

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Photophysical Behaviour of Novel Quaternary Pyrenoyl Salts and Their Sensitivity Towards Bile Salt Micellization

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Abstract

The present work describes the synthesis and characterization of pyrene derivatives, N-(1-Pyrenoylmethyl) pyridinium bromide (PM-PB) and N-(1-Pyrenoylmethyl)-N,N,N-triethylammonium bromide (PM-TAB). The photophysical behavior of these molecules has been studied in various protic and aprotic solvents. Using steady state fluorescence intensity, fluorescence anisotropy and dynamic fluorescence lifetime studies, the sensitivity of these molecules towards the micellization process of bile salts has been monitored. These derivatives have been effectively used in estimating critical micellar concentration (CMC) of bile salt, sodium deoxycholate (NaDC).

Keywords Pyrenoyl salts · Bile salt · Micellization · Sodium deoxycholate · Fluorescence

Introduction

Pyrene is an interesting fluorescent molecule for preparing organic electronic materials.¹ Over the past decade, many pyrene-based dyes have been synthesized, and their photophysical properties have been studied [1–4]. Fluorescence of pyrene derivatives always has potential application in studying organized and micro-heterogeneous media [3, 4]. The photophysical properties of pyrene carbonyl compounds like 1-methoxycarbonylpyrene, 1-acetylpyrene, pyrene-3-carboxaldehyde, 1-pyrenecarboxylic acid, are well known and have widely been used in various fields [1]. Polarity sensitive, sparingly soluble fluorophore pyrene-3-carboxaldehyde and pH sensitive 1-pyrenecarboxylic acid make them useful derivatives of pyrene [1, 5–7]. The understanding of photophysical properties of carbonyl

functionalized pyrenes is essential for material design and for expanding the scope of their applications.

The physiological importance of bile salts lies in their potentiality to solubilize fat soluble vitamins, cholesterol, and lipids in the hepatobiliary systems [8–10]. These biosurfactants have obtained much recognition due to their application in delivery systems for medicines, cosmetics etc. Bile salts at their lower concentrations are known to hydrate the lipid bilayer membranes [11–13]. Micelle forming ability of bile salts is due to the presence of hydrophobic and hydrophilic parts in the same molecule. The micellization process brings about several changes in a surfactant solution. This results in appreciable alteration in surface tension, viscosity, light scattering phenomenon, etc., which makes the basis of several analytical techniques for the investigation of micelle formation [14–18]. For monitoring the biological activities of bile salts the critical micelle concentration (CMC) is an important fundamental parameter. Over the years, fluorescence spectroscopy has been used as an important technique to study the CMC of bile salts [4, 18–21].

The main objectives of the present work are (i) synthesis and characterization of the carbonyl functionalized pyrene derivatives, N-(1-Pyrenoylmethyl) pyridinium bromide (PM-PB) and N-(1-Pyrenoylmethyl)-N,N,N-triethylammonium bromide (PM-TAB); (ii) detailed photophysical investigations of the synthesized molecules in homogeneous media; (iii) sensitivity of these molecules towards micellization process of bile salt, sodium deoxycholate (NaDC).

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Study of interactions of bioflavonoid quercetin with hydrotropic agent urea: An environmentally friendly approach

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ABSTRACT

The plant pigment Quercetin (QUE) belongs to the flavonoid group and it is having significant biological importance. However, its poor water solubility is a matter of concern. To increase the dissolution and bioavailability of QUE, the use of hydrotropes is encouraged. As flavonoids are precisely associated with human health and dietary constituents, in the present work different concentrations of QUE are prepared in 30 % v/v, 40 % v/v ethanolic solutions of a hydrotrope, urea. The specific conductance (K) values were measured at different temperatures. Parameters like limiting molar conductance (Λ_m^0), association constant (K_a), thermodynamic parameters like change in free energy (ΔG_a^0), change in enthalpy (ΔH_a^0), change in entropy (ΔS_a^0), and activation energy (E_a) for the solvation process were derived from the K values. The results obtained give us information regarding the extent of interactions of QUE with alcoholic solutions of urea. This may help to explore the degree of hydrophobic and hydrophilic interaction in the solution, which may imply achieving stable QUE and alcoholic hydrotrope concentrations for developing pharmaceutical formulations. Since QUE are associated with plant's responses to excruciating environmental conditions and energetically coordinate and improve cell growth and differentiation and also it may have future implications as far as aquatic environment is concerned.

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1. Introduction

Flavonoids are a class of natural substances with widely-distributed polyphenolic secondary metabolites, synthesized in different parts of plants, showing an excellent antioxidant capacity. The class of such antioxidant compounds reveals a very significant role in stress tolerance in plants and great importance in human health, particularly because of its antimicrobial and anti-inflammatory characteristics. It also protects low-density lipoprotein from oxidation, free radical scavenging capacity, blocks platelet aggregation, and develops relaxation of cardiovascular muscle [1].

The flavonoid used in this field is Quercetin also known as, [3,3',4',5,7-pentahydroxyflavone] a bioactive flavonoid, that expedites many plant physiological processes like antioxidant machinery, pollen growth, seed germination, and photosynthesis, also activates the growth and development of plants. Due to this higher

availability in plants, it is the most abundant flavonoids consumed by herbivorous and human beings [2]. The activity as an inhibitor of reverse transcription is used in controlling retrovirus infections like AIDS. It has the potential to scavenge free radical and lipid peroxidation which may have the ability to defend against cardiovascular diseases and cancer. Moreover, QUE also plays an important role in modulating the transport across epithelial cell membranes [3]. It is tending to act as an anticancer agent that promotes apoptosis of tumor cells [4]. The wide spectrum of biological properties of QUE has gained the point of attraction in research sectors. However, the low bioavailability and poor water solubility of QUE is still a major problem [5,6].

The physicochemical characteristics determined by using thermodynamic and acoustic studies generally helps to decide the quality of drug molecule being developed into formulations [7,8]. The study of electrical conductivity of solute in a solvent is greatly influenced by a number of components like solvent-solvent interactions, ion-solvation, hydrogen bonding, relative permittivity, temperature, viscosity etc [9–12].

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Exploring the interaction of dietary fiber hydroxypropyl methylcellulose and biosurfactant sodium deoxycholate

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Abstract

The interaction of dietary fiber and biosurfactant bile salt, and the fundamental concept of their aggregation process, may have implications for food formulations and pharmaceuticals. In this work, we have tried to explore the interaction between a simple dietary fiber hydroxypropyl methylcellulose (HPMC) and bile salt sodium deoxycholate (NaDC) by bringing almost all fundamental aspects of their aggregation process and physicochemical properties. The polarity parameter of fluorescent probe molecule pyrene and conventional conductivity method has been used to collect information on aggregation number (N_{agg}), critical aggregation concentration (CAC), and critical micellar concentration (CMC) of the HPMC/NaDC mixed system. The nature of micellization was found to be a feasible and spontaneous process from the calculated thermodynamic parameters, i.e., standard entropy (ΔS_{mic}^0), standard enthalpy (ΔH_{mic}^0), and Gibbs free energy (ΔG_{mic}^0). The dynamic light scattering and zeta potential measurements were carried out to get more information on the size distribution of HPMC/NaDC mixed system at different regions of their interaction and to have a better insight into their interaction.

Keywords Cellulose · Pyrene · Bile salt · Fluorescence · Aggregation · Thermodynamic parameters

Introduction

The non-digestible and non-ionic polysaccharides are commonly used as emulsifiers, as a potential lipid digestion modulator, in processed foods, and in many technological applications [1–7]. In the food industry, the physicochemical properties of these dietary fibers are modified to improve the texture, viscosity, shelf-life of their products [8]. Hydroxypropyl methylcellulose (HPMC) is non-ionic polysaccharides that acquire surface-active properties because of hydroxypropyl (hydrophilic) and methyl (hydrophobic) groups added to the anhydroglucose backbone (Fig. 1). HPMCs show plasma and hepatic cholesterol-lowering effects [9, 10]. To get a controlled release in the gastrointestinal tract, they act as a carrier for the active food ingredients [11]. HPMCs are having a good role in the modulation of *in vitro* lipolysis [12]. HPMC and methylcellulose (MC) are

the primary cellulose derivatives that are used in a wider way of applications in food formulations and pharmaceuticals [3].

Bile salts are biological surfactants that get generated in the liver by the oxidation of cholesterol, stored in the gallbladder, and pass into the intestinal lumen [13]. These are vital constituents of hepatobiliary systems [14, 15]. They have a facial amphiphilic nature due to the presence of hydrophobic and hydrophilic groups in opposite faces (Fig. 1) [16, 17]. The structural conformation of bile salts makes them very efficient in interaction with cellulose derivatives. The means of their interaction depends on the nature of the dietary fiber [8]. Bile salts play an important role in lipid digestion by stabilizing the oil droplets and by forming micelles with them. The lipolysis effect of cellulose derivatives has been explained by their interaction with bile salts [7, 10, 12].

Torcello-Gómez and Foster [10] have analyzed the interaction of cellulose derivatives with NaTDC (sodium taurodeoxycholate) by interfacial tension, micro-differential scanning calorimetry (micro-DSC), and dilatational rheology methods. Torcello-Gómez et al. [8] in another work by using micro-DSC and linear mechanical spectroscopy methods have studied the effect of substituent pattern of cellulose

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ISSUES AND CHALLENGES IN SUPPLY CHAIN MANAGEMENT FOR VEGETABLE MARKETING: A CASE STUDY OF BARGARH DISTRICT IN ODISHA

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ABSTRACT

The areas of supply chain management in vegetable marketing have received significant attention from many researchers. Many of the prior studies have focused on foreign countries in this context, while very few studies have been conducted on the content of the state of Odisha also the majority of the studies have focused on the whole horticulture sector but not specified any particular sector. However, the present study is an attempt to explore the issues and challenges in supply chain management for vegetable marketing regarding the awareness level of young people will be dealt with in this study. The study has been conducted by taking farmers, local commission agents, wholesalers, retailers & consumer responses from Bargarh District. India is the world's second-largest producer of many vegetables, whereas Odisha ranked fourth in terms of the production of vegetables. Supply chain management plays an important role for the vegetable growers and also for the consumers so that the farmers could be benefited and the consumers could fetch fresh vegetables at the proper price. Vegetable growers are faced many challenges due to limited irrigation facilities and insufficient infrastructure support like cold storage, markets, roads, transportation facilities, etc these are the main reason for low vegetable production. Vegetable crops are more damaged due to heavy post-harvest and handling losses, and high cost of production. For this analysis, the total sample size of farmers is 504, local commission agents 45, wholesalers 67, retailers 84, and the consumer 100 respondents have been



**THE ROLE OF SUPPLY CHAIN MANAGEMENT PRACTICES ON VEGETABLE
MARKET PERFORMANCE IN BARGARH DISTRICT**

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Abstract

This study examines supply chain management as a new concept from a business point of view, an opportunity for marketers to take advantage of SCM to promote their products and target customers. Today, people don't have time to buy & sell physically. So, people are becoming more and more connected with Supply Chain Management. As technology improves and the number of Internet users increases most traders are choosing SCM to promote the sale of goods and services and connect with customers indirectly. India ranks second in the world in vegetable production after China. The fast-growing popularity of social networking is considered to be the third revolution in communication that allows traders, regardless of location and time to communicate with target audiences. Supply chain management will be addressed through cold chain infrastructure, proper connectivity, modern technology, proper packaging, and farmers' awareness; these are all responsible for vegetable sales and profitability. SCM can be a farmer's best friend for the sale of seasonal products. Farmers will begin a new era of experience through knowledge, availability, distance, time, or physical walls. Every vegetable trader will take SCM and determine their daily farming practices and be able to reach the maximum benefits. This analysis focuses on the block-level data of the Bargarh district of Odisha. The total sample size of farmers is 504, local commission agents 45, wholesalers 67, retailers 84, and the consumer 100 respondents have been selected. The study has focused on supply chain management practice, middlemen effect, and vegetable market performance.

Keywords: SCM Practices, Technological Effect, Vegetable market performance, Marketing Awareness

1. Introduction

Supply chain management is a business perspective as a new concept, it plays an important role from vegetable growers to end-customer. There involved many stakeholders like farmers, local traders, wholesalers, and retailers. It also developed a supply chain model which would help to reduce wastage by enhancing the effective flow of information and product within the supply chain. Most of the time state of Odisha produces high vegetable crops and supplies to the other state. Some of the major vegetables produced in Odisha like brinjal, tomatoes, cabbage, cauliflower, onions, and sweet potatoes. These vegetables represent three-fourths of the total vegetable production in Odisha as compared to other states; Odisha is the largest producer of sweet potatoes and pumpkin, the second-largest producer of brinjal and cabbage, the fourth-largest producer of okra, cauliflower, and the fifth-largest producer of tomatoes in India. Fluctuating demand and supply management allow for prices to be unstable. This affects the profit margins of

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Abstract - Digital Marketing has become most preferred way of communicating to the customers. In a State like Odisha, where the potential customers have increasing been influenced by Digital Marketing, its scope has grown manifold in the recent years. The customers of Odisha have been increasingly drawn towards online shopping in the last few years. In regards to the results of this study and the theoretical understanding about the subject matter through literature review, this study analyzed the hypotheses and discussed their comparisons with the literatures. Consumers of Odisha are medium users of the Internet and they research moderately for product/service information. And their favorite searching mode for product/service information is company website and then social networking sites. In this context, Consumers mainly acquire information for intangible products (education) more than the tangible products via the Internet. In addition, they tend to buy electronic and FMCG products online. A part from that majority of the consumers in the study has the intention to buy online in the future. Nevertheless, the present study has contributed to our understanding of online buyer behaviors, which has profound implications for organizations conducting business via the Internet. It helps online retailers better address the needs and wants of their consumers and devise their online retail strategies for website design and online advertising. Data on online consumer buying behaviors are much needed in lieu of the gaining importance of online retailing.

Keywords: Digital Marketing, Buying Behavior, Purchase Decision

1. INTRODUCTION

Digital Marketing has become most preferred way of communicating to the customers. In a State like Odisha, where the potential customers have increasing been influenced by Digital Marketing, its scope has grown manifold in the recent years. The customers of Odisha have been increasingly drawn towards online shopping in the last few years. Although the numbers have been increasing, the complexities and challenges involved are worth studying. The buying decision process is cumbersome but can be studied to understand how a typical customer takes the final decision to buy, to defer, or not to buy and the place and time at which he buys. This study is an exploration in to the customers' psyche, impact of Digital marketing, online buying behaviour and purchase decision of a customer.

1.1 Purpose of the study

Most of the companies are using digital marketing to fulfill the demands of the target consumers because most of the consumers are using digital media. The purpose of the study is to examine the impact of digital marketing on the online buying behaviour and actual purchase decision with special focus on the consumers of 9 districts of 3 zones of State of Odisha. This study also intends to find out the awareness level of consumers towards the importance of digital marketing and the preference of various digital channels. This empirical study is carried out through exploratory and causal research design.

**IMPACT OF EMPLOYEE STOCK OWNERSHIP PLAN (ESOP) ON EMPLOYEE
SATISFACTION IN PAYTM**

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Abstract

The Indian workforce is currently experiencing career stress. ESOP can be used to support employees who are faced with these issues. The research motto was to investigate the relationship between ESOP and employee career development in Indian companies. Ancillary data is used to analyze Paytm data. Research has shown that ESOPs help improve the careers of employees within organizations and reduce employee turnover. Employees of the organization will have the opportunity to own shares in the company while the rights are transferred.

Keywords: ESOP, Employee satisfaction, Companies act 2013, labour turnover, Career development.

1. Introduction

The United States developed the world's first Employee Share Ownership Plan (ESOP). Since then, ESOPs have been adopted by many countries, including Russia, France, Japan, UK, and China, but the main goal is to focus on human capital (Xiao et al., 2019). Currently, each company pays special attention to career development, sustainability and retention of employees in the business. The ESOP concept was first introduced in India after the company law amendment in 2013. The main motto of ESOP is to satisfy employees by issuing shares for free (Abbott, 2003). The purpose of this study is to retain key executives and other employees of the company through employee satisfaction. Recently, employee satisfaction is recognized as an intangible asset of service companies. There are many ways to reduce labor turnover in the corporate world, but ESOP is one of the best in recent years (Sainju et al., 2021). China has successfully implemented ESOP, but in southern China, employees of manufacturing companies are the biggest beneficiaries (Xiao et al., 2019). India is a newcomer to the ESOP field. Paytm's secondary data is used to analyze the data in this review. This study will show that Indian companies can retain key management by issuing ESOPs. The company considered the sustainability of employee careers and future growth in the workplace (Fang et al., 2021).

2. Literature Review

Employees of various companies have benefited from implementing ESOPs in China. This has helped employees develop their careers as well as improve job security. Employees of Chinese manufacturing companies have greatly benefited from ESOPs (Xiao et al., 2019). Although the hospitality industry has a higher employee turnover rate, to mitigate this problem, the company has adopted the hospitality industry job satisfaction model. This model has been completely successful in retaining staff in the hospitality industry (Bangwal & Tiwari, 2019; Ann & Blum, 2020; Gu & Chi Sen Siu, 2009; Sainju et al., 2021). Even if employees are unhappy and have low morale, they have worked hard, satisfied customers, and made more profits in the industry. This was particularly pointed out in the banking and technology sectors (Abbott, 2002). Overall quality control has a huge impact on job satisfaction in the Indian manufacturing sector. The TQM showed that the satisfaction level of private

Article

Examining Risk Absorption Capacity as a Mediating Factor in the Relationship between Cognition and Neuroplasticity in Investors in Investment Decision Making

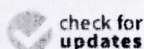
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Abstract: The encouragement of potential investors who are emotionally broken by past losses and market experiences is crucial to the sustainable flow of funds to the stock market. This can be established by building a knowledge-creating mechanism among investors in their cognitive dimensions, which, in turn, can develop their risk-bearing potential to reach the optimum level so that emotionally broken investors can use their cognitive abilities with their developed risk-absorption potential to further invest in the market in the near future. This study investigates the mediating effect of risk-absorption attitudes in the relationship between cognition and neuroplasticity in investors. Data for the study collected from 506 individual retail investors' samples using a stratified random sampling technique were analyzed through covariance-based structural equation modeling. The findings of the study indicate that the constructs, viz., the investors' cognition, risk absorption, and neuroplasticity, are valid and reliable. The structural model also supports the notion that risk absorption mediates the relationship between the investors' cognition and neuroplasticity. The outcomes of the study are expected to aid in the policy formulation for equity-related financial product marketers, such as depository participants, brokers, mutual funds and SIP institutions, and to help in healing psychological trauma that potential investors suffered from due to losses in the past and overcoming reluctances to further invest in stock markets. The investors' terrible psychological health developed because of past loss experience can be restored through the concept of neuroplasticity, in which different cognitive dimensions are used, while also enhancing risk absorption in potential investors.

Keywords: risk absorption; risk tolerance; neuroplasticity; cognition; behavioral finance; CB-SEM

JEL Classification: E71; G41; G24



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1. Introduction

A sustainable economy always requires sustainable financial power, but a crisis in world economy significantly affects India's economy (Himanshu et al. 2021; Liu et al. 2020), as it mainly depends on major foreign direct, portfolio and institutional investments for its financial needs (Long et al. 2017). The investment from domestic individual investors is only 3.7% of the total investment pool, in comparison to 55% in the U.S.A. (Balwani et al. 2021). These statistics show that the flow of funds to Indian securities markets is the result of the contribution from external sources rather than domestic sources, which makes the Indian economy vulnerable to external crises (Hoffmann et al. 2010). Therefore, it is necessary to inject more funds from domestic sources to make the economy sustainable in the future.

Shibani Sharma

Marketability of Electric Bikes: A Study in South East Odisha

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Shibani Sharma²

Srinivas Rao K.³

Abstract

Starting from the need to have cost-effectiveness in transportation to combating pollution, the electric vehicle (EV) stands as a potential alternative. Still, a large mass in India depends on fossil fuel-operated vehicles for their transportation questioning the marketability and acceptability of the electric vehicle. The purpose of the study, therefore, is to find the features driving the purchase decision and its impact on the purchase intention of the customers for the electric vehicle. 108 responses were collected using stratified random sampling with the help of a self-structured questionnaire from four districts of South Odisha, namely, Koraput, Kalahandi, Malkanigiri and Rayagada. Social media influence, post-purchase services, cost-effectiveness, and combating pollution are found to be the most important factors driving the consumer's purchase intention for the electric vehicle the most. Some other elements also influence the purchase intention of the consumers such as ease of use (maintenance cost, pollution control certificate, easy-to-drive electric vehicle, etc.), promotional and advertisement strategies (roadside banners, television advertisements, friends and family's recommendation, etc.).

Keywords: *Social media influence, electric vehicle, advertisement, purchase intention.*

Introduction

India being the fourth automotive market in the world provides a wider scope for automobile and ancillary industries to grow. The automotive sector has contributed

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Development of a database of RNA helicase inhibitors (VHIMDB) of pathogenic viruses and in silico screening for the potential drug molecules

Satpathy R¹, Acharya S²

Abstract

The pathogenic RNA virus that infects human beings contains the RNA helicase enzyme, responsible for the replication of the viral genome. The enzyme is used as a suitable target against which the drug molecule acts. Therefore, the identification and proposal the novel compounds that can be targeted toward the helicase enzymes to stop the functioning of the enzyme is desirable. Although many viral helicase inhibitor molecules have been identified, still yet no unique database is available for these compounds. This research work envisages developing a curated database of RNA helicase inhibitors. The database contains in total of 353 entries that are computationally predicted and experimentally verified RNA helicase inhibitors. The database contains information like compound name, chemical properties, chemical format, and name of the target virus to which it acts against it with a user-friendly menu-driven search engine. Presently, the database is freely available at: <https://vhimdb.rsatpathy.in/>. Further, in silico screening of the whole database by drug-likeness and toxicity resulted in 14 potential drug molecules. The selected molecules were analyzed for their effectiveness in binding by using molecular docking score and interaction with the helicase enzymes of three categories of pathogenic viruses (SARS-CoV-2, SARS-CoV, and MERS-CoV).

Keywords: relational database, RNA helicase inhibitor, pathogenic virus, web development, molecular docking, interaction analysis, drug development

Introduction

A large number of diseases in the case of human beings are caused due to the infection of the RNA-based virus. The enhanced infection rate sometimes becomes pandemic and causes a huge loss in human society [1-2]. Also, the genomic evolutionary rate of these pathogenic viruses is rapid therefore creating resistance against the antiviral drugs. Different types of anti-viral drugs are available for the control of infection of pathogenic viruses based on their activity on the viral targets [3-4-5]. Interestingly, sometimes a single type of antiviral drug molecule can be used to control the pathogenic RNA viruses that usually block the genome replication. In this aspect, the RNA helicase enzyme is considered a suitable target upon which the inhibitor molecules can act [6-7]. The viral helicase enzyme is an essential enzyme that helps in the separation (post replication process) of nucleic acid strands by deriving the energy from the hydrolysis of the Adenosine Triphosphate (ATP) molecule [8]. The detailed structural studies of the helicase enzymes have been performed in the case of positive-sense single-stranded RNA viruses such as hepatitis C virus (HCV), severe acute respiratory syndrome coronavirus (SARS-CoV), Dengue virus, Japanese encephalitis virus (JEV), and West Nile virus (WNV) and so on [9-10-11]. Most recently their validity as effective antiviral drug targets has been confirmed in the case of novel coronavirus 2019 (Sars-CoV-2) [12-13-14]. Due to rapid progress in the viral assay development methods followed by high throughput screening (HTS) enables the researcher to discover the novel potential helicase inhibitor molecules [15-16-17]. Also, the major challenge encountered in understanding the interaction of these compounds with the viral helicase enzymes, so that they can be treated as drug molecules against the virus. Very few compounds with promising helicase inhibition activity

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Reclassification of *Streptococcus ilei* as a later heterotypic synonym of *Streptococcus koreensis* based on whole-genome sequence analysis

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Abstract

The genus *Streptococcus*, a member of family *Streptococcaceae*, is known for its wide range of industrial, clinical and human relevance. Among the species of genus *Streptococcus* two members, namely *Streptococcus koreensis* and *Streptococcus ilei*, were isolated from subgingival dental plaque and human small intestinal fluid, respectively. The 16S rRNA gene sequence similarity of the type strains of these members shows a similarity of 99.87%. In this study, we performed a systematic study to clarify the taxonomic assignment of these two species. Genome similarity assessment based on whole-genome sequence information such as average nucleotide identity using orthoANI and fastANI, digital DNA–DNA hybridization value between *S. koreensis* and *S. ilei* were 96.31, 96.60, 86.4 and 97.63, respectively. All these genome similarity values clearly exceeded the species delineation cutoffs. Phylogenetic assessment using 16S rRNA gene and whole-genome information using PhyloPhlAn, which uses around 400 conserved genes across bacterial phyla, provides additional evidence for these members forming a monophyletic clade in the phylogenetic tree. Pan genome analysis suggests a very large core genome ($n=1374$) and the presence of no unique gene between the genomes of *S. koreensis* and *S. ilei*. Additionally, we found highly syntenic genomes of type strains of these two species. Based on these evidences, we propose *S. ilei* should be reclassified as a later heterotypic synonym of *S. koreensis*.

Keywords Reclassification · *Streptococcus* · *S. koreensis* · *S. ilei* · Phylogeny · Taxonogenomic · Species group · Genomospecies

Abbreviations

CSI	Conserved sequence indels
ANI	Average nucleotide identity
dDDH	Digital DNA–DNA hybridization
ML	Maximum likelihood
GS	Genomospecies

Introduction

The genus *Streptococcus* belongs to family *Streptococcaceae* which was first described by Rosenbach (1884) by defining *S. pyogenes*. In accordance with the current standing in nomenclature, genus *Streptococcus* has 113 validly published species (<https://lpsn.dsmz.de/genus/streptococcus>).

The current taxonomy of the genus is widely based on 16S rRNA gene sequence analysis, polyphasic characterization, conserved sequence indels (CSI) or limited whole-genome sequence information including 70 species only (Patel and Gupta 2018). Hence, till now, the taxonomy of the genus *Streptococcus* is based on limited genomic information of a limited number of species. A recent taxonogenomic and phylogenomic study of the genus *Streptococcus* considering 115 type/representative strains along with 23 unclassified ones have revealed a robust taxonomic framework and identification of 16 novel species of the genus (Kumar et al. 2022).

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Isolation and Molecular Characterization of Important Fish Pathogens from River Niger and Two Other Major Rivers in Anambra State, Nigeria

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Abstract: This study was designed to isolate and characterize pathogenic bacteria from fish samples from Niger, Otuocho and Amansea rivers using polymerase chain reaction (PCR) and sequencing approaches. Thirty-two fishes (16 tilapia and 16 catfish) were sampled from the three rivers. The intestines (one gram each) of all the fish samples were screened for the presence of pathogenic microbes of green colonies using *Aeromonas* agar base (Sigma) enriched with Ampicillin for selectivity. The extraction and sequencing of 16s rRNA of the pure isolates was done in GeneWiz laboratory USA. Polymerase chain reaction was used to assay for haemolysin gene and microscope for their morphological characteristics respectively. Basic local alignment tool (BLAST) compared the 16s rRNA sequences with the ones in the National Centre for Biotechnology Information (NCBI) Database. Results showed that 99% of the catfish samples grew with green colouration and were resistant to ampicillin, while none of the tilapia samples showed any form of growth on the selective media. BLAST analysis of the 16s rRNA sequences showed pathogenic *Enterobacteriaceae* spp. (*Citrobacter freundii*, *Enterobacter cloacae* and *Serratia rubidaea*) and *Ochrobactrum anthropi* bacteria in the catfish samples which were 99% identical with 16s rRNA sequences. They were haemolysin negative and microscopic result showed the isolates to be rod shaped and motile. The study showed that 99% of the catfish samples contained more than one pathogenic microorganism. These findings serve for awareness creation to fish consumers, handlers and processor in order to guide against such infectious microbes.

Keywords: Fish Pathogens, Molecular Characterization, Sequencing, River Niger

INTRODUCTION

Fish is a crucial source of animal protein in many countries of the world including Nigeria and known as a nice protein and mineral sources globally (Oko, 2019; Oko, et al., 2019; Adebayo Tayo et al., 2012). In the developing countries of the world, 50% farmed and captured fishes which are consumed as local delicacy (Adebayo-Tayo et al., 2012). Microorganisms easily catabolise the protein content of fish which leads to fish spoilage (Udeze et al., 2012).

Fishes are infected with pathogenic microbes through the contaminated water, feed, and through the handling, processing, transportation, etc. (Adebayo-Tayo et al., 2012). It is established that fishes from both rivers and ocean water bodies contain different human pathogens (Adebayo-Tayo et al., 2012).

Enterobacteriaceae spp and *Ochrobactrum anthropi* bacteria are widespread in the environment and many mesophilic species

contaminate food in low numbers (Garcia-Armesto et al., 1993). The psychrotrophic taxa can multiply in refrigerated foods such as meat, fish and milk. *Hafnia alvei*, *Serratia* spp. and *Enterobacter* spp. have been reported to occur in such high numbers that they actually spoil the food (Lund et al., 1992). Mesophilic taxa of *Enterobacteriaceae* such as *Salmonella* spp., *Shigella* spp. and certain *Escherichia coli* may cause severe diarrhoea, and so are the psychrotrophic *Yersinia enterocolitica*. However, food spoiling *Enterobacteriaceae*, capable of growth in refrigerated foods, may also be of clinical concern. This is partly because they can act as opportunistic pathogens in immunocompromised patients and partly because shiga-like toxins (verotoxins) and other enteropathogenic toxins as well as other virulence factors have been found in *Enterobacteriaceae* genera outside the traditionally pathogenic taxa (Albert et al., 1992).

In silico Tools and Techniques for Screening and Development of Peptide-Based Spike Protein Inhibitors against Novel Coronavirus (Sars-CoV-2)

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Abstract

The recent pandemic situation created by the novel coronavirus (SARS-CoV-2) across the globe is a great concern. So, the discovery of novel antiviral agents is desirable to address this challenge. In this context, the antiviral peptides (AVPs) possess an enormous potential and can be considered to develop novel therapeutic strategies to combat SARS-CoV-2 infection. The anti-viral peptides are mostly preferable over small inhibitor molecules for having high target specificity and lower side effects. The spike protein is an important structural protein of SARS-CoV-2 that binds with the human angiotensin-converting enzyme-2 leading to host entry of the virus. Hence, the activity of the anti-viral peptides will be based on the interference of the peptide inhibitor between the binding site of spike protein, and the ACE2 protein ultimately will prevent the virus invasion process. Several database resources are available that contain many anti-viral peptides from natural sources. However, the experimental basis of establishing the therapeutic importance of every protein from the database is a difficult and time-consuming task. Hence the available bioinformatics tools and techniques can be suitably used to screen, structure prediction, evaluation of anti-viral peptide- SARS-CoV-2 spike protein interaction, toxicity prediction, molecular dynamics simulation, and so on. In this review, the implementation of some of the major computational tools, their availability, and effectiveness in predicting the peptides against the Spike protein have been discussed.

Keywords: Antiviral peptides, novel coronavirus, Spike Protein, Bioinformatics, Screening Methods, Binding Affinity

1. Introduction

The novel coronavirus disease was first identified in China during the last month of 2019. Further, this novel virus (SARS-CoV-2) infection continued to outbreak globally at an alarming rate. The genomic sequence study of the virus has been observed to share some homology with the related virus such as (Middle East respiratory syndrome-CoV) and the coronavirus (SARS-CoV) [1-3]. High infection, as well as the death rate of the novel coronavirus in comparison to other previously known coronaviruses, created the research challenge to discover the potential drug candidates for the pharmacological treatments. From the beginning of the pandemic, several molecules have been repurposed and proposed to prevent the infection of the virus; however, till yet, no such effective drug is available for the treatment [4-6]. Some of the repurposed drugs including remdesivir, favipiravir, lopinavir, ritonavir, ribavirin for the inhibitor of viral RNA- replication have been approved but there is no evidence regarding their clinical efficacy [7-11]. In the host-virus interaction process of SARS-CoV-2, the Spike glycoproteins (molecular weight 180-200 kDa) play a major role. The Spike glycoproteins (S) contain an N-terminus region (extracellular), transmembrane (TM)

anchored region, and a short C-terminal region (Figure 1). It was studied that, the *open* conformation of the S-protein facilitates the virus interaction with ACE2 protein of host (human) and further leads to the fusion process with the host cell membrane. The S protein also contains the polysaccharide coating that prevent the virus from the host immune system recognition process [12-14].

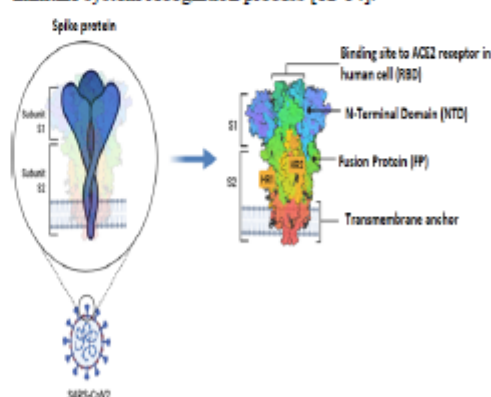


Figure 1. Structural components of the spike glycoprotein (SARS-CoV-2)

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Review Paper:

Application of Bioinformatics resources for mining of simple sequence repeats (SSRs) marker in plant genomes: An Overview

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Abstracts

In the case of plants, the prediction of simple sequence repeats (SSRs) is important for the purpose of gene mapping, biodiversity study and detection of genes with desired characters. In addition to this, due to their polymorphic nature and distribution throughout the genome, it is considered as an ideal marker in plants. However, the traditional methods for the detection of SSR-based polymorphism cause difficulty. As an alternative method, the bioinformatics approaches have been used extensively in the study of these molecular markers, in a economic way.

The next generation sequencing (NGS) techniques generate a huge amount of genomic data which is stored in the public databases in the form of whole genome and EST. This provides the opportunity to implement the bioinformatics tools to predict and annotate the SSR associated with desired gene of the plants. Several computational programs along with the pipelines have been developed to detect the SSR sequences automatically by using the genomic information from the database. In this review, the application and availability of specific bioinformatics resources and the methods of application involved for SSR discovery have been presented by taking suitable examples from the literature.

Keywords: Simple sequence repeats, Bioinformatics tools, Next generation sequencing, Plant breeding, Biodiversity study, Gene mapping, Expressed Sequence Tags.

Introduction

For the last 30 years, the applications of molecular markers are being regularly utilized in plant genomics and breeding areas. Several types of these molecular markers are used for generating the fingerprinting of a plant, genetic map construction including mapping alleles for desirable traits, marker-assisted selection (MAS) and so on.^{44,45} Among different types of molecular markers, the simple sequence repeats (SSRs) found in both the coding and non-coding region are associated with the specific trait and affect gene regulation activity respectively. A microsatellite is a specific representative form of repetitive DNA in which the repetition of DNA occurs commonly in the range of 2-5 base pairs. The microsatellites occur throughout the genome of an

organism and exhibit greater genetic diversity, hence can be used as a suitable molecular marker.

The origin of the repeat patterns in the case of SSRs of a genome due to the mechanism of *slippage* during replication has been reported.^{11,47} The microsatellites such as SSRs are having some of the important unique features like locus specificity, high reproducibility, co-dominance inheritance and hypervariability studied by Squirrell et al.⁴²

The traditional experimental methods that are involved in finding SSR markers, constitute complex time-consuming techniques like genomic libraries construction and the isolation followed by the sequencing of clones.

Another problem that is encountered by the traditional method is the gel electrophoresis techniques used, may not display the perfect genomic sequence that contain the SSRs, so there is a chance to obtain the error-prone information during PCR amplification.^{36,55} But because of cost-effectiveness, the use of microsatellites in plant species has been reduced, therefore, here the use of *in silico* approach has been appreciated being less cost-effective and less time consuming to identify the SSRs, to investigate their functionality and to screen the applicable SSRs for primer design. Bioinformatics is a sophisticated computational approach (storing, processing and analyzing) used to derive meaningful information by using molecular data and play a major role in the integration of the data.

Several computer programs have been developed by the researchers for mining the SSR sequences from the genomic data. As SSR markers are available throughout the genomic sequences also in the ESTs, hence can be detected by use of these programs and available pipelines.^{12,15} Many of the important biological functions can be detected by identification of the SSR sequences, such as regulation of transcription factor and gene expression of a particular trait, other molecular information such as genomic methylation, chromatin organization and so on in the case of plants.^{20,49}

Due to the rapid advancement of genome sequencing techniques, thousands of plant genomes have been completed and the updated data is available in the database. This published genomic information opens the path for the implementation of the available bioinformatics tools for the scientific community to identify microsatellite containing sequences that lead to the development of SSR markers.³⁵



Genome-based reclassification of *Streptococcus ursoris* as a later heterotypic synonym of *Streptococcus rattii*

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Abstract

Among the species of genus *Streptococcus* two members namely *Streptococcus rattii* and *Streptococcus ursoris* were isolated from oral cavity of rat and bear, respectively. Type strain of these members shows a 16S rRNA gene sequence similarity of 98.9%. Based on systematic phylo-taxonomics investigations, we could deduce the taxonomic assignment of the members of these species. Genome similarity assessment among the type strain of these members using average nucleotide identity (orthoANI and fastANI), digital DNA–DNA hybridization and average amino acid identity (AAI) were 98.5, 98.3, 88, and 98.3% respectively. All these values exceed the species delineation cutoffs suggesting a unified species. Phylogenetic tree obtained using 16S rRNA gene sequence also indicates the monophyletic nature of the member strains. Such monophyletic taxonomic positioning of the strains was further complemented with the whole genome-based phylogenomic tree. Based on these evidences, we propose *S. ursoris* should be reclassified as a later heterotypic synonym of *S. rattii*.

Keywords Reclassification · *Streptococcus* · *S. ursoris* · *S. rattii* · Phylogeny · Taxonomomic · Species group · Oral cavity

Abbreviations

CSI	Conserved sequence indels
ANI	Average Nucleotide Identity
dDDH	Digital DNA–DNA hybridization
ML	Maximum likelihood
GS	Genomospecies

Introduction

The genus *Streptococcus* is a species-rich group of Gram positive, facultative anaerobic chain forming cocci-shaped bacteria (Rosenbach 1884). Currently, the genus embraces 113 validly named species which are known for their wide ecological niches (<https://lpsn.dsmz.de/genus/streptococcus>). A large number of its members are known for their ability to colonize human and animal gut. Several of them such as *S. pyogenes*, *S. pneumoniae*, etc. are pathogenic, whereas other groups are commensals and beneficial (Orla-Jensen

1919). The genus *Streptococcus* has been divided into several groups based on their ability to show hemolytic activity known as Lancefield group (beta-hemolytic), whereas several others groups such as viridans group streptococci (VGS) (Facklam 1977) and *Streptococcus anginosus* group (SAG) (Fazili et al. 2017) were classified based on their morphological characters like colony shape and size etc.

Several *Streptococcus* species are known to be isolated from oral cavities of diverse animals such as rat, monkey, hamster, bat, wild boar or pig, etc. (Andrewes and Horder 1906; Bridge and Sneath 1982; Handley et al. 1991; Kawamura et al. 1998). Species description of many such species is based on classical taxonomic parameters. In 1974, Coykendall described *S. mutans* subsp. *rattus* isolated from rats based on biochemical tests and DNA composition (Coykendall 1974). Further in 1977, *S. mutans* subsp. *rattus* was described as a new species of the genus based on their molecular composition (Coykendall 1977). Furthermore, its specific epithet was corrected to *S. rattii* (Trüper and De'clari 1997). *S. rattii* has been isolated from carious lesions of both human and rat (Jablon and Zinner 1966; Zinner et al. 1966, 1967). In 2011, *S. ursoris* was isolated from oral cavities of bears and was described as a novel species based on 16S rRNA, biochemical characterisation and manual DNA–DNA hybridization (Shinozaki-Kuwahara et al. 2011).

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Comparative genomics analysis of genus *Leuconostoc* resolves its taxonomy and elucidates its biotechnological importance

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ABSTRACT

Genus *Leuconostoc* consists of a diverse range of lactic acid bacteria (LAB) from dairy, food and environmental ecology. Even though the species of *Leuconostoc* are commercially significant, their taxonomy is largely based on old, low-resolution classical methods. Several taxonomic reclassifications in the past were inadequate for microbiologist and food industry professionals to demarcate any new strain of genus *Leuconostoc*. The current taxonomy of the genus is largely based on classical approaches, which are in utmost need of reinvestigation by whole genome-based approaches. In the present study, the taxono-phylogenomic analysis depicted sixteen species, including three novel genomespecies and several reshufflings across the species, namely, *L. mesenteroides*, *L. pseudomesenteroides*, *L. gelidum* and *L. lactis*. Genus-wide TSPKS, CAZymes, and vector plasmids supports its biotechnological potential. However, detection of the antibiotic resistance genes in such an important LAB genus raises concern over their utility in industry. Present, large-scale in-depth genome-based study can shed light on the genome dynamics of the member species, help to obtain a more robust taxonomy and elucidate its biotechnology importance.

1. Introduction

The genus *Leuconostoc* (Van Tieghem, 1878) belongs to the family *Lactobacillaceae* (Zheng et al., 2020), which is one of the widely used group of lactic acid bacteria (LAB). It was first isolated in 1878 from a slime outbreak in a sugar factory by Cienkowski and was named *Asococcus mesenteroides* (Devooy and Poullain, 1988; Hucker and Pederson, 1930). In 1911, an aroma bacteria "X" was isolated from a creamery starter which was later named *Leuconostoc* in 1930 (Hucker and Pederson, 1930; Lundstedt, 1983). Since 1920s, *Leuconostoc* has been known as a component of starter cultures in dairy, but its factual information is not very well documented (Thunell, 1995). *Leuconostoc* spp. can metabolize a wide range of carbohydrates, sugars, and alcohols (Kandler, 1983; Lonvaud-Funel, 1999). *L. mesenteroides* is the type species of genus *Leuconostoc* known to survive under various stress conditions present in the gastrointestinal tract (de Paula et al., 2015). Due to these intrinsic properties of *Leuconostoc* spp., it is historically being used as a probiotic candidate in industries. Although some of the *Leuconostoc* spp.

have been identified for safe use in the food industry and accorded "generally recognized as safe" (GRAS) status (Holland and Liu, 2011; Ogier et al., 2008), there are some reports of its disease-causing nature among immunocompromised patients (Cappelli et al., 1999; Franco-Cendejas et al., 2017). In addition, some strains of *L. mesenteroides* follow dual lifestyles causing disease in plants and immunocompromised patients (de Paula et al., 2015). This suggests an urgent need of genome-based investigation of genus *Leuconostoc*.

Even though the genus *Leuconostoc* are widely used for several purposes, the taxonomy is mainly unexplored. Historically, its taxonomy is a long tug of war across several families of LAB. *Leuconostoc* spp. often occurs in similar habitats as *Lactobacillus* and *Lactococcus*, and was considered as an intermediate between *Streptococcus* and *Lactobacillus*. This paraphyletic nature of the constituent members with *Lactobacillus* as a most recent common ancestor was further confirmed by family level study (Wittouck et al., 2019). Later on an in-depth genome-based investigation of *Lactobacillaceae* and *Leuconostocaceae* suggests union of these two families (Zheng et al., 2020). According to the latest standing

Abbreviations: OH, Glycoside Hydrolase; CE, Carbohydrate Esterase; PL, Polysaccharide Lyase; GT, Glycosyltransferase; AA, Auxiliary Activities; CBM, Carbohydrate-Binding Module; ANI, Average Nucleotide Identity; dDDH, digital DNA-DNA hybridization; LAB, Lactic Acid Bacteria; TSPKS, Type III polyketide synthase.

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Designing metadata schema for a human library: a prototype

Anupta Jana, Rosalien Rout ▾

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Abstract

Purpose

In the absence of a working model for describing, managing and archiving the human library resources, this study aims to attempt a practical approach that will provide all the necessary information to the library users, library professionals and researchers.

Design/methodology/approach

Initially, different metadata standards, archival projects and attributes of the human books were reviewed to identify appropriate metadata standards that accurately describe the resources of the human library. A free and open-source software; DSpace was considered for implementing newly defined metadata schema in this study. Thereafter, a set of new subject entries was incorporated to standardize the contents of the human library.

Automatic assessment of adherence of terms and conditions of web service-based process

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Abstract: In general, web service-based processes (WSBP) are distributed and composed of one or more WSBP called component web services (CWS) which are developed and controlled by third parties. Hence, the functional and quality guarantee terms made with the WSBP provider and client depends on the correctness of all CWSs involved. A run-time, dynamic and non-intrusive approach for compliance assessment is highly essential. This article proposes a functional and quality guarantee terms specification mechanism between the WSBP provider and client. The conformance verification of execution traces of WSBP against the guarantee terms specification is enabled by translating these specifications to automata. A compiler is designed to automate the process of translation of these automata into executable C programs. These auto-generated C programs monitor the WSBP and CWS interactions to detect violation of functional guarantee terms or validation of quality related guarantee terms at run-time of WSBP.

Keywords: web services; web service composition; service monitoring, formal language

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A Novel Approach Based Design of Neural Network Classification Algorithms for Pattern Recognition

4663

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Abstract

One of the key methods utilised in the area of artificial intelligence is pattern recognition. The most sophisticated senses in the human body, vision and perception, served as the inspiration for the computer paradigm known as neural networks. All real-time applications revolve on pattern recognition. Human decision-making is influenced by our ability to recognise patterns. Neural network classifiers are created for pattern recognition applications in this research effort. For the purpose of evaluating the benefits and drawbacks of the suggested Neural Network Classifiers, the job of handwritten character recognition has been selected as the application domain. With the aim of achieving rapid training, the standard Backpropagation method for Feedforward Neural Networks is changed. The proposed adaptive backpropagation method dynamically modifies the learning constants based on adaption cycles and error. When compared to traditional methods, the error is observed to reduce more quickly. The categorization of the Iris data set and the identification of handwritten characters serve as proof of the algorithm's effectiveness. Learning and generalisation are greatly influenced by the network size. The ideal network size is chosen using adaptive genetic algorithms. Depending on how sensitive the edges are to mistake, duplicated connections that contribute little to nothing are cut.

Keywords: Neural Network, Machine Intelligence, Pattern Recognition, Conventional Algorithms and Backpropagation.

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1. Introduction

Recent research has focused on understanding natural intelligence and using that knowledge to construct artificial intelligence, which is both a fascinating and difficult effort. Engineers may learn a lot from the difficulties of studying biological processes in order to create new mathematical techniques and scientific instruments [1]. Vision, learning, smell, touch, and taste are examples of natural sensory phenomena that should be aggressively studied and analysed in order to create smart sensors and new, intelligent systems. This research and the desire to create robots that imitate human cognitive functions are what first sparked interest in neural networks (NNs). Known also as "Parallel Distributed Processing" and "Connectionist," neural networks have gained popularity in the disciplines of cognitive science, neurobiology, computer science, signal processing, optics, and physics because to its high performance. The

network's ability for categorization and generalisation is a key component of hierarchical problem solving [2]. Artificial intelligence can also successfully do these tasks if classification criteria and generalisation rules are known, while NNs can learn from examples and generalise even when the rules are unknown [3]. Other fascinating benefits of NNs include parallelization, VLSI implementability, fault tolerance, evidential response, contextual information processing, and adaptability. The ability to see patterns has some bearing on how humans make decisions [4]. As a result, the majority of NN applications are in the field of pattern recognition. Neural networks have their origins in early 1940s multidisciplinary history and were first developed by Warren McCulloch and Walter Pitts. Following this research, several advances were made to explore the nervous system, ranging from basic perceptron to large neural networks [5]. Feedforward, feedback, and



A REVIEW ON ANOMALY BASED NETWORK INTRUSION DETECTION SYSTEM

MADHUMITA PANDA

ABSTRACT

Intrusion Detection has become a prominent research area with the increase in malicious activities taking place in the network. These malicious activities can be identified using signature based or anomaly-based intrusion detection methods. By using machine learning techniques anomaly-based IDS solutions offer the best line of defence against network breaches. This survey paper presents the use of machine learning techniques to identify anomaly-based network intrusion detection.

Keywords: *Intrusion Detection System, Signature Based, Anomaly Based, Machine Learning*

1. INTRODUCTION

In recent years, the widespread use of computers and networks and the emergence of new technologies such as big data, internet of things, and cloud computing have prompted new threats in this modern complex environment. There has been a significant increase in the number of malicious activities. The need to protect network resources from cyber threats has been growing, and the intrusion detection system (IDS) is critical in the cybersecurity to achieve robust protection against cyber attackers. An Intrusion Detection System (IDS) is a system that monitors network traffic for suspicious activity that violates the security policy and compromises its confidentiality, integrity, and availability and issues alerts when such activity is discovered.

2 CLASSIFICATION OF IDS

IDS can be classified with the viewpoint of its deployment or detection methods.

2.1 Deployment method based IDS

Based on the location in the network, IDS is further subclassified as host-based-IDS (HIDS) or NIDS. HIDS is deployed directly into the device that scans the system for any malicious behaviour. The main drawback is its deployment on all the hosts that require intrusion protection, which results in extra-processing overhead for each node and ultimately degrades the performance of the IDS. In contrast, NIDS is deployed on the network with the aim to protect all devices and the entire network from intrusions. The NIDS will constantly monitor the network traffic and scans for potential security breaches and violations.

2.2 Detection method based IDS

Signature-based intrusion detection (SIDS) and Anomaly detection-based intrusion detection (AIDS) are the two main methods for identifying threats [1,2,3]. SIDS is based on the idea of defining a signature for attack patterns. The attack pattern may be found within network packet header, or within destination or source network addresses as well as in specific sequences of data or series of packets. These signatures are stored in the signature database [4] and the data patterns are matched with these stored signatures for attack detection. The advantage includes the high detection efficiency for the known attacks due to the availability of signature for those attacks. On the other hand, this method lacks the ability to detect the novel and new attacks due to the absence of signature patterns. Also, a huge signature database is maintained and compared with the data packets for possible intrusions, which makes it a resource-consuming approach. Instead of searching for patterns linked to specific types of attacks, behavior or anomaly based IDS solutions monitor behaviors that may be linked to attacks thus increasing the likelihood of identifying and mitigating a malicious action before the network is compromised. By using AI and machine learning, behavior-based IDS solutions offer the best line of defense against network breaches. Machine learning has the ability to differentiate between normal and abnormal traffic [5].

In this article, we have focused on reviewing few anomaly-based NIDS using machine learning approaches, which can be deployed for the security of the network traffic entered through the edge router.

3. RELATED WORKS

This paper [6] presents the investigation of different techniques and intrusion classification on KDD Cup 99 dataset.

This paper [7] explores the comparative study of various ML algorithms used in IDS for several applications such as fog computing, Internet of Things (IoT), big data, smart city, and 5G network. In addition, this work also aims for classifying the intrusions using ML algorithms like Linear Discriminant Analysis (LDA).

CARDIAC DISEASE PREDICTION USING SMOTE AND MACHINE LEARNING CLASSIFIERS

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Abstract

Cardiovascular Disease (CVD) is presently the biggest reason of death globally. Clinical data analytics face a huge hurdle when attempting to predict cardiac disease. Massive amounts of raw data generated by the healthcare business are transformed into meaningful insights using machine learning techniques. The goal is to use of machine learning models that can enhance the predictability of cardiac patient survival. This paper employs eight machine learning classifiers: Decision Tree (DT), Extra Tree (ET), Random Forest (RF), Adaptive Boosting (AdaBoost), Ridge Classifier (RC), Linear Discriminant Analysis (LDA) and Light Gradient Boosting Machine (Light GBM) for prediction of cardiac disease. Synthetic Minority Oversampling Technique (SMOTE) is used to resolve the issue of unbalance dataset. Experiment outcomes demonstrate that SMOTE technique improves the accuracy of the selected classifier's output and Random Forest achieves highest accuracy with 95.12% applying SMOTE in predicting the survival of cardiac illness.

Keywords-Cardiovascular Disease (CVD), Machine Learning, Classifier, SMOTE

1. INTRODUCTION

According to World Health Organization (WHO), the most common reason of mortality in the world is cardiac disorder [1]. It is difficult to diagnose cardiovascular disease (CVD) because of a wide a number of risk elements, such as excessive cholesterol, high blood pressure, an inappropriate pulse rate, diabetes, and a number of other problems [2] and also the diagnosing is a difficult job which requires knowledge and ability. A wrong diagnosis could cause the patients' death or a person may become disabled. Medical experts and practitioners can forecast cardiac disease with the aid of the disease prediction model. The enormous volume of information that can be acquired with the use of digital gadgets (either by the patient or in the hospital) can be combined with machine learning techniques to diagnose and predict diseases.

Machine learning is one of the most well-liked and fastest developing sectors of artificial intelligence. By lowering the error in prediction and actual results, a variety of machine learning approaches are utilised to better grasp interaction between multiple components that is complicated and non-linear [3]. In order to predict cardiac illness many classification approaches are used in medical data mining [4]. Due to the ever-growing amount of medical information, machine learning algorithms must be employed to assist medical professionals in analysing data and producing diagnostic decisions that are exact and accurate.

The remainder part of the paper is organized as follows: A review of various heart-related works are presented in the Section 2. The proposed framework, as well as the various algorithms used to classify the given dataset are explained in the Section 3. Section 4 presents the outcomes of implementing the proposed methodology. The conclusion and future work are finally summarised in Section 5.

2. RELATED WORK

This section presents a discussion of various algorithms used in the prediction of cardiovascular disease.



An effective machine learning method for the diagnosis of cancer based on Biomedical Image from medical scans

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Abstract

Automated systems built on machine learning algorithms are gaining popularity for developing novel device applications in the area of artificial intelligence. Implementing new machine learning paradigms, particularly in healthcare systems, has the potential to improve efficiency, uniformity, and treatment quality. Worldwide, cancer is an epidemic with a high death and incidence rate. The most common types of cancer in men and women, respectively, are oral cavity cancer and breast cancer. The only way to confidently detect the existence of cancer is via a biopsy, which involves a number of processing procedures including grading, staging, and close examination of histology slides under a microscope. The labor-intensive manual study of histopathology slides is impacted by a variety of parameters, including pathologist competence, attention span, and weariness. To design an automated computer aided diagnostic system for cancer detection, however, is now possible because to recent advancements in soft computing approaches. This system helps pathologists diagnose cancer more reliably and consistently. Most computer-assisted diagnostic systems are built using traditional machine learning approaches, which depend on accurate data representation for performance and need extensive domain knowledge and meticulous manual engineering. In this context, the feature extraction stage in traditional machine learning receives a lot of attention. The most recent development in this area, deep learning, expands the horizons of machine learning. The deep learning technique's main strength is automatic data representation, but for it to work properly, it needs extensive training and a large, well-annotated dataset. Due to the time-consuming and costly process of collecting patient data, gathering big annotated datasets is a difficult undertaking in the area of health informatics. In light of the above, the current study tackles the issues raised above and presents fresh ideas for categorising a large collection of histopathological pictures of breast cancer known as "BreakHis," which is publicly accessible in the public domain.

Keywords: artificial intelligence, machine learning, Deep learning, Breast cancer and health care system.

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1. Introduction

Because vision is the most important sense for humans, images have always been crucial to human existence. Due to the fact that image processing has several uses in the fields of agriculture, defence, security, and medicine, among others. The development of digital technology has made it simple to produce a large number of photographs. Given the abundance of pictures, image processing algorithms must handle increasingly complicated issues as well as the problem's adaptability. One of these challenging issues is the diagnosis of illnesses using photographs [1]. For academics and scientists, the complexity of healthcare data has

always been of utmost importance. For data analysis and decision-making, it takes a lot of work to extract important information from healthcare data. The only data analysis technique that automates the construction of analytical models by seeing patterns and taking choices with little to no human involvement is machine learning [2]. When such adaptation is necessary, machine learning functions as a crucial part of intelligent computer vision systems. The discipline of "Machine Learning" has recently made significant strides, creating a fresh window of opportunity for the creation of intelligent computer-controlled hardware and software. In order to use them in creating automated systems for purposes ranging from object identification to





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SMLMAC-HEAP: Slotted Multi-Layer MAC Protocol for Wireless Sensor Networks Powered by Ambient Energy Harvesting

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Abstract

Objectives: To study the lifetime of Wireless Sensor Network (WSN) as well as to propose and simulate a suitable approach so that the Quality-of-Service (QoS) of the network in terms of throughput improved when compared with the previous methods. **Methods:** The lifetime of WSN depends on the MAC layer because energy consumption is more due to the sharing access of media. Our approach is designed not only to adopt the division of the MAC layer into a number of slots by keeping both listen and sleep mode but also using the solar harvested energy; hence, the network's lifetime is improved with the compared protocol. Our approach with compared protocol is simulated through MATLAB simulator on EZ430-RF2500-SHE" (Datasheet of Texas Instruments). **Findings:** In WSN, we found that energy consumption is more at the MAC layer, so network performance degrades in terms of lifetime. To solve the issue of energy consumption in WSN, researchers focused on and designed several techniques to improve the MAC layer. To bring out the practicality of the proposed protocol, we present a case study on the variation of layers with slots in terms of throughput metrics. Finally, the simulation result shows that the proposed protocol performs better than MLMAC-HEAP, Probabilistic Polling and Optimal Polling from layer 7 with slot 7. **Novelty:** The proposed approach merges the two concepts; one is by using the ambient solar energy, and the other, by adopting slot concepts for each layer of MAC.

Keywords: MAC; MLMAC; MLMAC-HEAP; WSN

1 Introduction

Wireless Sensor Networks (WSN) are mostly battery powered means limited capacity and cannot be reenergized because of its deployment in harsh and dynamic environment. To overcome the limitation of battery-powered environment, Energy Harvesting (EH) techniques evolved⁽¹⁾. Researcher use solar power for energy harvesting, as solar energy is easily available and a convenient source⁽²⁾. The efficiency may decrease on cloudy days. Author proposed electromagnetic harvesting technique

Concept Mapping Strategy and Learning Achievement: A Systematic Review

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Abstract:- Concept mapping is an essential tool for the development of the learning achievement of the student. It plays a very important role in the understanding of concepts, facts and information in a visual form. As per the current generation of teaching-learning process concept mapping is an essential tool to deliver the content and make students comfortable with teaching learning and their learning achievement. This paper deals with a systematic review of related literature on concept mapping. To find out the relation between concept mapping and the learning achievement of learners. For this purpose, studies related to concept mapping were collected from various sources like Research Gate, Google scholar, Shodhganga, Dissertation, Conference papers, and Online sources and analyzed for significant conclusions. Conclusions were made and thoroughly analyzed with the help of subject experts.

Keywords:- Concept Mapping, Learning Achievement Teaching Learning.

I. INTRODUCTION

Concept mapping is an instructional tool and strategy for the learner to integrate knowledge and create a new concept with the help of the association of facts or information (Torre, Durning, Dalay, 2013). Concept mapping helps the students to integrate, organise new knowledge, and remodel the structure of knowledge. (Kalyuga, 2009). Concept maps also help students to promote meaningful learning (Schroeder et al., 2018). Meaningful learning also has a positive emotional dividend in that the learner feels they are in control of what they have learned and able to use that knowledge to solve problems or facilitate further meaningful learning. It also helps the learner to organise and represent thoughts and ideas so which can help the latter represent a strong positive intrinsic motivation of the learner, in contrast to the extrinsic motivation that occurs with rote learning. Where the main dividend is a high test score. Moreover, knowledge gained in meaningful ways tends to last longer, serves to

facilitate future learning, and can be used to solve new problems and creative thinking. Present education has changed the scenario of student learning, they become more talented and curious about their teaching-learning process. Until they learn to express themselves student learning achievement is not able to increase. Concept mapping is a graphical presentation of concepts which helps students or learners to secure good marks in a semester or examination. The way they organized the fact and figures helped to interpret them in sequential order and show an understanding of the situation. Good presentation is needed for high achievement in the field of the teaching-learning process, it enhances the learning achievement of the student at different levels (Corre, 2021; Schmid, 2021.).

II. OBJECTIVE OF THE SYSTEMATIC REVIEW

This study focuses on the concept mapping strategy to find out whether the concept mapping affects the academic achievement of the students or not, whether the concept mapping has a greater effect on the thinking abilities of the students. This systematic review emphasizes concept mapping as a strategy for improving the teaching-learning process of the students at different levels to enhance the academic performance of the student to develop their careers and achieve their goals in life and also emphasizes the quality of the teaching process.

III. SOURCE OF RELATED LITERATURE

In the present review paper, the investigator used the study on concept mapping strategy on academic achievement of the students as the major observation. the investigator searches the primary database, google scholar, web science, Educational Resource Information Centre (ERIC) ProQuest digital platform, Shodhganga, Shodhgangaotri, Research Gate, etc. From there, the researcher collects the published article, published thesis and unpublished thesis taken in to review the related literature relating to the Concept Mapping Strategy and Learning Achievement.

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Smartphone Use Pattern of College Students in Relation to Gender, Residential Locality and Academic Streams

Article in SSRN Electronic Journal · January 2022

DOI: 10.21203/ssrn.4807097

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Parenting behaviour of Rural India, inrelation to demography [View project](#)



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Introduction: The use of smartphones has been drastically increased in recent years throughout the world irrespective of users' age, sex, profession, residential affiliation status, etc. With reference to its use by college-going students, researchers from all corners of the world have documented their long-time duration of use and explained this type of use as addictive use which has an adverse effect on their health, interpersonal relationship, mental health, academy, etc (Park & Lee, 2014; Nikhita et al., 2015; Awasthi et al., 2020). The time duration of use and nature of the use of smartphone is though primarily depends upon an individual's own psychological attributes like attitude to use which is based on perceived effectiveness and easiness to use, but in a larger ecological context, the socio-demographic variables play some indirect effect amount of use and nature of use. But in research literature effect of these variables like gender and locality on addictive use (time duration) has been primarily focused on (Hassan & Hassan, 2016; Basu et al., 2018; Ghosh & Chatterjee, 2018; Shahrestanaki et al., 2020), on the other hand, their effect of nature or purpose of the use is less explicit with reference to the Indian context. The addictive use and its adverse effect on college-going students are associated with both time duration and nature or purpose of smartphone use. Along with identifying the significant categorical variables like gender, residential locality, and academic streams which affect college-going students' addictive smartphone use in terms of time duration of use, their effect on purpose or nature of use have been focused.

Theoretical Background:

Researchers from almost every corner of the world have documented the abrupt increase in smartphone use by the general population including college-going students. At present, it is very hard to find college-going students having no smartphone with them. As the survey conducted by Directorate of College Education, govt. of Kerala, India, almost all college students have access to a smartphone, only .051% of college students have lacked that, not only there is an increase in the number of smartphone users but also time duration of use. As of 2015, 76% of college students from the USA use a smartphone (Smith, 2015). College students in India check their smartphones on average 150 times per day due to high smartphone dependency anxiety and fear of missing information (Khan et al., 2019). Though attending online teaching during the pandemic period is one of the contextual reasons for this increased smartphone users among college-going students but before this period researchers have also documented high time smartphone use by college-going students due to a decrease in the cost of the smartphone. Their high time use has been explained by the smartphone addiction process and found to be negatively associated with their physical and mental health (positively associated with anxiety, depression, etc); physical interpersonal communication, academic achievement (Park & Lee, 2014; Nikhita et al., 2015; Awasthi et al., 2020).

College students from the USA use smartphones on average 3.5 hours per day (Clayton et al., 2015), 8.7% of students from Korea and 32% from India are found to be smartphone-addicted (Park & Lee, 2014; Nikhita et al., 2015). Two recent studies conducted on Indian college-going students found that 40% of postgraduate students and 42% of medical students are smartphone-addicted, just like substance addiction (Agrawal, 2012; Awasthi et al., 2020).

Along with the increase in time duration of smartphone use by college students, research literature also documented for their more time use in non-academic purposes like communication, internet browsing, entertainment, surfacing social media, etc. than academic (Awasthi et al., 2020). Ataş and Çelik (2019) in their study found that university students are



Psycho-social and Institutional Predictors of Study Habits

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The present study aims at finding predictors of study habits and the ways of influence. This review work is based on 100 research papers from digital resources. It is found that all predictors of study habits can be broadly categorized as psychological, social and institution. Psychological predictors are very much proximal to students' cognitive process including their motivation, intelligence; sociological predictors are, though distal influence the student study habits via parental expectation, encouragement and psycho-social support; institutional climate, teachers' personality and methods of teaching and peer group influence.

Keywords: Study habits; study approach; study skills.

1. INTRODUCTION

Attaining good marks in examination, getting a good job and other form of cognitive development within students have direct connection with their study behaviour. This

creates a larger interest among researcher to focus study related behaviour of students. Its manifestation or focus in research literature is found in multifarious ways, like study skills, technique, approaches, time management style etc. In a broader framework some researchers

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Impact of Interpretation Construction (ICON) Model on problem solving and decision-making abilities

Article · March 2023

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Impact of Interpretation Construction (ICON) Model on problem solving and decision-making abilities

Brundabana Meher¹ Dr. Partha Sarathi Mallik² Saroj Sahu³ Dipanjali Sahu⁴

Abstract

The objective of the present study was to find out the impact of interpretation construction model on developing problem solving and decision making abilities among secondary school students through teaching of political science subject. For this, the *non-equivalent control group quasi-experimental research design* was used over a sample of 72 students; 36 each in experimental and control group. The students of experimental group were taught through interpretation construction model whereas the students of control group were taught through Herbartian method of teaching for eight weeks. The findings revealed that though both the instructional designs have significant impact on developing problem solving and decision-making abilities of secondary school students in political science subject but the impact of interpretation construction model is relatively more than Herbartian method. With respect to relative changes in these abilities, it was found out that increase in problem solving ability was more than decision- making ability by both the designs. The present study will help various stakeholders such as secondary school students, teachers, teacher educators, teacher training institutions, parents, administrators and policy makers for improving quality education of the country in particular and world in general.

Key Words: *Constructivist learning strategy, Experimental research, Higher order cognitive abilities, Learner centric approach, Traditional method of teaching*

Introduction

Development of problem solving and decision making abilities among the students is time relevant educational goal realised by the institutions. In connection to development of these abilities within curricular frameworks, multiple pathways or strategies have been claimed by the researchers (Senan, 2013). Traditionally, teachers were using Behaviorism guided instructional strategy like Herbartian method for developing these abilities. At present, researchers have claimed about effectiveness of constructivist guided instructional designs like interpretation construction (ICON) model (Zulkarnaen, 2018; Sahu, 2013; Tsai, 2001). Though effectiveness of ICON model have been claimed and substantiated by empirical



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RESEARCH ARTICLE

EMPLOYABILITY SKILL AMONG UNIVERSITY STUDENTS IN RELATION TO ACADEMIC STREAM

Suruchi Sahoo, Madhusmita Panda, Suchitra Patel and Partha Sarathi Mallik

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Key words:-

Employability, Skills, Graduate
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Abstract

The study was intended to investigate employability skills among University Graduate students and one of the specific purpose was to find out difference in employability skills between Science and Arts students. Descriptive survey method was employed for this study. Primary data were collected from 50 science and 50 arts of G.M University by standardised 'Employability Assessment inventory' of Larry Dershem, 2016 which has six employability skill domains, measured by 24 items. The obtained data were analysed and interpreted by using percentage and t-test. The results of the study revealed that 17% university students have self-concept, 17% have self control, 17% have social, 17% have communication, 18% have problem solving and 13% have job searching skill. With reference Academic stream wise employability skill difference, it is found that science students have comparative more skill than arts students and the difference is significant at .01 level. The result of the present study will help full for policy makers and practitioners of higher education to develop employment skills among students by redesigning curricular content, methodology and practical component.

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Introduction:-

The Context

Employability can be explained as an ability of or attribute of a person to get employment at the initial stage and maintain it for a long duration. In addition, this ability and attribute help them to switch jobs or to get different employment opportunities. The term employability skills though primarily focus on knowledge of a person i.e., what they know, it also covers several skills and attitudes, including the way to approach things (Pool and Sewell, 2007). All these skills are crucial factors for assessing one's employability. There are certain skills which are very important and possession of these skills help for easy employment. The employability skills are: communication, professionalism, personal development, teamwork, flexibility, ideas and innovations, leadership etc. (Buheji & Buheji, 2020). Higher education plays a critical role in equipping youths with employability skills. Universities and Higher Education Institutions are generally regarded as the producers of human capital. In the present globalisation scenario, the role of higher education in initiating youth employability cannot be discarded. In this context, Weligamage (2009) noted that "the current changing business environment emphasizes the importance of education for employability, focusing on the development of not only these skills but also practical expertise." The content of employability is borrowed from the western thinkers. In Indian context, the India Skill Report 2021 indicates a degradation of youth's employability since 2018. Employability is regarded as the ability to improve the skills and applicability that are necessary in the context of employment sector. Entrepreneurship need to be nurtured by higher

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King-Cult- and Tutelary Deity (Man) Inagesivari in Ranapur (Nayagarh/Nabagarh): An Emergence and Enquiries of New Iconography from Janapada (Nagamata) to Kingdom (Man) Inagesivari)

Dr. Santosh Kumar Mallik

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This present paper entitled "King-Cult- and Tutelary Deity *Man)inagesivari* in Ranapur (Nayagarh/Nabagarh): An Emergence and Enquiries of New Iconography from *Janapada (Nagamata)* to Kingdom (*Man)inagesivan*)" is a brief historical analysis of *Naga-Nagi* cult prevailed in Odisha particularly the *Gadajata* province among the religion of *Sanatana* (Hindu-is a Colonial term) and *Mulanivashi/Adivasi* (Tribal/indigenous) scenario; its merely appeared in the autochthonous or tribal dominated locality. In these particular region inhabitants are believed/understood in nature worship, it may be flora-fauna world for instance reptiles or human-beings, calamities, seasons, and other natural agencies. The emergence of new iconography of *Naga-Nagi* a local icon transformed to a tutelary deity of a powerful medieval kingdom Ranapur located in Nayagarh/Nabagarh.

Brief Historical Out-line:

The earliest extant images of *Nagamatas*, meant as independent cult deities conforming to the iconography of the *nagi*, date in Odisha from around the 2nd BCE. They are represented by a pair of colossal *nagi* figures, perhaps originally installed in a Buddhist cult edifice, which are at present worshipped along with the image of a *Nagaraja* as the triune *gramadevata* of the village of Sundarpada or Kapilaprasad (outskirts of Bhubaneswar) and Panchagaon (Bhubaneswar-OEC-XUB-Jatni road). Both these anthropomorphic *nagis* stand out in a rigid pose and severe attitude against the heavy and massive coils of a polycephalous snake, whose head, appearing above theirs, is five-hooded. They wear heavy ornaments and have squattish bodies, bulbous breasts, bulging hips, large thighs,

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Policing the Police: Salt Monopoly and the Colonial Rule of Law in Orissa

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Abstract

The system of salt monopoly was introduced by Marquis Cornwallis in the year 1790 for the improvement of revenue of the East India Company. The manufacture was carried on under the strict supervision of European agents. The principal salt agencies were Cuttack, Balasore etc. Salt became the subject of strict government control both in the manufacture and sale in Bengal. In the early nineteenth century, the British East India Company monopolised the salt production of in Orissa. By 1860s the external political and economic forces devastated indigenous salt industry and its workers and sought to create a new market for English salt in India. This necessitated a series of institutional reforms by the colonial government. The legal machinery formed the fulcrum of the colonial administration to enforce the salt monopoly. Salt, its manufacturing site and its markets became public properties and the indigenous power centres were deprived of their landed and commercial interests of privileges and authority over it.

Keywords: Colonial State, Monopoly, Rule of Law, exploitation, and Subjugation

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I. INTRODUCTION

The geographical location of Orissa is blessed with a considerable coastline which was famous for salt manufacturing historically. Andrew Stirling reported that the finest salt in the whole of India was produced in the "wild inhospitable tract". Before 1803, it was a private enterprise controlled by the coastal chiefs and Zamindars. The salt manufacturers of Orissa were under the Zamindars whose estates bordered the coast. After the introduction of the salt monopoly they were forced to surrender their salt and fuel lands to the Government and abandon all rights to manufacture salt. The Government agreed to pay them an allowance to compensate the loss. This allowance was known as Moshaira. Besides Moshaira, a diet allowance called Koraki comprising a certain quantity of salt was granted in 1811 for the loss of privilege of manufacturing salt on their own account.

The Regulation of May 1804 introduced salt monopoly and brought it under exclusive colonial control for the purpose of public revenue. As a result salt making developed as an important industry in the beginning of nineteenth century along the eastern coast of India. In the early years of British rule the salt was made by men hired by the government, and large staffs of highly paid officials was maintained to supervise the work. The salt makers called Malangis were hired by the Government for salt making and were paid a very low rate of wage.

The private manufacturing was forbidden and made punishable under law. A tax of 12 Annas for Maund was also imposed on the sale of the commodity. The regulation XXII established complete monopoly over the manufacture and sale of salt in Orissa. The salt industry was oriented towards profit earning disregarding the welfare of the salt makers and the concern of the ordinary people. Only 6 Annas were paid for making one Maund salt while the government duty from the same was as high as 3-4 Annas in 1860. The Board of Revenue observed in 1860 that the rise in food prices and the insufficient remuneration of the Malangis from the manufacturers was the reason behind salt smuggling by the Malangis. The rate was increased from 6 annas to 8 annas in 1860. The increasing prices of the salt hit hard the ordinary people. George Plowden who enquired into the case of the salt manufacturers of Bengal Presidency in 1853 stated: "A tax of 500% appears to me a very high tax to impose upon any one article of consumption, when the article in question was comparatively very dear in the territory to which the tax applies". In 1854, Plowden recommended the gradual abandonment of salt monopoly and the introduction of the manufacture under the excise system. After the abolition of salt monopoly the government decided to discontinue such allowances of the Zamindars. The Zamindars challenged the Govt. decision in a petition of 12th March 1863. The Board of Revenue observed that the lands have been



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Prisons and Penal Measures under the British Colonial Rule in Orissa

Sasmita Rani Shasini

Introduction

The socio-economic transformation of eighteenth-century Europe brought a new understanding of the penal regime. It brought an end to physical capital punishment.¹ The prison was designed to reach beyond the body to reclaim the soul. Foucault quotes a contemporary saying, punishment 'should strike the soul rather than the body'.² The new penology found its expression in Jeremy Bentham's 'panopticon' of 1791. Imprisonment as a form of punishment took shape in 1750s in England. The new ideas of imprisonment, the prisoner's resistance, the reforms of the philosophers and political radicals revolutionized the field of legal administration in eighteenth century England. This transformed the strategy of punishment and introduced a new language of authority within the walls of the prison. It replaced the earlier forms of punishment that was 'directed at the body' (whipping, branding, public hanging etc.). Instead, it employed imprisonment as a form of punishment 'directed at the mind'. This transformation in the system of punishment has been linked to the class relations and the social tactics that the capitalist transformation brought in England³. There emerged the idea of imprisonment with due attention to the construction of prison building in a way to exercise overall control over the body and mind of the prisoner. The crisis of 1750 also questioned the effectiveness of the capital penalties like death and transportation for petty crimes. Various sections of English society recommended finding an intermediate penalty, combining "correction of the body" with "correction of mind".⁴ This necessitates the building of the prison which was initially called in England 'the House of Correction', with a strict code of prison discipline. Nothing crucial happened in these recommendations until the advance of John Howard, who became the father of penitentiary. He aimed towards the reformatory regimentation of criminals.

In his task of reforming the prison institution, he first looked at those practices and the abuses, which had destroyed the effectiveness of the 'House of Correction'. There was the contestation between eighteenth century English reformers regarding the effective form of punishment to reform a criminal. Whether subjecting to coercive physical torture can reform the criminal or there was a need to bring reformation of the soul of the criminal was the discussion going on in the intellectual domain. The latter was argued to be effective through solitary confinement as was delineated by John Howard in his 'The State of Prisons'.⁵ Howard

An Empirical Study on Use of Blockchain Technology as a Support Tool in Economic & Financial Processes

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Abstract

Technology has provided various advantages in terms of developing new techniques. For commercial solutions, blockchain technology ensures transparency and a safe system. It also works on the energy sector and the status of the economy by reviewing current business viewpoints, as well as cases and literature. In bitcoin, the miner enters transaction data into blocks that are mined, and the transaction is completed. On the contrary, it is critical to design a proper bitcoin procedure, which is a time-consuming technique. Cryptography is gaining popularity in the gaming sector, and it offers a huge opportunity to collaborate on research and analysis with systems like KYC to frame the process.

Keywords: Blockchains, KYC process, cryptocurrency, financial and economic process.

Introduction

The findings presented in this article are intended to demonstrate the benefits that may be acquired by incorporating and utilizing blockchain technology in various initiatives related to a territory's economic sectors, or even that can positively affect a business. In addition to the foregoing, a classification of the blockchain as a study object was developed, allowing for the theoretical foundation in the comprehension of how to use this new technology. Similarly, based on the analysis of the documentary results found through the database engine's search for

information, it has been proposed as an initiative to carry out a simulation project that will allow the validation of the information generated, which will be useful for both internal and external management to a specific economic sector or organization. The above-mentioned research and simulation method arose as a study opportunity since firms today suffer from a lack of transparency in the management of business processes that entail economic and financial qualities, making them auditable (Tseng and Shang 2021). As a result, it has been determined that blockchain technology offers a timely

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Soft optimization techniques for automatic liver cancer detection in abdominal liver images

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Abstract---Automatically segmenting the liver is a challenging process, and segmenting the tumour from the liver adds another layer of complexity. Because of the overlap in intensity and fluctuation in location and form of soft tissues, segmenting the liver and tumour from abdominal Computed Tomography (CT) images merely based on grey levels or shape is very undesirable. To address these challenges, this study proposes employing Gabor Features (GF) and three distinct machine learning algorithms: Random Forest (RF), Support Vector Machine (SVM), and Deep Neural Net, a more efficient way of liver and tumour segmentation from CT images (DNN). The texture data produced by GF should be consistent and homogeneous across numerous slices of the same organ. In the first, pixel level features are

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CNN based deep learning methods for precise analysis of cardiac arrhythmias

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Abstract---In contemporary day, Deep Learning (DL) is a developing discipline in the science of Machine Learning (ML) (ML). The research in this field is evolving extremely fast and its consequence leads to breakthrough in advance technology. Deep learning approaches are meant to gradually learn characteristics from several layers by adopting a general purpose learning mechanism, without relying on the human built features. This enables the system to learn the complicated functions and translate the input to the output straight from the data. This study effort primarily focuses on emphasising the Convolutional Neural Networks (CNNs), a kind of Deep Neural Networks (DNNs) and develop an 11 layered CNN for effective ECG arrhythmia classification. In this study the relevance of CNNs, the

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Classification of EEG signals using machine learning and deep learning techniques

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Abstract---Electroencephalogram (EEG) signals reveal electrical activity of brain in a person. Brain cells interact by impulses even during sleep. Any disruptions to these impulses induce problems in the individual. Hence clinicians analyze electrical activity of the brain by EEG readings to comprehend the disruptions in the impulses. EEG and its sub bands depict electrical pattern of human brain. EEG data comprises transient components, spikes, other sorts of artifacts due to eye blinking, movement of the individual, anxiousness etc. during EEG collection. Wavelet transformations are effective mathematical technique for sampling approximation to produce clear EEG. It also assists in filtering, sampling, interpolation, noise reduction, signal approximation and signal augmentation, feature extraction. In this study, a survey is done on EEG motor imagery signals and the various classifiers to assess them machine learning methods for EEG signal

Automated Vehicle Detection and Tracking Using Raspberry-Pi

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Abstract

As the world's population grows, the number of physical items, such as cars and trucks, on the road grows at an unparalleled rate. Heavy traffic causes a rise in the frequency of road accidents. In this study, computer vision paradigms are used to monitor traffic movement and improve the road perspective using photos or sequences of images. The camera module of the Raspberry Pi is used in conjunction with the Raspberry Pi to identify cars, monitor and predict traffic flow utilising low-cost electrical equipment. When there are changes in the monitored region, a remote access utilising a raspberry-pi will be used to identify, track, and count cars. An open-source, Python-based video solution is suggested that utilises video streams captured from automobiles in the monitored region. This video data is then processed and transferred using a compression algorithm. The suggested technique is thought to be a cost-effective alternative for companies that are developing cost-effective traffic control systems.

Keywords: Vehicle Detection, Raspberry Pi, Tracking, IoT, Sensor.

1. Introduction

During peak hours, particularly when people are commuting to and from work, excessive traffic may cause substantial delays on the road. In addition to impeding emergency vehicles, such as fire trucks and rescue helicopters, an overabundance of automobiles and other things pollutes the environment in ways that aren't conducive to economic development. The road transportation system must be automated to the greatest extent feasible in order to produce an efficient, dependable, clean, and safe means of transportation. In order to maintain track of cars in a specific region of interest, the key research emphasis is on object identification and tracking. Construction engineers and other associates require a traffic monitoring system so that they may make cost-effective judgments based on the density of cars and information gathered by low-cost electronic gadgets. [1]. It also solves key issues, such as automobile accidents, vehicle theft detection, parking lot management, and other security risks. Moreover In order to apply computer vision methods in real-time traffic control, there is a strong interest. [2] Vehicle segmentation under varied weather circumstances, such as darkness, snow or dust, was a serious obstacle to our task. A distinct [3] pre-processing unit based on Histogram Equalization (HE) has been used to increase the resolution of video and morphological processing to add or subtract pixels in the borders of objects, which are structured by their form and size. Vehicle detection is made more difficult by the fact that cars travelling towards the same location in either a brighter or darker zone, or vice versa, may have the same colour as the backdrop [4]. Our idea is to use background subtraction to record a vehicle ID if it reaches a certain threshold.

In this study, a continuous video feed is utilised to determine automobiles' movements. At chosen spots on roadways, at high-rise buildings, and at certain traffic crossings, cameras are used to capture the footage.. Passenger cars, trucks, and other types of vehicles may all be monitored to assist reduce accidents and identify those who caused them due to their negligence by monitoring their movements. There are now four lanes on each side of the road, unlike the previous days when there were only one or two lanes on each side of the road when there were few or no automobiles[5]. At a maximum speed of just a few kilometres per hour, the cars remained calm and orderly. It was always simple to keep up with the motions of these automobiles. Nowadays, it is difficult to keep track of moving automobiles, much alone supervise their behaviour. Vehicle tracking may be made easier by using techniques such as the installation of cameras, the use of GPS, and the addition of counting sensors.

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Solving Climate Crisis: Need for A Well-rounded Strategy

KESHAB C. RATHA

Abstract

A significant amount of greenhouse gases is released into the atmosphere in our environment each year as a result of human activity. Extreme rains, flooding, scorching heat waves, sea level rise, and destructive wildfires are all blatant signs of climate change which are currently causing havoc in various regions of the world. The lack of urgency surrounding the climate problem is both confounding and completely understandable given the seriousness of the issue and the possibility of existential harm to both the human race and the planet. The major objectives of the present article are to explore the different causes of climate change, potential ramifications, key challenges on the way of climate action by establishing the fact that it is necessary to chart a new and better course while listening to and learning from affected communities in order to address the climate crisis on a whole-of-government level. This piece of academic endeavour tends to provide more in-depth understanding of issues fomented from climate change in the real world. The methodology adopted in this article is historical, analytical, descriptive & interpretive. This study uses qualitative approach and secondary data particularly journal articles, conference proceedings, various documents of government, books, newspaper articles, magazine articles, and various websites of internet have been extensively used to determine the objectives. A coordinated effort from specialists in science, economics, and politics is necessary to address a global crisis. Combating climate change requires unified action across all sectors of the society. Future development plans and policies need to be grounded in sound scientific knowledge and sustainable development tenets. If civilization as a whole does not take action, the climatic calamity cannot be stopped.

Keywords: Climate Change, Human activity, Greenhouse gas emission, Technology, Local solution



Keshab Chandra
Ratha

Configuring the after effects of covid 19: Trials and tribulations of migrant labourers in India

Authors KC Ratha

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Description The exponential growth of the pandemic culminated in extensive lockdowns that put a stop to mobility, commercial undertakings and social interactions. In India, the pandemic brought about an acute 'crisis of mobility', for migrant labourers in many major cities looking for a return to their native lands. Their persistent attempts to come back home one way or another made the lockdown unproductive in several areas, causing confrontations with authorities, desperate policy relief and ultimately, the arrangement of transport measures. The major objective of the present paper is to explain the fragility of India's internal migrants in terms of their mobility, gender, mental health, and social insecurity, and food crisis, penalty of joblessness and callous response of the government. In addition, it critically highlights on the constraints of public policy response in addressing migrants and puts forward recommendations for the path ...

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Least Protected, Most Affected: Looking through Lens of Cross-border Migration in COVID Period

[Keshab Chandra Rath](#) [View all authors and affiliations](#)

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Abstract

The major thrust of the present article is to explore the gruesome sufferings of migrants with respect to detention and deportation, social stigma, income and livelihoods, lack of health services and digital divide by establishing the fact that an inclusive global migration governance supported with a prudent and forward-looking migration policy and a human rights dimension is the way forward to address the consequences of COVID-19. An inclusive approach to migrant health leaving no one behind during the COVID-19 pandemic deserves cynosure of attention to direct our public health efforts since there can be no public health without

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Original Paper

Climate Change and Revisiting Security from Traditional State-Centric to Human Security and Beyond

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Abstract

Traditional security premised on state and its military apparatus has got itself emasculated in the face of continuing emergence of new kind of threats from the non-traditional and nonstate centric sources. Climate change and deepening environmental crisis along with other crises like demographic change, incidence of poverty, and rise of fatal and dangerous diseases have already thrown down the gauntlet to the realist paradigm of security built on state. Out of all these what stands out as the greatest threat to entire humankind is the climate change with all its devastating consequences like global warming, sea level rise, floods, cyclones and storms not only killing and uprooting poor people from their homeland etc. but also dragging people into an unsafe, insecure and sepulchral uncertainty of life. The answer to the fundamental question of survival and security and of providing a dignified way of life to the individuals was tried to be found out in various world summits on climate change from Kyoto to Paris summit but it was not sufficient to keep the temperature of the earth down at 1.5 degree Celsius at the pre industrial level by reducing emission of carbon dioxide to the atmosphere as agreed to by the world leaders. Climate change inextricably connected with security and development based on fossil fuels necessitates a rethinking that urges upon all to view the earth, both animate and inanimate not mechanically as mere instruments to redound to human wellbeing, security and primrose way of life but they are co-constitutive of each other's life tied in the web of togetherness or being together as propounded by the proponents of worldly security.

Indian Foreign Policy towards Multilateralism: Its Problem and Prospects

**Dr. Banita Mahanandia &
Dr. Indira Garnaik**

The trend of multilateralism has been evolved significantly, in India's foreign policy since independence whereby India engaged with global institutions, organisations, international actors in different ways for the fulfilment of its national interest with global interest. Since 1990s owing to its greater economic power, overall political stability, new international significance and rise in global power, India's stature within global institutions with the spirit of multilateralism has been rising and mounting to a greater height. However, its involvement with the multilateral forums have been experienced as inconsistent and inconvenient to some extent due to Protectionist trend by major powers, Hegemonic US-China powerplay, hijack of UN in resolving global issues, lack of global framework for global agenda and inability of WTO to manage global economy for the advancement of its national interest along with the global progress. Much debate is deliberated over the problems and prospects of multilateralism because of the fact that large number of regional groupings seem to undermine the multilateralism and multilateralism is felt as uneven without representing and equally emphasising the Asian and African region and confined within the Western European region. This paper attempted to discuss on the evolution of the trend of multilateralism in India's foreign policy since independence till date, problems faced by India to fulfil national and global interest and suggested some points to make this tendency quite meaningful in India's foreign policy.

Long standing tradition of internationalism activism and assumption of leadership role in world politics made India a credible champion of multilateralism along with new opportunities of globalised world order. Multilateralism has been rooted in India's civilisational value and quite prevalent in last few decades to deal with a densely inter-connected, inter-related and interdependent multipolar world order. It may be broadly defined as a process that coordinates behaviour among three or more countries on the basis of generalised principles of conduct. (Ruggie, 1992) The trend of multilateralism has been evolved significantly, in India's foreign policy whereby India is engaged with

global institutions, organisations, international actors in various ways for the sake of its national interest as well as for global growth and prosperity. Its coordination with these institutions is mainly, based on three generalised principles and norms such as non-discrimination, indivisibility and diffuse reciprocity. Good diplomatic relations with multiple states is vital for each other's progress and growth in multiple sectors as well as foster international order with a stable global environment. Lack of material resources and military capability prevented post-independence India from staking a credible claim to its place in the 'diplomatic sun'. (Reddy, 1968) Therefore, India turned to multilateral forums as a way of magnifying its influence. (Malone, 2011) India's Foreign Secretary Vijay Gokhale in a lecture stated that the challenges we all face today whether these be the traditional security issues such as nuclear proliferation, armed conflict or newer non-traditional issues such as terrorism, migration and refugee flows and environmental degradation- all of these in our view, require more and not less multilateralism. (Roy, 2019) Multilateral trend may be formal or informal in nature through multilateral forum, multilateral trade agreement, disarmament treaty, counter-terrorism strategy, environmental treaty, economic agreements etc. India's voice carries significant weight today in multilateral forums largely. (Mukherjee, 2011) But India's involvement with this international forum has been experienced as inconsistent and results unsatisfactory to some extent due to number of factors. Much debate is deliberated over the problems and prospects of multilateralism because of the fact that large number of regional groupings seems to undermine the trend of multilateralism and the spirit of multilateralism is felt as uneven and unequal in serving the global interest and specifically, under-represented the Asian region and remain confined within the Western European region. This paper attempted to discuss on the evolution of the trend of multilateralism in India's foreign policy, problems faced by India to fulfil its interest with global progress and suggested some points to make this trend quite meaningful trend in India's foreign policy.

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Climate Change and Revisiting Security from Traditional State-Centric to Human Security and Beyond

Prof Narottam Gaan, Ph. D, D. Litt, Dr Sudhansubala Das, Dr Banita Mahanandia

Abstract

Traditional security premised on state and its military apparatus has got itself emasculated in the face of continuing emergence of new kind of threats from the non-traditional and nonstate centric sources. Climate change and deepening environmental crisis along with other crises like demographic change, incidence of poverty, and rise of fatal and dangerous diseases have already thrown down the gauntlet to the realist paradigm of security built on state. Out of all these what stands out as the greatest threat to entire humankind is the climate change with all its devastating consequences like global warming, sea level rise, floods, cyclones and storms not only killing and uprooting poor people from their homeland etc. but also dragging people into an unsafe, insecure and sepulchral uncertainty of life. The answer to the fundamental question of survival and security and of providing a dignified way of life to the individuals was tried to be found out in various world summits on climate change from Kyoto to Paris summit but it was not sufficient to keep the temperature of the earth down at 1.5 degree Celsius at the pre industrial level by reducing emission of carbon dioxide to the atmosphere as agreed to by the world leaders. Climate change inextricably connected with security and development based on fossil fuels necessitates a rethinking that urges upon all to view the earth, both animate and inanimate not mechanically as mere instruments to redound to human wellbeing, security and primrose way of life but they are co-constitutive of each other's life tied in the web of togetherness or being together as propounded by the proponents of worldly security.

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**UNDERSTANDING THE APPROACHES TO POLITICAL THEORY: FOCUS ON
HISTORICAL, NORMATIVE AND EMPIRICAL**

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ABSTRACT

Political theory is the core part of political science that emphasizes the aspects of describing and explaining political issues and behaviour. So, in the study of political science, we require specific approaches that help to find political truth and study the events. In political science, there are mainly two effective approaches: traditional and modern. From the ancient Greek political philosophy era, political philosophers and scientists have been directed to analyse and investigate various political issues and incidents from their perspectives. Henceforth, they have found conclusions and prescribed specific recommendations based on the study. This process is itself an ongoing way. It has brought the emergence of many approaches to studying and understanding the field of political science. Though normative and empirical approaches are two different parts of social science, both are somehow guided by each other. The present chapter discusses three fundamental approaches to studying political theory, mainly focussing on the historical, normative, and empirical approaches. Simultaneously, this chapter also gives a comprehensive knowledge of the different approaches to studying political theory.

Keywords: Approaches, Norms, Facts, Prescriptive and Past events

INTRODUCTION

Political theory, as an essential branch of political science, deals with the study of ideas related to the concepts of state, individual and their relationship with each other. So, it is difficult to identify various conceptions of political theory that different theorist uses. For this, different approaches emerge in political theory to understand, conceptualize and evaluate present and past theories. Henceforth, it is not limited to studying how the institution works but also to how it ought to work. The historical approach under the traditional approach insists on studying history to determine the future course of action. So, studying politics helps to gain knowledge about the functioning and the success and failure of government, political parties and various institutions.

In contrast, the normative approach is primarily philosophical that tries to explore values and interpreted events with the help of norms and moral standards. So, the normative approach is understood as the framework of philosophical speculation about values. It is prescriptive and based on 'what ought to be or should be'. This approach is reflected in the works of Leo Strauss. But the problem lies with this approach that ethical values are subjected to specific times and circumstances. Hence, it is quite challenging to provide absolute standards and values. Unlike the normative approach, the empirical approach believes in the scientific method. It has dominated political theory in the twentieth century and rejected value judgment. The empirical approach tries to provide value-free theory to make theory more scientific and objective. It has been pointed out that an empirical idea is a more reliable method to determine the future course of action. So, it has contributed a lot

PERFORMANCE OF INDIAN NATIONAL CONGRESS IN ODISHA ELECTORAL POLITICS

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Abstract:

Since Independence, Indian National Congress has dominated Indian politics, but in the 21st Century, the Congress party declined gradually. The rise of several regional political parties and emerging BJP in various constituencies is a major concern for the Congress Party. The voting share won by National Congress in several elections were also discussed in this paper and its implications. The tussle between the Indian National Congress and other parties in Odisha has been a perfect example of the cycling of political parties since the first elections. Compared to the one-party domination at the centre levels, the regional parties in Odisha show competitive nature to challenge national party domination in state politics.

Key Words: Odisha Politics, Indian National Congress, Party Politics, Institutional Decay, Umbrella Party, Internal Rising Party.

Introduction:

In Odisha Politics Indian National Congress Party is considered one of the oldest or most successful parties. Due to the Involvement of freedom fighters and several national leaders in this party, it gained mass support. Indian Party Politics can be classified under three major phases first 1947-1967 until the 6th general Election in 1977, second 1967-1989 era of challenges to congress domination, and 1989 to 2019 the regional party's rise and BJP at the national level (Farroqui & Sridhran, 2016). The Indian National Congress Party holds power at the centre more than any other party till today. The ability of leadership and organizational capacity are the main factor for party hold domination (Candland, 1997). Congress emerged as the strongest party because it accommodates every section in their party, and it is also known as the Umbrella party (Farroqui & Sridhran, 2016). The Election of 1977 formed the first-ever coalition government and non-congress national administration led by the Janata Party. Congress again gained power in 1980 under Indira Gandhi and later by Rajiv Gandhi. After the death of Rajiv Gandhi, Congress gradually lost national vote share in the general election and formed a coalition government. This coalition completes its 5-year tenure with Congress's minority government. Since 1999 India had witnessed coalition government at the centre till the 2014 election when the BJP government secured a majority on its own. The Rising faction-based congress party is also one of the primary reasons for declining the congress party and helping to emerge coalition government during these elections (Ghosh, 2015).

Key Argument:

- (i) Institutional Decay is one of the most important reasons for the Congress Party Decline in the State of Odisha.
- (ii) Indian National Congress holds vote share but fails to win seats.
- (iii) Candidates from Congress won by their Charismatic Leadership qualities. Indian national congress party does not have a substantial impact in several constituencies.

Review of Literatures:

Jena. B.B. (1994), in his paper Odisha Politics, described how Different political parties shaped Odisha politics. He mentioned the leading causes for it class between Indian Congress leaders such as Chief Minister Hare Krushna Mahatab and PCC Chief Biju Patnaik. Farooqui & Sridharan (2016) In their paper discussed why the Indian National Congress party is known as Umbrella Party and how the Indian party system developed. Palshikar (2017), in his article, discussed congress voting share in a

Prevalence and Factors Leading to Internet Disorder in Secondary School Gaming Students of Rural Areas

Suvrasmita Barik* and Dr. Sanjukta Padhi**

MOTIVATION FOR RESEARCH

During the past years, the number of internet users and gamers have climbed to a great extent. India is not at all an exception. There is also a significant rise in the number of reports of people who have been occupied with the internet to such an extent that it impacts their lives in a negative manner.

Internet gaming disorder tends to be one of the emerging mental problems among all the age groups but have specially captured adolescents and has captivated enough attention over the past decade. During these following years various researches have been carried out in order to determine the type, prevalence and factors leading to internet gaming addiction. Research have also been carried out in different countries related to the occurrence, and factors leading of IGD. Few of these studies employed the IGD-20 tool for this systematic review and none of them specify about the field of study whether it was rural or urban. Till today, though various studies have been conducted on IGD, but only a very few of them tried to determine the prevalence of IGD in rural areas. Therefore, this particular study seems to be very relevant as it puts a step forth in determining the prevalence and factors related to IGD for the rural people.

But generally all the studies catered to the urban areas, only a few of them tried to analyse the effect of Internet gaming disorder in the population of rural area, people who were having low access to technology. Hence, this particular study tried to understand the prevalence and factors leading to IGD in secondary school students of a rural region, who have considerably less reach to technology. We selected Nagaon Assam, India as our sample area because of their considerably less reach to technology. This cross-sectional study covered 4 secondary schools of Nagaon Assam, India.

The results obtained as per the data conducted further indicated that 5.4% of 150 subjects were diagnosed with Internet gaming disorder. The associated factors of this disorder were found to be, males were more vulnerable to IGD compared to females, not living with both the parents, being bullied at school, use of online dating sites, depression, anxiety, stress because of family issues, failure in exam, family composition, limit of internet use, suicidal ideation and consumption of alcohol are some of the other factors that tends to increase the vulnerability of an individual to IGD.

STATEMENT OF THE PROBLEM

The research problem of this particular research is to identify the prevalence rate and which of the factors from gender, type of school, living with parents, failing an exam, using online dating sites, being a victim of school bullying and cyber bullying, suicidal ideation, alcohol addition, suffering from mental disorder either anxiety, depression and stress increases the vulnerability of an individual towards internet gaming order among rural secondary school students.

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A Study On Factors Affecting Work Life Balance Of Women Employees Working In Health Sectors

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Introduction

Review of literature

Objectives

Hypotheses

Proposed Methodology

Conclusion

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Abstract

In this study factors affecting work life balance of women employees were examined. A descriptive research design was employed for this study to determine the factors that affect work life balance of working women in health sectors. Multiple regression was applied to find out the extent to which factors like work involvement, hours of work, family responsibilities affect work life balance of working women in health sectors. For this purpose 200 working women were randomly selected from different health sectors. The two instruments used for this study are Work life Balance Questionnaire by Hayman (2005) and Multidimensional Scale of Perceived Social Support (Zimet, Dahlem&Farley,1988). The Correlation analysis suggests that there is a positive relationship between social support and work life balance. The finding of the study revealed that factors like work involvement, hours of work ,family and childcare responsibilities affect work life balance of working women in health sectors.

Introduction

Work-life balance is that you need time for both work and other aspects of life, whether those are family-related or personal interests.It is difficult to maintain work-life balance in the fast-paced business world. As we grow increasingly more connected through technology and social media, it is becoming very troublesome to disunite work from our personal lives. It is very common to check emails, whatsapp messages, instagram pages, facebook account, take business calls at dinner time and work on our laptops on holidays.Organizations expect extra work from their employee, which gives force on them to accomplish greater results. As a result, this leads to lengthy working hours, and less time spent with family members. Atop executive has a responsibility to help his team meet the demands of their work and personal lives. A balanced life is important for leading a healthier life and to maintain good relationships with others it also can also improve employee's productivity, and performance. A poor work-life balance can affect one's physical, mental and social wellbeing.

By promoting employee to look after themselves and maintain a balance between work and personal life,an organisation will significantly reduce health issues and absences. It will assure that your organisation is more efficient during business hours and employee needs to be part of the business and culture.When employees findthe balance between work and their personal lives, their engagement levels increase. This has many positive impacts: According to Tower Perrin's 2006 global survey; "Companies with highly-engaged employees had a near 52% gap in performance improvement in operating income.", "Companies with high levels of employee engagement improved 19.2% in operating income while companies with low levels of employee engagement declined 32.7%."By fostering employees to lead a balanced life, an environment will be generated in which everybody is committed to the job. And it will help in improving retention rates, productivity and ultimately benefit of the company.

To understand work/life balance, George Washington University's Professor Swiercz and Doctoral Candidate Ezzedeem developed a cognitive approach, the "Cognitive Intrusion of Work." It means that work/life balance is not just about finding "physical time" to do all thatneeds to be done. Instead, and



Cybercrime Against Women: A Doomsday Prediction for Technological Advancement

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Abstract

The freedom to use the Internet has now been designated as one of the "human right" by "the United Nations Human Rights Council in June 2016". Penetration rate of Internet in India is continuously increasing, with the concept of a contemporary India seems to place a significant emphasis on technology and science for its highly inclusive growth.

In this particular study, the author moves ahead to explore the impact of technological advancement, and therefore greater availability to the Web and online media platforms, acts as a primary reason of rising cyber-crime towards Indian women. Women seems to be highly vulnerable to illicit acts carried out over the Internet, generally known as cybercrime.

To stay a step ahead of such culprits, the judges, police, and investigative agencies must be equipped with cutting-edge web-based technologies. The judicial measures offered under several pieces of law addressing cyber threats have indeed been highlighted. The function of government in the contemporary legal landscape, as well as the government's responsibility, are also thoroughly examined. The emphasis would also be on the different elements that are contributing to a rise in cyber-crime targeting women, as well as the repercussions of such offenses on the victim.

Key words- human rights, internet, cybercrime, women victim, bullying, hacking

Introduction

India is developing rapidly, and technology innovation is among the primary reasons attributing to its prosperity. It is worth noticing that there is indeed a breakthrough each moment, which benefits humanity significantly. India is unquestionably forging ahead at an unprecedented rate in the field of technology, notably information technology. For its all-inclusive growth, the idea of a contemporary India has placed great emphasis on innovation and technology.

Nevertheless, this quick progress brings along several drawbacks. Women are more vulnerable to illicit acts carried out over the web, generally known as cybercrime. Cyber-attacks on the net are as a result of several variables including ignorance, missing of privacy policy, and so on. The freedom to use the Internet has now been designated to be one among the right for human by the "United Nations Human Rights Council". Total number of people using social media in India had risen dramatically, it was "181.7 million in 2015 and became 216.5 million in 2016". One can expect it to reach "250.8 million in 2017". As per a prediction made by 2020, the figure will rise to at least 336.7 million.

Cybercrime is a global trend. With the technological evolution, cybercrime and the objectification and victimization of women are rising, posing a significant danger to an individual's sense of safety and mental health. Even though India seems to be one of very few countries to have enacted and enforced regulations to counter cybercrime, any special provisions pertaining to cybercrime targeting women remain unaddressed. The Act does not mention the significant threat to women's security in general.

Cybercrime targeting women is still taken lightly in India, owing to the overall lack of respect for women in our current culture, as well as the fact that many individuals are unwilling to accept the reality that merely publishing photographs of anyone online is a crime. Cybercrimes such as morphing and email spoofing lack moral support in the society and thus are treated lightly. Hence, taking us to crucial aspect of advancement in society: individuals must acknowledge others' rights with understanding what constitutes a crime.

Rationale for the Increase in Cyberattacks Against Women

As per official figures provided by the Government of India's National Crime Records Bureau, 9622 incidents of cyberattacks were filed in 2014, with 5752 people apprehended. In 2015, 11,592 instances were recorded – a 20 percent raise over the previous year with 8121 people jailed.

THE POSITIVE IMPACT OF ENTERTAINMENT TECHNOLOGY ON PUBLIC AND PRIVATE SECTOR EMPLOYEES

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ABSTRACT

Several organizational activities, as well as human resource management, are increasingly utilizing the social technology. Several aspects of the advantages and disadvantages of entertainment and social behavior are discussed. There has been much debate about the positive and negative effects of entertainment technology on human behavior; therefore, we will focus on the positive aspects. The focus of this study is the positive impact of entertainment technology on public and private sector employees. In this paper, a first preliminary overview of the positive effects of entertainment technology on employees is presented and discussed. This study is followed by an empirical design where entertainment technology is an independent variable and an employee's behavioral intention or performance is the dependent variable. Age, gender, public and private sector, and hours of work are demographic variables. The samples were chosen using stratified random sampling, and data were gathered from 220 (N = 220) public and private organizations of Odisha using a standardized tool. Descriptive and inferential statistics (t-test) were used to analyze the data. Results showed the positive impact of entertainment technology on performance anticipation and effort expectancy of both private and public sector employees. Managerial implications are discussed, and future research suggestions are provided.

KEYWORDS

entertainment technology, positive impact, public sector, private sector.

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1.0 INTRODUCTION

It is well known that technology is advancing at a breakneck speed. This article examines how these new technologies affect the lives of public and private sector employees.

Research Article

Subhashree Patel, Bijaya Laxmi Panigrahi* and Gnaneshwar Nelakanti

Legendre spectral projection methods for Fredholm integral equations of first kind

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Abstract: In this paper, we discuss the Legendre spectral projection method for solving Fredholm integral equations of the first kind using Tikhonov regularization. First, we discuss the convergence analysis under an a priori parameter strategy for the Tikhonov regularization using Legendre polynomial basis functions, and we obtain the optimal convergence rates in the uniform norm. Next, we discuss Arcangeli's discrepancy principle to find a suitable regularization parameter and obtain the optimal order of convergence in uniform norm. We present numerical examples to illustrate the theoretical results.

Keywords: Ill-posed problems, Fredholm integral equations of first kind, Tikhonov regularization method, Legendre polynomials, Arcangeli's method

MSC 2010: 65J10, 65J20

1 Introduction

Let $X = L^2[-1, 1]$. We consider the following Fredholm integral equations of the first kind:

$$\int_{-1}^1 k(s, t)x(t) dt = y(s), \quad -1 \leq s \leq 1, \quad (1.1)$$

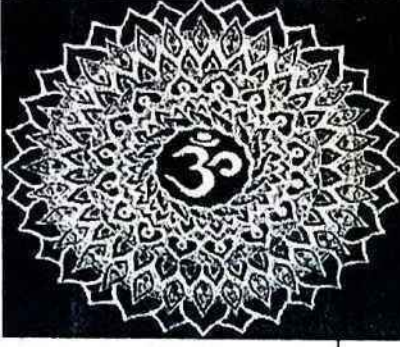
where $k(\cdot, \cdot)$ and y are known functions and x is the unknown function to be determined. This type of equations (1.1) arises in many of the inverse problems in science and engineering, for example in geophysics, radiography, electromagnetic fields, signal processing, and backward heat conduction (see [1, 6, 13]).

The problem of solving equation (1.1) is ill-posed, i.e., a solution does not always exist, if a solution exists it need not be unique, and if a unique solution exists, then a small error in data y leads to a large error in the solution. This property makes it difficult to find a stable solution. To overcome this ill-posedness property of the first kind Fredholm integral equations, the regularization techniques [6, 8, 11] are utilized to reduce the ill-posed equation to a nearby well-posed equation. In the existing literature, the Tikhonov regularization method is an efficient method to solve the ill-posed equation. An important issue for such a regularization process is the choice of an appropriate regularization parameter. A large amount of research works is available in the literature on the development of the appropriate strategies for choosing the regularization parameter [4, 7, 12, 21, 23].

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सम्बलपुरम्, उड़ीसा, भारत

कृष्णकेशवषडङ्गिनः समुद्रशतकम् : एकमध्ययनम्

डॉ. सुनेली देई

सारांश

२०२० ख्रीष्टाब्दे उत्कलीयकविना ड. कृष्णकेशवषडङ्गिना विरचितं समुद्रशतककाव्यं क्रमेण एकं लघुकाव्यं शतककाव्यं गीतिकाव्यञ्च भवति । काव्येऽस्मिन् आत्मपरिचयात्मकेन पुष्पिकाश्लोकद्वयेन सह १०१ श्लोकाः सन्ति । उत्कलीयकविः ड. कृष्णकेशवषडङ्गी १९७८ ख्रीष्टाब्दे जुन् मासस्य अष्टादशदिनाङ्के कटकमण्डलस्य वैदेशग्रामे जन्मग्रहणमकरोत् । तस्य पितुः नाम प्रवक्तारत्नः स्वर्गतः पण्डितः जयदेवः षडङ्गी मातुः नाम च श्रीमती मनोजमञ्जरी षडङ्गी । कविः कृष्णकेशवः षडङ्गी सम्प्रति कटकमण्डलस्य वाङ्गीनामके स्थाने सर्वकाराधीनस्थ-वृक्-पशुरोगचिकित्सा-अधीकारीभावेन कार्यं करोति । कविः ड. कृष्णकेशवषडङ्गी स्वर्गतः रघुनाथषडङ्गी- स्वर्गतः जयदेवषडङ्गी-स्वर्गतः प्रफेसर् दोलगोविन्दशास्त्री-प्रफेसर् गोपीनाथमहापात्रः- पण्डितप्रबोधकुमार-मिश्रमहाभागेभ्यः संस्कृतविषये शिक्षालाभं कृतवान् । कविः ड. कृष्णकेशवषडङ्गी अद्यावधि चतुर्दशग्रन्थान् रचितवान् ।

समुद्रशतककाव्यस्य मुख्यरसः शान्तरसः भवति । काव्यस्य प्रारम्भे आशीर्वादात्मकमङ्गलाचरणं दृश्यते । काव्येऽस्मिन् पौराणिक-प्राकृतिककथातत्त्वमाश्रित्य समुद्रस्य निन्दाप्रशंसे उभे वर्णिते । अत्र कविना उपजाति-वंशस्थविलं-वसन्ततिलका-शिखरिणी-मालिनी-स्रग्धरा-पृथ्वी-शार्दूलविक्रीडितादि- छन्दांसि प्रयुज्य श्लोकाः निर्मिताः । काव्येऽस्मिन् श्लोकैः सह तेषामन्वयाः उत्कलार्थाः आङ्ग्लभाषा-हिन्दीभाषाभ्यामनूदितार्थाः च प्रदत्ताः । अन्योक्ति-अर्थान्तरन्यासाद्यलङ्कारमाध्यमेन कविना समाजस्य मानवेभ्यः बहवः सुशिक्षाः प्रदत्ताः ।

कूटशब्दः सालङ्कारमिदं समुद्रशतकम्, रसमयम्, कृष्णकेशवकवरेषा कृतिः

प्रस्तावना

वर्णनीयविषयवस्तुः अस्य शोधपत्रस्य मुख्यवर्णनीयविषयवस्तु भवति समुद्रशतककाव्यस्य रचयितुः ड. कृष्णकेशवषडङ्गिनः परिचयप्रदानपुरः सरं समुद्रशतककाव्यस्य कथावस्तुवैशिष्ट्यादीनां प्रतिपादनम्।

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कृत्यप्रत्ययार्थविमर्शः

Dr. Suneli Dei

शोधसारः

महर्षिपाणिनिना पाणिनीयव्याकरणे ३९९६सूत्रैः प्रकृतिप्रत्ययाभ्यां साधुशब्दानामनुशासनं कृतम्। धातुः प्रातिपदिकश्च प्रकृतिरूपेण गृह्येते। प्रकृतिः सर्वदा आदौ प्रयुज्यते, प्रत्ययः सर्वदा प्रकृतेः अनन्तरं प्रयुज्यते। पाणिनिमतेन पदं द्विविधम्-सुबन्तं तिङन्तश्च। धातोः लिङ्-प्रत्ययाः प्रयुज्यन्ते, प्रातिपदिकात् सुप्-प्रत्ययाः प्रयुज्यन्ते। कृत्तद्धितसमासाश्च इति सूत्रानुसारं कृत्यप्रत्ययान्तः प्रातिपदिकं भवति। अत एव कृत्यप्रत्ययान्त-प्रातिपदिकात् सुप्-प्रत्ययाः प्रयुज्यन्ते। तस्मात् कृत्यप्रत्ययान्तपदं सुबन्तं भवति। १) तव्यत् २) तव्य ३) अनीयर् ४) केलिम् ५) यत् ६) क्यप् ७) ण्यत् चेति सप्त कृत्यप्रत्ययाः भवन्ति।

तयोरेव कृत्यक्त्वलार्थाः^१ इति सूत्रानुसारेण भाववाच्ये कर्मवाच्ये च कृत्यप्रत्ययाः प्रयुक्ताः भवन्ति। प्रैषातिसर्गप्राप्तकालेषु कृत्याश्च इति सूत्रेण प्रैष-अतिसर्ग-प्राप्तकालेषु इत्येतेष्वर्थेषु लिङ्-प्रत्ययाः कृत्यप्रत्ययाः अपि प्रयुज्यन्ते।^२ अर्हतीत्यर्ह, तद्योग्यः। अर्हं कृत्यतृचश्च इति सूत्रेण अर्हं कर्त्तरि वाच्ये धातोः लिङ्-प्रत्ययाः कृत्यप्रत्ययाश्च भवन्ति।^३ कृत्याश्च इति सूत्रानुसारं आवश्यकार्थे आधर्मण्यार्थे च धातोः कृत्यप्रत्ययाः भवन्ति।^४ शकि लिङ् च इति सूत्रानुसारं शक्यर्थगम्यमानाद् धातोः अपि लिङ्-प्रत्ययाः कृत्यप्रत्ययाश्च स्युः।^५ प्रैषादिषु गम्यमानेषु ऊर्ध्वमौहृत्तिके अर्थे विद्यमानाद् धातोः लिङ्-प्रत्ययाः कृत्यप्रत्ययाश्च स्युः।^६ कृत्यल्युटो बहुलम्^७ इति सूत्रेण कृत्यप्रत्ययाः ल्युट्-प्रत्ययाश्च बहुलेषु अर्थेषु प्रयुक्ताः भवन्ति।

कुञ्चीशब्दाः - तयोरेव कृत्यक्त्वलार्थाः, प्रैषातिसर्गप्राप्तकालेषु कृत्याश्च, अर्हं कृत्यतृचश्च, शकि लिङ् च, कृत्यल्युटो बहुलम्।

१.० उपक्रमः

कृत्यप्रत्ययार्थविमर्शः इत्याख्यं शोधपत्रमिदं महर्षेः पाणिनेः अष्टाध्यायीं भट्टोजिदीक्षितस्य सिद्धान्तकौमुदीं जयादित्यवामनयोः काशिकावृत्तिश्चाधारीकृत्य प्रस्तुतम्। अष्टाध्यायी सूत्रात्मकशैल्या विरचितः एकः व्याकरणग्रन्थः। प्रकृतिप्रत्ययशैल्या तेन साधुशब्दानामनुशासनं कृतम्। सूत्रात्मकशैल्या विरचितायाः

^१ पा. ३.४.७०^२ पा. ३.३.१६३^३ पा. ३.३.१६९^४ पा. ३.३.१७१^५ पा. ३.३.१७२^६ पा. ३.३.१६४^७ पा. ३.३.११३

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Concepts of Dāna in Mahābhārata : Facts and Facets

Dr. Sushree Sasmita Pati^१

Abstract-

Society is built on the cooperation and coordination of the people who stay within it. Indian culture has been so nourished with the idea of cooperation that it paves the way the society toward the concept of donation or gift (Dāna). Dāna has been one of the most essential elements in building a safe and cordial community. We can safely assume that the idea of "Unity in Strength" is nothing but the result of Dāna.

Being one of the historical texts, Mahābhārata has been a storehouse of all the concepts that require a society. The idea of Dāna has been discussed thoroughly in the book and has disclosed several facts which need to be known by the idealists.

This article will focus on disclosing the various components and context of Dāna reflected in Mahābhārata. The Anushashan Parva of Mahābhārata has been examined to understand the idea of Dāna. This article will be a journey to understand the concept of Dāna reflected in the post-Vedic period and during Mahābhārata society.

(Keywords- Dāna, Mahābhārata, History, Virtue, Gift, Yajna, Panchamahayajnga)

Introduction-

Dāna or gift is considered one of the noblest acts in these words. Human, by nature, loves to live in a society where they live with mutual support. In the words of Anthropologists, the distribution and exchange of gifts do not mean a one-way process.^२ The gift is social practice spontaneously developed by the society with a socio-economic cause. The famous historian Prof. Romila Thapar

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^२ Mauss, The Gift, Page-१

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रथेशशतकस्य समीक्षात्मकमध्ययनम्

(RATHESHASHATAKASYA SAMIKSHATMAKAMADHYAYANAM)

by

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रथेशशतकस्य समीक्षात्मकमध्ययनम्

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संस्कृतविभागः

गङ्गाधरमेहेरविश्वविद्यालयः, सम्बलपुरम्

१.१ शोधपत्रसारः

उत्कलीयकवेः कृष्णकेशवषडङ्गिनः रथेशशतककाव्यं श्रीजगन्नाथमहाप्रभोः रथयात्रोत्सवस्य पूर्णविवरणीं प्रददाति । रथेशशतककाव्ये १०३ श्लोकाः सन्ति । अस्य काव्यस्य मुख्यरसः भक्तिरसः भवति । काव्यस्य प्रारम्भे नीलाद्रिनाथस्य रथेशस्य श्रीजगन्नाथस्य कृते प्रशस्तिवाचकः एकः विरुदः नीलाद्रिनाथविरुदनाम्ना वर्तते । काव्यस्य आरम्भतः अन्तं यावत् नीलाद्रिनाथस्य रथेशस्य श्रीजगन्नाथस्य जयगानं क्रियते । काव्येऽस्मिन् रथयात्रादिवसीयदृश्यानां रथप्रतिष्ठा-पदहिण्डन-वेषकरण-रथमार्जन-अश्वयोजन-रथाकर्षणादीनां प्रमुखभावेन वर्णितमस्ति । अधिकन्तु महाप्रभोः रथेशस्य रूपमाधुरी-लीलामाधुरी-गुणमाधुरी-धाममाधुरी-नाममाधुरी-प्रसादमाधुरीप्रभृतिविषयाणां व्यञ्जना स्थाने स्थाने श्लोकेषु प्रदर्शिता अस्ति ।

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ईशावास्योपनिषदि वैदिकजीवनपद्धतिः

डा. सुनेली देई

शोधसारः

मन्त्रब्राह्मणयोर्वेदनामधेयम्¹ इति वेदस्य लक्षणानुसारं मन्त्रब्राह्मणात्मकशब्दराशिः वेदः भवति। मन्त्रभागः संहितारूपेण ख्यातः। ब्राह्मणभागः ब्राह्मण-आरण्यक-उपनिषद्भेदेन त्रिधा विभज्यते। एवरूपेण ऋग्यजुःसामाथर्वाख्यानां चतुर्णां वेदानां संहिताभागः ब्राह्मणभागः आरण्यकभागः उपनिषद्-भागश्च दृश्यन्ते। एतेषां ग्रन्थानामध्ययनेन वयं वैदिकार्याणाम् आदर्शजीवनपद्धतिविषये ज्ञातुं शक्नुमः।

शुक्लयजुर्वेदस्य चत्वारिंशदध्यायो भवति ईशावास्योपनिषद्। अस्यामुपनिषदि अष्टादश मन्त्राः सन्ति। यद्यपि उपनिषदियं परिमाणदृष्ट्या लघुः भवति, तथापि गुणात्मकमानदृष्ट्या अस्याः स्थानं दशप्रमुखासु उपनिषत्सु प्रथममस्ति। अस्मिन् शोधपत्रे वैदिकालस्य आदर्शमयजीवनपद्धतिः ईशावास्योपनिषदमाधारीकृत्य प्रतिपाद्यते।

सर्वासु उपनिषत्सु प्रारम्भे प्रयुक्तः शान्तिमन्त्ररिव ईशावास्योपनिषदि प्रारम्भे प्रयुक्तः शान्तिमन्त्रः सकलजीवस्य त्रिविधदुःखप्रशमनार्थं प्रयुज्यते। अस्यामुपनिषदि त्यागेन भोगकरणार्थमुपदिश्यते। अपि चेयमुपनिषद् शतवर्षकालं सत्कर्मभिः प्राप्तैः धनैः सुखशान्तिभिः सह जीवनधारणपूर्वकं परलोकार्थं यज्ञाननुष्ठीय मोक्षलाभार्थमात्मनः स्वरूपं ज्ञातुं प्रेरयति। वस्तुतः अत्र सदुपायैः उपार्जितस्य धनस्य भोगकरणार्थं गुरुत्वं प्रदीयते। ईशावास्योपनिषदि वर्णिताः त्यागस्योपादेयता, सत्कर्मणः सुफलता, विद्याविद्ययोः सम्भूत्यसम्भूत्योश्च प्रासङ्गिकता, सर्वभूतेषु मित्रता चेत्यादयः विषयाः आदर्शवैदिकजीवनपद्धतेः पूर्णपरिचयं प्रददति। संक्षेपेण संसारे मनुष्यः सत्कर्मणा इहलोके शतवर्षं यावत् सुखशान्तिलाभपूर्वकमवस्थापनं कृत्वा अविद्यया स्वर्गलाभपूर्वकं विद्यया मोक्षलाभञ्च कृत्वा जीवनं परिपूर्णं कर्तुमुपनिषदिद्यं समुपदिशति।

कुञ्जीशब्दाः – ईशावास्योपनिषदि, वैदिकशान्तिमयी, वैदिकत्यागमयी, वैदिककर्ममयी, वैदिकात्मज्ञानमयी, वैदिकविश्वबन्धुत्वात्मिका, वैदिकमोक्षमयी, वैदिकसंस्कारात्मिका, जीवनपद्धतिः।

मन्त्रब्राह्मणयोर्वेदनामधेयम्² इति वेदस्य लक्षणानुसारं मन्त्रब्राह्मणात्मकशब्दराशिः वेदः भवति। मन्त्रभागः संहितारूपेण ख्यातः। ब्राह्मणभागः ब्राह्मण-आरण्यक-उपनिषद्भेदेन त्रिधा विभज्यते। एवरूपेण ऋग्यजुःसामाथर्वाख्यानां चतुर्णां वेदानां संहिताभागः ब्राह्मणभागः आरण्यकभागः उपनिषद्भागश्च दृश्यन्ते। एतेषां ग्रन्थानामध्ययनेन वयं वैदिकार्याणां परोपकारात्मिकां स्वास्थ्यसंरक्षणात्मिकां रोगोपशमनात्मिकां विश्वबन्धुत्वात्मिकां सर्वदेवमयात्मिकां ब्रह्मचर्याश्रमीयां गृहस्थाश्रमीयां वानप्रस्थाश्रमीयां सन्न्यासाश्रमीयां त्यागमयीं शान्तिमयीं सत्कर्ममयीं साम्यवादमयीं यज्ञमयीं ओङ्कारमयीं सात्त्विकगुणमयीं मोक्षमयीं प्रकृतिपूजामयीं शिष्टाचारमयीं विश्वकल्याणकारिणीं आदर्शवैदिकजीवनपद्धतिं ज्ञातुं शक्नुमः।

उप-नि-पूर्वस्य षट् लृ (विशरणगत्यवसादनेषु)³ धातोः क्तिप्रत्ययान्तस्य रूपमुपनिषदिति। सामीप्यवाचिना उप-उपसर्गेण प्रत्यगात्मनो ब्रह्मसामीप्यमुच्यते। सामीप्यञ्च तयोरभेदरूपं विवक्षितम्। निशब्दो निश्चयार्थकः।

¹ आपस्तम्बपरिभाषा, १:३३.

² तत्रैव

³ धातुपाठः, पृ. ३६.

Impacts of Water and Energy Sector Reforms in Gujarat: The Case of Expansion of Micro Irrigation Schemes and Rationalisation of Agricultural Power Tariff

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Abstract

Against the backdrop of the water and energy sector reforms enunciated by the state government in Gujarat, this paper reviews the important policy changes and outcomes of farm-level adoption of water-saving technologies, on the one hand, and the effective implementation of energy tariff policies, on the other hand. Following an assessment of the water and energy policy and regulatory interventions, the paper provides an overview of the farm-level adoption micro irrigation (sprinkler and drip irrigation) systems over the past one decade of the policy reforms. The paper then examines the case of energy sector reforms enunciated by the state in coordination with the energy regulator through establishment of the distribution companies (DISCOMs). The paper brings out that the policy and regulatory interventions in the water and energy (power) sectors have been successful in terms of wider promotion of micro irrigation systems and deregulation of power generation and distribution activities by establishing dedicated DISCOMs. Thus, the policy initiatives were able to address several challenges facing the water and energy sectors in the state. Firstly, the wide-scale promotion of micro irrigation schemes has significantly reduced the groundwater over-extraction for agriculture. Second, the energy sector reforms have shown a significant progress towards rationalisation of tariffs across sectors.

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"I have seen the Moment of My Greatness Flicker": Travel, Modernism, and Empire in Hilaire Belloc's *The Modern Traveller*

P. Muralidhar Sharma

This paper attempts to examine modernism's engagement with the Victorian discourses of travel that crucially determined the European attitude to imperialist expansion. The paper argues that modernism's pronounced anti-imperialist stance and scepticism, as exemplified in the works of Joseph Conrad, E.M. Forster, and James Joyce, among others, can be traced back to the close of the earlier century, when lesser known and less celebrated texts like Hilaire Belloc's *The Modern Traveller* (1898) exposed the seamy side of British imperialism in a humorous, satirical vein. Through a lengthy verse-parody of the project of travel in the context of imperialism, *The Modern Traveller*, this paper establishes, paved the way for modernism's famed critical engagement with the ideologies of imperialism.

I

The idea of travel is integral to the English literary and cultural consciousness and has significantly informed literary writing since the age of Chaucer. English expansionism dates back to the 15th and 16th centuries, when explorers like Christopher Columbus and Francis Drake were iconized in the public imagination. Over the years, the notion of travel and exploration came to be inextricably linked to the idea of national pride, which has often been reaffirmed in texts like Richard Haklyut's *Principal Navigations, Voyages, Traffics, and Discoveries of the English Nation* (1589). Colonialist and imperialist ideologies impinged themselves upon, and were also embedded in, travel narratives. Travel

narratives facilitated colonial expansion and promoted the cause of the Empire. They endorsed many of the beliefs imperialist ideologies were founded upon. They created, perpetuated, and were influenced by the equations of power between European and non-European worlds. By their confirmation to established hierarchies, travel narratives participated in the projects of imperialist expansionism. In the hierarchical Victorian world order, travel to the non-European parts of the world was inextricably interlinked with a certain notion of 'Englishness' and cultural achievement. In her influential book *Imperial Eyes: Travel Writing and Transculturation* Mary Louis Pratt argues how

Travel books gave European reading publics a sense of ownership, entitlement and familiarity with respect to the distant parts of the world that were being explored, invaded, invested in, and colonized. They were the key instruments that made people "at home" in Europe feel part of the planetary project; a key instrument, in other words, in creating the 'domestic subject' of empire (3).

The end of the Victorian age also pronounced the eclipse of some of the ruling ideologies of the time. A strong sense of scepticism had crept into the hitherto confident outlook of the Victorians, voiced eloquently in the literary texts of the time. Notions of national pride in the Empire came to be questioned, as a strong group of thinkers and activists promoted what came to be known later as anti-imperialism. The vast British Empire could no more be written about without a sense of uncompromising unease, and as an unhappy reminder of the overt and covert ways by which the British imposed themselves upon other cultures. The close of the 19th century witnessed the decline of the prevalent jingoistic attitude of travellers to the question of territorial conquest. Concomitant to this paradigm shift was the gradual extinction of a readership that avidly consumed celebratory accounts of travellers' overseas exploits.

Contingent upon such unease with imperialism was the cosmopolitan consciousness of the modern artist, which encompassed all cultures and strove to address a wider international audience. The emergence of a highly influential group of expatriate writers, who had little or no vested interest in an 'English' literary tradition and national culture led to the shaping of a cosmopolitan cultural sensibility that countered the hegemonic discourses of Empire. In his essay "The End of English" Terry Eagleton suggests that the peripheral positioning of this group of writers revolutionized the way the English literary tradition was conceived: "Positioned as they were within essentially peripheral histories, such artists could view native English lineages less as a heritage to be protected than as an object to be problematized" (270). Scholars like Jessica Berman (2001) have shown how a revised notion of community and an unprecedented cosmopolitan outlook are indispensable to modernist writing. For the modernists, cultural difference was no more doomed by the complexities of unequal power relations but defined ideas of shared suffering and cause for solidarity. In this respect, Helen Carr maintains, "Modernist texts register a new consciousness of cultural heterogeneity, the condition and mark of the modern world; in both imaginative and travel writing, modernity, the meeting of other cultures, and change are inseparable" (74). Travel writing's complicity with the discourses of colonialism was rendered problematic by the cosmopolitan consciousness of the modern artist.

The modern intellectual's scepticism towards imperial achievement was nowhere more palpably felt than in early 20th century fiction, particularly in the work of novelists like James Joyce, Joseph Conrad, Rudyard Kipling and E.M. Forster, among others. Interestingly, the idea of travel was central to much of the best work of the modernists. Travel and travel writing, as Robert Burden (2015) asserts, crucially informed some of the major narrative tropes of modernist fiction.

...there is an effect of travel and travel writing on their fiction as narrative paradigm and as recurrent trope for questions of identity and otherness in the

encounter with places and cultures. Perspectives gained from travel at home and abroad or simply the desire for expatriation spill over into the deep-seated concern with the emergent crisis of national cultural identity, Englishness or the new American identity (1).

II

Published in 1898, Hilaire Belloc's *The Modern Traveller* is a paradigmatic turn-of-the-century text which interrogates Victorian ethos and worldview and mercilessly exposes its limitations. This apparently humorous, parodical poetic venture debunks some of the dominant ideologies of Victorianism. The poem takes shape as a verse-narrative of the conversation between a colonial adventurer who has recently returned from his African expedition and a correspondent from a newspaper called *The Daily Menace*, a satirical dig at *The Daily Mail*, which avidly published and circulated news on travellers' experiences. The book is illustrated with sketches displaying the exotic curiosities of the Oriental world and mocks at the sojourner's fascination for them.

And so the public want to hear
About the expedition
From which I recently returned:
Of how the Fetish Tree was burned;
Of how we struggled to the coast,
[...]
And how, like Englishmen, we died. (6)

The speaker begins to narrate his account of what is supposed to be a heroic mission of travel to the wilderness of Africa. The text parodies some of the well-known Victorian accounts of travel to Africa, like Henry Morton Stanley's *In Darkest Africa* (1890) and Mary Kingsley's *Travels in West Africa* (1897). The speaker is accompanied by Commander Sin and Captain William Blood, two formidable presences in his expedition. William Blood, an uncompromising patriot, is avidly interested in the imperial

ambitions of England. His career is a reflection of all that is ambitious and ruthless in an imperial officer of the time inclined to assist in the expansion of the territory:

His soul with nobler stuff was fraught;
The love of country, as it ought,
Haunted his every act and thought.
To that he lent his mighty powers,
To that he gave his waking hours,
Of that he dreamed in troubled sleep,
Till, after many years, the deep
Imperial emotion,
That moves us like a martial strain,
Turned his Napoleonic brain
To company promotion. (22)

Both Blood and Sin are of a dubious origin. Their dubious, sinful origin also crucially informs their double dealings in the context of imperial expansion. Blood, we are told, was born of a man whose identity is not known; his unsure parentage being an important determinant of the origin of debasement in him. The emphasis on the ruthlessness of colonial violence and the unquenchable sense of avarice from which it springs is consistently reiterated through the actions and motives of Blood and Sin: "Was there by chance a native tribe/ To cheat, cajole, corrupt, or bribe?" (25). The speaker's hypocrisy is exposed in the way he is overcome with sympathy for the poor souls that were defeated. He affirms the need to uplift the 'native races' and suggests ways in which the imperial explorers could do so. Sin suggests they use the power of the gun to subdue the natives of Africa during a mutiny that ensued: "Whatever happens we have got The Maxim Gun, and they have not" (41). They victoriously declare, "We shot and hanged a few, and then/ The rest became devoted men" (42). The lines satirize the imperialist idea of complicity through violence.

The narrative has as its focus the adventures of the trio in the Eldorado Expedition. The later reference to the expedition in Conrad's *Heart of Darkness* (1899) and its thematic centrality may

not merely be a coincidence. The inter-textual resonances between Belloc's poem and Conrad's novel and the steady genesis of ideas in both texts is only one instance of how late Victorian texts anticipated and addressed some of the major debates of modernism. In *The Modern Traveller*, the fear and insecurity of "foreign foes" is overcome during the expedition by extremely ridiculous mechanisms. The Russians and Germans, both competing political forces, are perceived as potential threats to British imperialism.

The massive failures of the trio, in spite of their pronounced heroism exposes of the limits of imperial masculinity, which was premised on certain notions of infallibility and impeccability. The text underplays some of the dominant motifs through which imperial authority asserted itself. The notion of unquestioned reverence for everything English, which was a defining assumption of colonial supremacy is turned upside down, as the natives of Africa flaunt colonial authority and threaten Sin and Blood. The absolute possibility of the fate of the unfortunate but "noble" chief (74), their European predecessor, replicating itself in his case as well is shamelessly acknowledged by the narrator. The relics of the dead chief are displayed by the natives as proud markers of their victory over the colonizer. The awkwardness that the reactions of Sin and Blood evoke in readers at this point is a further indication of their obliviousness to such humiliation in the hands of the natives. In spite of the humorous tone, the narrator's propensity to failure and indignation repels the readers. The Mutiny that results out of the resistance of the natives to colonial presence turns out to be a complete disaster for the trio. They are vanquished by the natives, but strongly refuse to be subdued. The immediate Victorian audience of Belloc might have found the text shockingly unacceptable. The vulnerability of the characters might have been perceived as not just inadmissible, but impossible to the Victorian audience, accustomed as it was to consuming jingoistic accounts of travel to the colonized domain.

III

What makes Belloc's *The Modern Traveller* appealing is the trio's recurring tendency to fail in action, even while eulogizing

failure as martyrdom and heroism in rhetoric. The insurmountable gap between imperialist rhetoric and action and their incongruence is emphasized in the text. Imperialist rhetoric is high-sounding, unbelievably optimistic even in the face of irrevocable failure. The dubiousness of this rhetoric and its incapacity to legitimate its high claims to power and authority are exposed in Belloc's poem. Imperial authority relied heavily on this well-established rhetoric, which was often used to legitimize the action of the colonizer. This rhetoric has a refined appearance, and often promotes high and noble values like culture, civilization and morality while dubiously taking recourse to hypocrisy, corruption, and injustice. In his book *The Rhetoric of Empire: Colonial Discourse in Journalism, Travel Writing, and Imperial Administration* (1993) David Spurr proposes that at a time of high imperialism, a well-established and popular rhetoric on the colonized domain was available to the Western writer inclined to write about the non-Western world. This rhetoric, he suggests, constituted "a kind of repertoire for colonial discourse, a range of tropes, conceptual categories, and logical operations available for purposes of representation." Further, he argues, these rhetorical modes were "the tropes that come into play with the establishment and maintenance of colonial authority or, as sometimes happens, those that register the loss of such authority" (3). Belloc's poem targets the palpable hollowness of this rhetoric and wittily subverts the prevalent belief in the 'White Man's Burden'. The narrative demystifies the binary of Western civilizational superiority and native moral debasement through the figuration of the native King and his representatives who are more rational and commonsensical than the European explorers. They see through the vile intentions of the trio and subject them to befitting punishment and torture.

By consistently focusing on the trivial and the petty in what was supposed to be a magnanimous, massive and noble venture, the text calls attention to the banality and mundane-ness of the enterprise. One episode in the narrative details the petty means by which the trio manages to deceive the natives. They pick up a brawl with a native king who, to make matters worse, keeps them imprisoned. They then settle a ransom and seek freedom. In his

Prose of the World: Modernism and the Banality of Empire (2013) Saikat Mazumdar identifies banality and boredom as two important emotional impulses that inform some of the well-known texts of modernism and constitute an 'oppositional aesthetic' of modernist texts. He shows how the colonized people on the fringes of Empire are caught up in the inescapable banality of their situations, while at the same time defining their relationships to the (apparent) excitement and eventfulness of the imperial centre, London. The lives of imperial administrators, the chief agents in the enterprise, were not entirely free from banality, either:

The oppressive banalization of everyday life on the margins of the empire is an ineluctable experience of colonial modernity... the iterative banality of colonial life is infective; it is a malaise that ails the agents of imperial administration, too. However, while the boredom of imperial bureaucrats captures a significant experiential dimension of everyday life on the colonial periphery, it is radically different, in its affective structure and political meaning, from the way large groups of colonized people etch their self-image through a sense of the banality of their individual and collective lives against the magnetic epicenter of historical, social, and cultural phenomena represented in the metropolitan centre of empire. (3)

Although the formidable trio in the poem is affected by this banality, they respond to it in seemingly heroic ways, laying bare the rottenness of the conquest. The mock-heroic tone of the poem disparages the apparently heroic venture and the notion of martyrdom attached to it. The unbearably savage torture inflicted upon the narrator is hardly seen as ignominy; it is celebrated as an indicator of his 'unflinching' patriotism. Referring to the excruciating pain of the punishment, he says:

They hung me up above the floor
Head downwards by a rope;
They thrashed me half an hour or more,
They filled my mouth with soap;
They jobbed me with a pointed pole
To make me lose my self-control,
But they did not succeed.

[....]

But did I flinch? I did not flinch.
In tones determined, loud, and strong
I sang a patriotic song
Thank Heaven it did not last for long!
My misery was past;
My superhuman courage rose
Superior to my savage foes;
They worshipped me at last. (76-79)

This bizarre demonstration of unearthly courage and patriotism even at the verge of a near-death situation is a shrewd maneuver to subdue the natives and demonstrate his cultural superiority. What the narrative helps the readers to unmistakably notice is the cunningness of the colonial explorer, a self-appointed custodian of national pride and community honour. Though the experience of getting flogged by the natives might have been demeaning, it translates into sacrifice and self-annihilation in the narrative, which is but a retrospective recounting of the disastrous encounter. This manner of attributing respectability to an otherwise humiliating incident and unconditionally dignifying it is a typical colonial strategy of self-legitimization.

By consistently attesting to its authenticity, the narrator's tale seems to affirm its falsity and constructedness: "And then—an incident occurred/ Which, I will pledge my sacred word, / Is absolutely true" (66). The narrative questions its own authenticity and obliquely comments upon its own fictive quality. What the narrator shares is also unreliable and mostly fabricated. This important fact of the Victorian travel tale is exposed in the closing

lines, where Commander Sin and Captain Blood, who would have testified to the authenticity of the exotic experiences, are dead.

Oh! England, who would leave thy shores—
Excuse me, but I see it bores
A busy journalist
To hear a rhapsody which he
Could write without detaining me,
So I will not insist.
Only permit me once again
To make it clearly understood
That both those honourable men,
Commander Sin and Captain Blood,
Would swear to all what I have said,
Were they alive; but they are dead! (79-80)

Incidentally, Belloc also wrote an essay arguing for the freedom of the press, entitled *The Free Press: An Essay on the Manipulation of News and Opinion, and How to Counter it* (1917). His reference to the 'popular opinion' or 'the public', referring to the anticipated readership of travel accounts is a self-conscious act. The narrator is seen noting down every minute detail in the exploration, hoping perhaps to publish it after returning to England. This significant Victorian trend of not merely undertaking travel to the colonized domain, but also mandatorily publishing an account of it, is used as an important satirical device in the text. He uses the readerly expectations of Victorian audience as a strategy to puncture and dismantle national pride in colonial achievement.

IV

Although it is beyond the scope of this paper to establish any specific parallels between texts like *The Modern Traveller* and Joseph Conrad's *Heart of Darkness*, for instance, it believes that such an analysis is both desirable and essential. Rather than curiously establishing thematic/structural parallels and locating similarities between late-Victorian and modernist texts, the paper indicates possibilities of indebtedness of the modernists to writers like Belloc. Such indebtedness, the paper suggests, was premised

mostly on grounds of ideological orientation and varying attitudes to the project of empire.

As a text arriving at the confluence of historically simultaneous currents of late colonialism and modernism, *The Modern Traveller* adequately thematizes the pettiness and triviality of the colonial project. The poem highly unsettles, for its late Victorian audiences, the dichotomies of domination and subordination. The hierarchical arrangement which established the imperial metropole as culturally superior and more powerful than the colonized periphery is rendered problematic. Though engendered by imperialist ideologies, the text also enables us address some of the major debates about this ideology, which are central to the modernist enterprise. Through its anti-imperialist stance, it complicates our understanding of literature's tacit complicity with the discourses of imperialism. By articulating its scepticism about colonial modernity and its civilizing effects, it dismantles the constructive claims of the political ambitions of the English.

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Structural and Functional Changes of Family during Post-Industrialization: An Anthropological Study

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Abstract: This paper examines the changing context of family due to industrialization around the Hirakud reservoir in Odisha, India. With an objective of how industrialization has altered the family institution of project affected peoples, it attempts to comprehend the socio-economic transition of few selected family in two rehabilitated colonies comparing with non-affected villages. Data collected through anthropological techniques in selected villages portrays that process of industrialization not only jeopardize family epitome but has altered the kinship structure surrounding the family. Furthermore, the data also reveal that industrialization has led to vulnerable condition of the project affected family compared to non-affected family and later become a dominant structure influencing the social institutions- family, kinship and marriage- of former.

Keywords: Traditional, Structure, Function, Family, Change, Industrialization

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Introduction

Family is the smallest and core institution among the social structure which transmits the cultural value, ethic, belief, morality etc. to the upcoming generation in a societal framework. So it is the very foundation of all societal institutions and organizations. The momentous role of family bespeaks certain principle, which may characterize as followable prescription and proscription in a specific societal context. These principles facilitate the longevity of individual's relationship with family or society and vis a vis. It is not taught rather learnt through continuous interaction with the family and individual's obligatory attitude. The proper functioning of the superstructure of the family makes individual felicitous and stress free. It also refers to the promotion of marriage, procreation, enculturation and protection of the



Ethnomedicinal plants used by *Dongaria Kondha* tribe of Rayagada district, Odisha

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Studies were conducted to document ethnomedicinal plants used by *Dongaria Kondha* tribe in Kashipur block of Rayagada district, Odisha, India. Tribal belief/faith systems used to address health-related issues are recorded and evaluated. Information on traditional knowledge (TK) on medicine and resources was documented through personal interview, questionnaires and observation methods from 134 informants in the age group 21-70, including three medicine men. Community believes that the medicine men gain knowledge of herbal medicine through devotion and animal sacrifice. It is not inherited. Ethnomedicinal practices play a pivotal role in their health care system. However, the younger generations have limited interest in ethnomedicine. Eighty-one plant species belonging to 79 genera and 55 families are documented which are utilized by the tribe in Rayagada. Plant species of Fabaceae, Cucurbitaceae, Euphorbiaceae and Lamiaceae are predominantly used. Most of the species grow wild. The traditional healer frequently uses roots (56 out of 189) followed by stem bark (36), leaf (32), whole plant and fruit (19 each). Paste is the most common method of drug preparation and application (104 out of 189) followed by juice (35 applications) and powder (22 applications). The traditional healers with long and practical experience perceive the usefulness of plants or plants parts for ethnomedicine formulations to enhance the efficacy of the drug in treating the ailments.

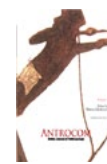
Keywords: Belief system, *Dongaria Kondha*, Ethnomedicinal plants, Medicine man, Traditional knowledge, Tribe

IPC Code: Int Cl.²²: A61K 36/00, A61K 45/00

The link between the indigenous people (aboriginals) and their environment is very intricate. An aborigine, the *Kondha* tribe of Odisha mostly inhabits the forest covered hills of central region (Boudh and Kandhamal districts), Rayagada and south western parts of Eastern Ghats region¹. These indigenous people depend on their environment for food, shelter, clothes and medicine²⁻⁵. In the tribal culture, knowledge of environment is transmitted from generation to generation by traditions and is called as Indigenous/Traditional Environmental Knowledge (IEK/TEK)⁶. Health care of these societies are based on acquired TEK- the traditional system based on the use of different plants and animal extracts^{5,7-9} and is called 'Traditional Medicine (TM)' or 'Ethnomedicine'. Ethnomedicine is culture specific and differs from one indigenous society/culture to the other. Every culture has its own healing practices⁹⁻¹¹. Domestic animals⁵ are also treated following TEK. According to the World

Health Organization¹², TM is defined as the sum total of the knowledge, skill and practices based on the theories, beliefs, and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health as well as in the prevention, diagnosis, improvement or treatment of physical and mental illness. TM is often used as the most accessible and affordable means of treatment for ailments among the marginalised people in developing countries while complementary and alternative medicine (CAM), mostly plant and animal extracts, are becoming popular even in developed countries⁸. A majority of the population in developing countries, including nearly 65% of the Indian population, relies mostly on TM for their primary health care needs¹³. Nearly 80% of the people in the world use the traditional healing practices while in India, nearly 63% of the people, living in the rural areas and forest environment, depend on TM because TM are cost-effective, safe and affordable¹⁴. Globally, nearly 85% of the TM used in primary healthcare is derived from plant species¹⁵.

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Ambience as a consequence of the COVID-19 pandemic within the Umuri village of Koraput district of Odisha

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KEYWORDS

Tribal, COVID-19, Health, Sickle-cell, Indigenous Knowledge, Poroja

ABSTRACT

Indigenous knowledge simply refers to health practices, approaches, knowledge, and beliefs incorporating plant, animal, and mineral based medicines, spiritual therapies, manual techniques and exercises applied singly or in combination to treat, diagnose, and prevent illnesses or maintain well being. The study aims at assessing the situation and effects of COVID in the rural population of the country, and finds the major challenges that the natives had to face during the pandemic. The world in the state of medical emergency trying to find the cause, diagnostic methods, and the possible treatment for this new pandemic diverted all the attention of the medical community towards the corona virus which left the rest of the diseased and patients sort of unattended. The study was conducted in Umuri village of Koraput district, where the effects of COVID on the tribal population in the area and the challenges faced by the inhabitants were studied. There is a strong need for developing awareness among the natives about the genetic disorders and the inhabitants need to be educated to improve the attitude regarding issues of importance.

Introduction

COVID-19 or the Wuhan virus as we know started in December of 2019 and from a city in China it spread across the globe causing havoc, panic, and fear among the people. The world in the state of medical emergency trying to find the cause, diagnostic methods and the possible treatment for this new pandemic diverted all the attention of the medical community towards the corona virus which left the rest of the diseased and patients sort of unattended. The citizens filled with fear were feeling a bit cautious to visit hospitals, to step out of their houses, that left majority of citizens untreated, unattended and also increased the trend of self treatment of conditions. Not only medical challenges but also social challenges were faced in this lockdown period, mass movement from places without any means of transport, sudden drop in employment, shifting of above poverty line population back to below the line, loss of guardians due to Corona, and what not occurred in these two years.

COVID -19 caused by SARS-COV-2 is a new variant of the SARS Pandemic that occurred in 2002-03 (SARS-CoV) and the MERS-CoV that occurred in 2012, the SARS-COV-2 affects the respiratory system which results in symptoms like pneumonia and fever, and with various others and more to be discovered. SARS-CoV-2 is an RNA virus that enters respiratory tract cells via the angiotensin converting enzyme receptor-2 belonging to the beta corona virus genera of coronavirinae sub-family

The Behavioural Economic Perspective of Looking at Distress Migration: A Case Study

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Abstract

Distress migration is a socio-economic issue which has perennially attracted the attention of policy makers, planners, researchers and the media all along. Besides some other anomalies, the most backward KBK region of Odisha has been witnessing the problem of distress/forced migration for quite a long time now. The standard socio-economic theorizing has pinned on the dominant presence and applicability of the traditional push-pull hypothesis in explaining the very nucleus of the problem. But of late, the behavioural dimensions of migration decision making has started staring at the archaic push-factor dominated hypothetical undertone. Moving deep into the core of the monster brings forth the inherent presence of behavioural factors like emotions, cognitive biases, perception-based exclusions and own identity in the overall societal structure of the probable migrants. This study has adopted a direct interview method of collection of primary data from the Balangir district and has used various statistical methods like descriptive statistics, info-graphic analysis of the problem, rank analysis, emotional intelligence scale of measurement, logistic regression and so on to disentangle the behavioural factors influencing the decision to migrate. The study also includes one section on the quantitative beneficial impacts of distress migration in the same study area i.e. the KBK region of Odisha.

Key-words: Distress Migration, Cognitive Biases, Emotional Intelligence, Push-pull Hypothesis, Perception and Identity.

JEL Code: O15, D9, O18, O58.

1. Introduction

Migration is a concept of mobility which is a very familiar concept to everyone. This phenomenon is not specific to human beings alone but it is also associated with different species of

animals. Migration is the movement of population from one climatic location to another climatic location. Therefore, migration plays an important role in over valuation and devaluation of population. There are many reasons which lead to make decision to migrate but majorly all the factors are divided into two category one is push factor and another one is pull factor of migration. People migrate within the territory and beyond the territory so majorly migration was categorised into two types one is internal migration and another one is external migration. Internal migration refers to movement of people from one location to another location within the country and external migration, also known as international migration refers to the movement of people from one country to another country.

“Migration is a fundamental aspect of human existence. As we know that movement of one place to another place for resettlement for some predictable period of time is known as migration but all forms of movement are not migration. In spite of fact that the migration associated with social, cultural, political and some personal reason but migration for economic purpose attract attention of academicians as well as policy makers. Meanwhile, livelihood considered that economic purpose is not only a primary reason of migration but it also occurs due to different social and cultural reasons.” (Ellis, 2003).

India is a nation having high migration rate in recent modern time period and now a days India is one of the top sources of international migrants. “India experienced a major increase in migrants from the neighbouring countries during the beginning of 21st century due to different political and economic reasons.” (Sammadar, 1999, p.29).

India is an agrarian country where most of the rural people are engaged in agriculture and work as labourer. If agricultural failure happens in these areas people are forcedly moved to cities or developed states to earn income. Rural people are distressed migrants and they are migrated as temporarily or seasonal basis with the hope of getting good income to enhance their living standard.

In India poverty, lower wage rate, small land holding, unemployment etc. are the major push factors that forces rural people to move towards urban cities which increase the urban population of the country as well as urban slums in the country. So, these are the main push factors of migration which leads to increase the internal migration in the country. Those who have migrated as a skilled person with better job do earn good amount of money income and having enough capacity to fulfil their dreams.

“In India census period of 2001-11, more than 5.65 million people are migrated annually and about 45.31 crore people who are almost 37% of total population are migrant and more than 80% migrants are males. Migration rose to 4.5% per annum in 2001-11 from 2.4% in 1991-2001.” (Srivastava, 2011).

Odisha is known for its poverty where most of the rural people migrate to urban areas due to poverty. Most of the seasonal labour migrants are from Odisha who generally move to the southern part of the country. It is known to every concerned that the most backward region of the state is the KBK region of Odisha. Seasonal migrants mainly migrate to Andhra Pradesh and Telengana to work in brick kilns. Temporary or circular migrants of Odisha majorly moved to developed cities like Mumbai, Chennai, Bangalore, Raipur and Surat etc.

“The numbers of migrants migrating to other states of the country are increasing rapidly. In 2007 more than 55,000 workers migrated to other state. In 2015 1.46 lakh of workers left Odisha and migrated to other states. In 2008, around 87,000 workers left Odisha as seasonal migrants to other states and it increased to 1.05 lakh in 2012, 1.2 lakh in 2013 and 1.35 lakh in 2014. And the maximum number of migrants those who migrated to other states 2015 were from Balangir district which was 45,000 migrants.” (Praharaj, 2017).

Odisha is a poor state where most of the rural people's incomes are lower than the same of other states' people. Further, most of the rural migrants are mainly from the schedule tribes and schedule castes. As these communities of rural Odisha belong to the lower economic strata and they struggle to get work opportunities at high/medium wage rates, they have no other options than to migrate to other developed state in search of gainful employment opportunities.

Poverty and lack of employment opportunities put rural poor in a situation of distress. Hence, very often such type of migration is also termed as distress migration. Though they are hardworking labourers, they are devoid of any skills as they are illiterate or do possess very negligible level of education. Therefore, they get employed in various unskilled jobs and get exploited physically and economically too. Being uneducated and poor they are not able to move out of the country, but they migrate to nearby states or growth centres or cities. They may migrate seasonally or temporarily. Seasonal labour migration refers to the movement of labour from one place to another place for a specific seasonal time period. Seasonal migration is very common in India as agriculture is almost the only occupation in rural areas and agriculture being a chiefly monsoon dependent activity, there happens to be a lean season in these areas. Temporary migration refers to the movement of people from one place to another place not for a fixed time period but for a predictable time period. More often temporary migration is associated with international migration when people move to another country with some work permit for a definite period of time. States which have more outmigration rate are Bihar, Jharkhand, Himachal Pradesh, Chhattisgarh, Mizoram, Nagaland and UP. This phenomenon also is common in some backward districts in the western part of Odisha like Kalahandi, Balangir, Nuapada etc. Usually it happens during winter season.

1.1 Why is Migration Important?

Migration is nothing but the movement of people from the source to the destination and it has different synonyms like relocation, resettlement, population movement etc. Migration is not a new phenomenon but it has been occurring since very beginning of human's appearance on the earth. Migration is a broad concept which means movement of population from one climatic location to another climatic location for a particular period of time or permanently. This phenomenon is not specific to human beings alone but it applies to animals, birds as well as plants. Migration occurs within the boundary of a nation, or beyond the borders or in simple words we can say migration occurs at local level, regional level and international level.

There are different definitions of migration given by different thinkers and researchers, and one of the simplest one is that: "Migration is the movement of population from one climatic location (place of origin) to another climatic location (place of destination) for a particular time period"

Migration is a selective process and it can be voluntarily chosen for new and better opportunities, or forced to escape from dangerous or negative situation. The factors like development of industrialisation and means of transport & communication, interaction of different cultures, Globalization, etc. have led millions of people to move out from one place to another in search of better opportunities related to better living standards, education, employment, healthcare facility etc.

Migration also acts as a third factor of population change after fertility and mortality. Being one of the important components of population change, it occupies a central place in demographic analysis.

People tend to move out of their natural environment or place of origin when it fails to provide them with sufficient opportunities to grow. Migration is fostered by inequalities in the development of different regions.

Migration is widely recognised as one of the major mechanisms of development. It helps in maintaining some balance between distribution of resources as well as population. Migration is both a cause and consequence of various social, cultural and economic constraints as experienced by people in a society or beyond the society.

1.2 The Push & Pull Hypothesis-Is it still relevant?

The factors that serve as driving forces for migration may be put under two categories namely pull and push factors. We can define push factors as negative home conditions that imply the decision

to migrate or force people to leave their homes e.g., lack of job, drought, lack of professional opportunities, overcrowding, famine, war etc.

Besides the push factors there are also pull factors working from the side of the destination. Important pull factors which attract workers towards the destination are availability of job opportunities, better wage rates and urban amenities and facilities available at the work place.

Although the push and pull factors are operative in propelling forced migration in the backward KBK districts of Odisha, there are no research studies undertaken so far to understand the individual-centric issues related to the attitude and behavioural patterns of the migrants. There is ample scope of research to judge the role psychological and subjective factors play in driving people out of their home to work outside. This may not be included under the push factors rather could be categorised as subjective decision making problems on the demand side of the whole issue of distress migration.

Thus, it is imperative to look at the entire recurring episodes of distress migration from the psycho-social and psycho-economic perspectives. Hence this particular study is oriented towards the analysis of the behavioural economic dimension of rural distress migration. Once we look at the problem from the behavioural economic angle, a serious question arises in our minds about the meaningfulness of distress migration despite its picturization in a demonic way.

1.3 Meaning of Distress Migration from the Perspective of the Migrants

Distress migration refers to movement of rural people from one climatic place to another place due to reasons like lack of employment opportunities, natural resources depletion, poverty, food insecurity, environmental degradation, failure in agriculture etc. These aspects majorly come under push factors of migration. This type of movement mainly arises from such places where individual or the family feels that except migration there is no option for them to survive with dignity. So, from above description one common characteristic is that decision to migrate is prompted and conditioned by limited alternative opportunities available at the place of origin.

Distress migration is particularly seen among rural people and factors like poverty and lack of employment opportunities put rural poor in a situation of distress. For most of them, making decision to migrate is not a voluntary choice but only perceived action for getting employment to meet their needs and to take them out of the clutches of poverty.

In India, lack of work opportunities, low wage rates, small land holdings, agricultural failures, natural calamities like drought, floods etc. are the major push factors that force the rural productive folk to tend towards urban areas which increase the urban population as well as urban slums in the

country. It is known to everyone that India is an agrarian country where most of the rural people are engaged in agriculture. If agricultural failure happens in these areas people are forced to move to the nearer cities or developed states to earn a livelihood.

In general parlance, migration is broadly divided into two types; one is internal migration and another one is external migration. But it can be noted that flows or pattern of distress migration mainly occur internally because most of the rural migrants are illiterate and not having enough financial strength to migrate beyond the national borders.

1.4 The Behavioural Economic Approach to the issue of Distress Migration

One of the most important aspects associated with distress migration that has not yet been looked into is the behavioural economic dimension of the problem. It is high time we shift our focus and orientation from an over emphasized supply side to the most relevant demand side of the problem. When we address the issue from the micro theoretic behavioural attributes of the individual migrant a different picture is expected to come to the fore.

The standard neo-classical economic theorization has over emphasized on the reality of an optimal solution with the help of a number of unrealistic assumptions. But the fact of the matter is that once we take away the assumption of rationality or *Homo Economicus* from the analysis the result is a situation of *bounded rationality*. To be more specific, the problem of bounded rationality is based on a variety of real life constraints like information asymmetry, limits to information, irrationalities of different degrees and kinds, dogmas and superstitious beliefs and perceptions. Meaning thereby, due to such irrationalities human beings vie for and arrive at a satisfactory solution instead of a solution of *Pareto-optimality*. In the words of Herbert Simon, bounded rationality leads to “*satisficing behaviour*” which is an economically sub optimal solution.

The bounded rationality aspect of a sub optimal satisficing level solution is also applicable to the case of individual migrant while making a choice and decision regarding migration from home to an outside place of destination. Looking at the problem from this perspective, the capability of a migrant labour in making a right decision is very important to understand the whole psycho-social and psycho-economic domain of the migration decision. The highly important and relevant dimension of distress migration can be seen and researched from the behavioural economic perspective, which includes various real life aspects like emotion, identity, attitude, motivation and happiness of the individual migrant. Thus, the issue of distress migration which is a major problem especially in the KBK districts of Odisha can be seen from the behavioural economic perspective.

1.5 The Identity Perspective of looking at Distress Migration

The entire migration literature has centred on the propositions of the push and pull hypothesis. There is no denying the fact that distress migration as such has many things associated with the push and pull factors operating in the Indian context. But a micro-theoretic approach towards the study of distress migration reveals a different fact all together. An enquiry into the demand side of the problem brings forth behavioural dimensions to be seen from multiple angles.

The neo-classical economic paradigm has mostly emphasized on the supply side of the problem with the assumption of rationality or *homo economicus*. On the contrary, the modern *New Classical doctrine* has a different story to tell about the crisis associated with distress migration. The behavioural economic dimension does have a major say as far as forced migration is concerned in the backward region of Odisha. Within the broad framework of the behavioural economic dimension, identity of the migrants acts as a dominating force. In other words, the decision to migrate is a choice problem on the part of the person who prefers to migrate out. Therefore, the identity perspective on the demand side has to be considered seriously while analysing the problem of distress migration.

From the behavioural angle, identity of an individual can be incorporated into the utility function and through that a satisfactory outcome is expected to be accomplished. The concept of identity is multidimensional in nature and has been rooted in the domains of sociology, anthropology, economics and psychology. Being a normative concept based on subjective inter-personal utility consideration, it has got close qualitative inter connections with different dimensions of an individual's decision making. The four important dimensions are:

1. Identity related economic decision based on a person's own action.
2. Identity related economic decision based on someone else's action.
3. Identity related economic decision depended on third parties' actions.
4. Identity related economic decision as a part of own choice but not as a part of societal choice.

2. Review of Literature

Sharma, S. and Sharma M. (2010) tried to describe the role of different moderators and mediating factors which lead to Psychological well-being. Variables are like social identity, psycho-social attributes or self. The study found out that people deprived majorly in terms of Gender identity, Devalued social identity and acculturation. According to Gender identity in the workplace if a woman engaged in a man job than it puts impact on the male identity. Threatened social identity describes the

identity related exclusion of socially devalued groups (Defines in terms of minority category, caste, and race). And the stress of acculturation generates during the process of readjustment in a new cultural environment.

The main objective of Deshingkar, P. (2010) is to describe the relationship that exists between chronic poverty, migration and remote rural areas. The study is based on both qualitative and quantitative data. The study has found that migration is a major happening mostly in RRAs (Remote rural areas) and Schedule tribes and Schedules caste people are majorly associated with chronic poverty.

Parida, J.K. (2015) tried to describe the role of MGNREGS in enhancing rural poors' living standards and its impact on seasonal distress migration. For the study, primary data was taken into consideration. The study found out that MGNREGS plays important role by providing or creating job opportunity for rural poor. Government schemes to some extent lead to prevent the seasonal distress migration.

The main objective of Bhugra, D.(2019) in his article "Migration, Distress and Cultural Identity" is to describe the stress of acculturation that a migrant faced at the place of destination. The study has concluded that during the process of readjustment of migrants in a new cultural environment a stress is generated which is known as stress of acculturation and due to this stress the first generation of migrants faced numerous problems.

Sharma, S. and Jaswal, S.(2006) in their paper "Migration and Magnitude of psychological Distress" tried to describe the magnitude of psychological distress associated with migrant labourers. The study was purely based on primary data. The study stated that psychological distress was more among the migrant labourers than the normal or local labourer.

The study conducted by Bhagat, R.B. (2015) on trends of urban migration in India has found that urban migration was in a declining rate between the census years 1981 to 1993 but after 1993 it was in an increasing rate pattern.

Also important studies are made by Mahapatra, S.R. (2010), Samantaray, L.L. (2016), Agasty, M.P. (2016) on female migration, reverse migration and impact of migration on children education.

3. Objectives of the Study

This particular study on the behavioural perspective of distress migration is based on the following four important objectives-

1. To ascertain the impact of distress migration on the quantitative dimensions of wellbeing of the migrants.
2. To explore into the role played by qualitative behavioural factors in the decision making by the migrant workers.
3. To analyse how psycho-economic factors enter into the picture when a migrant takes decision to leave his homeland in search of a livelihood.
4. To assess the relevance of the traditional push-pull hypothesis as far as the decision to migrate by an individual migrant is concerned.

4. Hypothesis of the Study

H_0 : In terms of the quantitative dimensions of wellbeing, distress migration decision is beneficial to the migrants of the study region i.e. the KBK region.

H_0 : Instead of the quantitative push factors, the qualitative psycho-economic factors are influencing migration decision highly as far as an individual migrant is concerned.

5. Methodology of the Study

A scanning of the available literature on distress migration has so far indicated towards the Push-Pull Hypothesis as the prevailing paradigm in explaining the reasons for the forced migration. Studies are not available on the behavioural dimensions of the whole issue of distress migration. If we make a cursory look at the way the behavioural economists are approaching individual-centric problems at the micro level, there is ample scope for analysing the problem in terms of the interplay of psycho-economic factors in decision making. Viewing the problem from the behavioural perspective brings forth the importance of identity-related behaviour as far as the decision to migrate by an individual migrant is concerned.

Keeping in mind the emergence of the identity-related behavioural perspective of distress migration in mind, this study is based on primary data collected from the migrants who have come back to their villages during the time of covid-19. For this study 100 migrants were contacted directly through the use of a structured questionnaire. The covid-19 protocol and guidelines of the government were followed scrupulously while collecting primary data from the field. The migrant workers from the hot bed of distress migration i.e. the undivided Bolangir district of Odisha were selected. The

migrants who have been included in this study belong to the Sonepur district (previously a part of Bolangir district) and adjoining areas of the Bolangir district of Odisha.

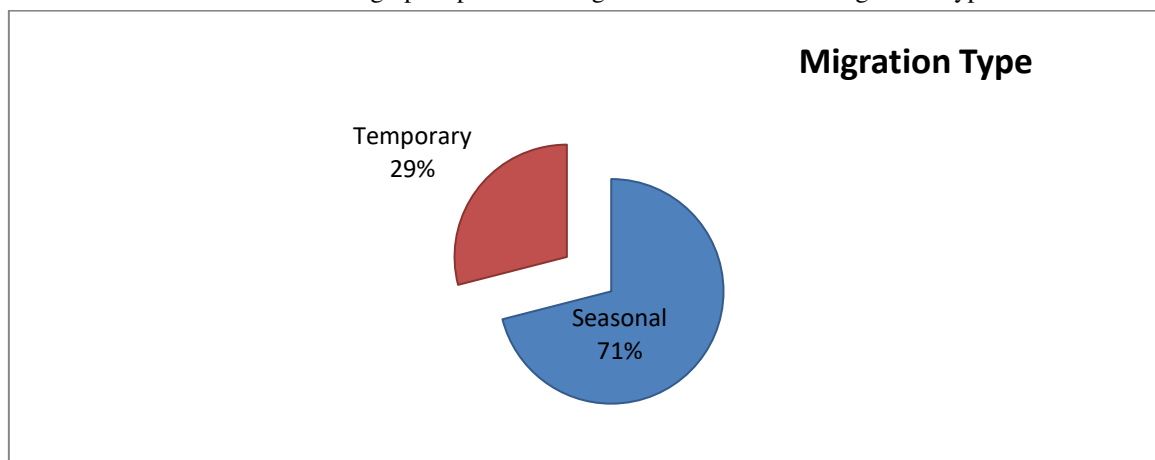
Since this study is based on the behavioural economic dimensions of the problem of distress migration, the questionnaire includes demographic questions, questions for measurement of emotional intelligence (EI) of the migrants, questions on identity related behaviour and perceptions of the migrants. Although the EI questionnaire is the standard one as prescribed by the experts from the field of Psychology, it was subjected to necessary checks as regards the validity and reliability of the questionnaire.

For analysing the data as per the objectives and hypotheses, efforts have been made to ascertain the qualitative dimensions of migrants' perception on various aspects of identity, exclusions and emotions. A number of psycho-economic dimensions have been included in the study to look at the problem from the angle of behavioural economics. Various statistical methods like descriptive statistics, rank analysis, perception measurement and logistic regression analysis have been used to get an overview of the whole issue of distress migration from the perspective of new classical behavioural economics.

6. Analysis and Interpretation of Data

A thorough analysis of the data collected and processed revealed different qualitative or psychological dimensions of the problem of distress migration. The demographic profile of the sample is presented below for obtaining a clear idea on the scope and applicability of the study at hand.

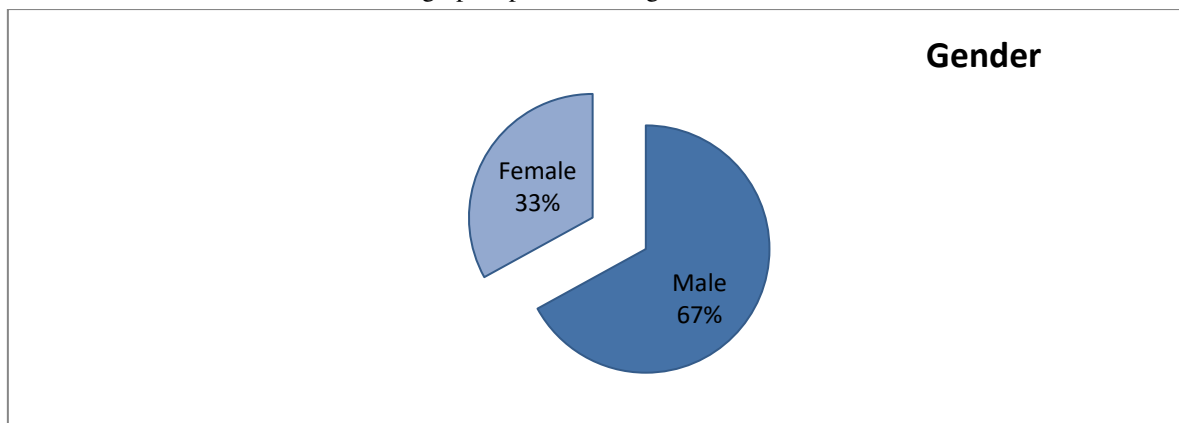
Chart no.1- Demographic profile of migrants on the basis of Migration Type:



Source: Compiled from Primary data

From the above pie chart it can be seen that 71% of migrants are seasonal Labourers and remaining 29% migrated on circular/temporary basis. It implies that seasonal migration of distress type is highly prevalent in the study area that is the KBK region of Odisha.

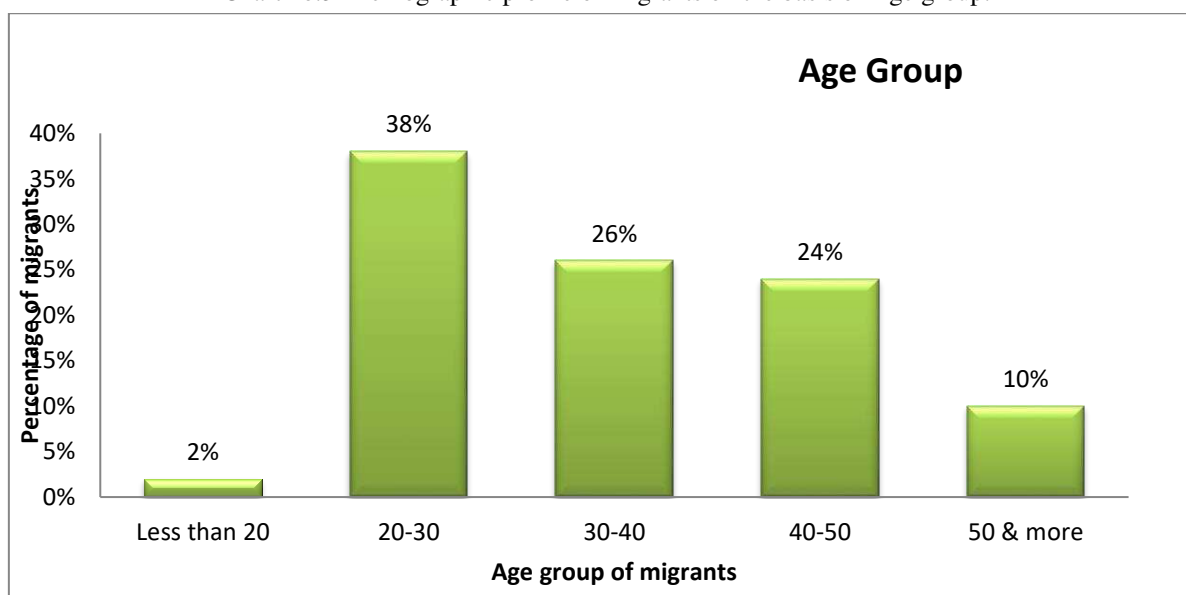
Chart No.2-Demographic profile of Migrants on the Basis of Gender:



Source: Compiled Primary Data

Chart no.2 shows the demographic profile on the basis of gender where 67% migrants are Male and 33% migrants are female. It implies that males constitute the bulk of migrants out of the KBK region of Odisha.

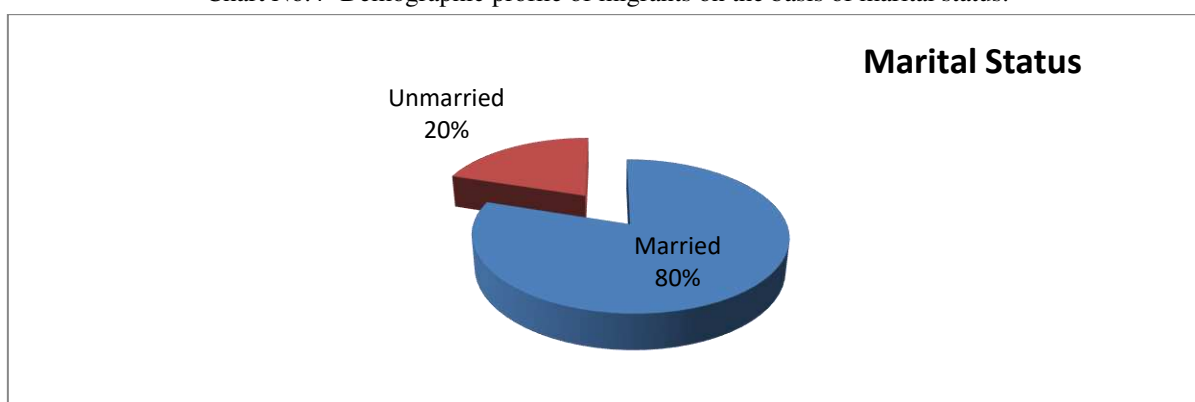
Chart no.3- Demographic profile of migrants on the basis of Age group:



Source: Compiled from Primary data

Chart no.3 shows the demographic profile of migrants on the basis of age groups where 38% of migrants belongs to age group of 20 to 30 which is highest among all. This result shows that youths are the biggest group of workers who are going out in search of employment outside their homeland in the KBK region of Odisha. This is also indicative of the recent trend of how youths are withdrawing from agriculture in this part of Odisha. Withdrawal of youths from agriculture is a national phenomenon now but such a trend in the poverty-stricken backward areas like the KBK region is compounding the problem of migration with mounting pressure on the employment situation of the state. Agriculture is getting harmed and is going to be affected in a big way in the days to come, which may further aggravate the food insecurity situation in this part of the world.

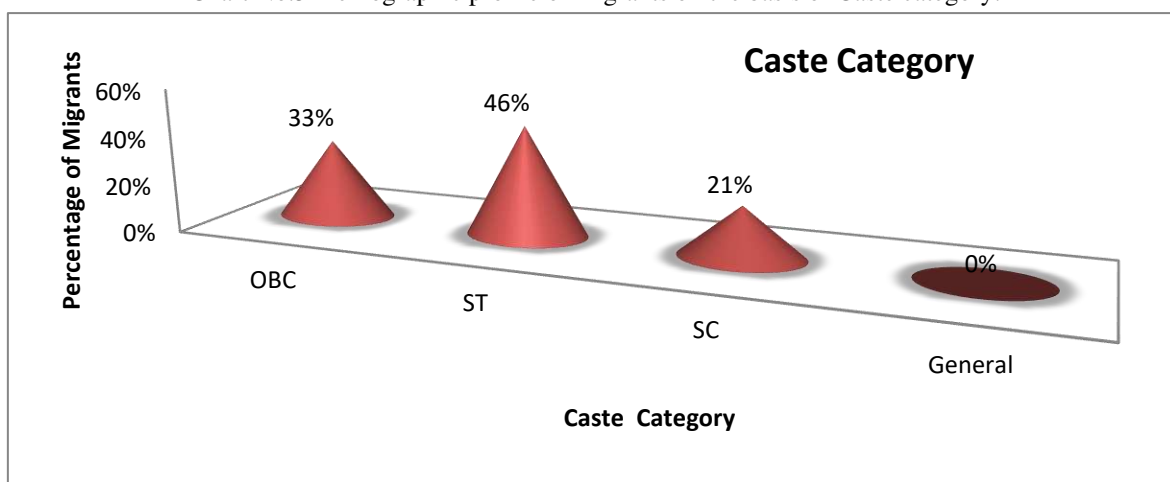
Chart No.4- Demographic profile of migrants on the basis of marital status:



Source: Compiled from primary data

Chart no.4 shows the demographic profile of migrants on the basis of marital status where 80% migrants are married bringing out the fact that married persons are migrating more which is clearly understandable.

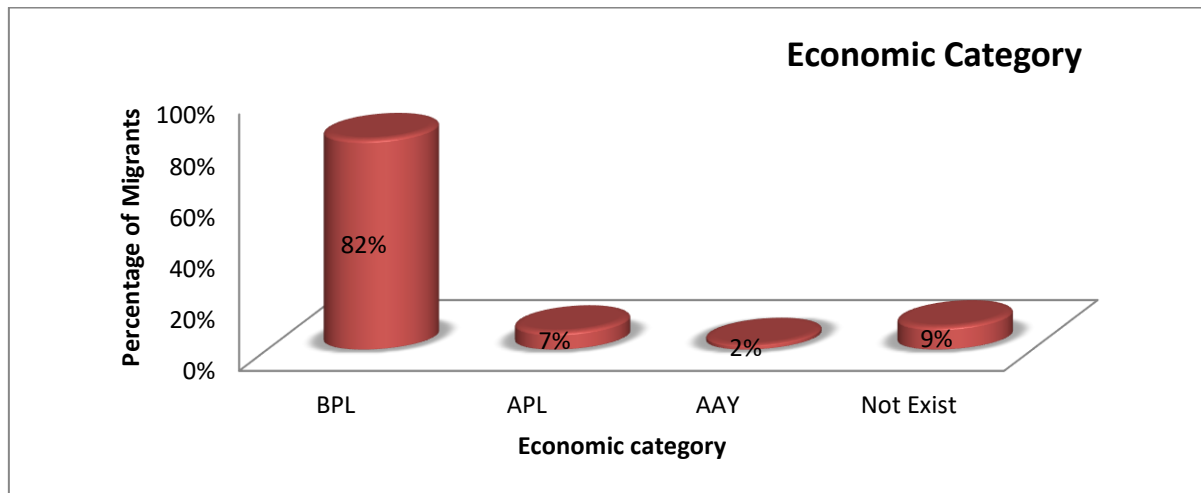
Chart No.5- Demographic profile of migrants on the basis of Caste category:



Source: Compiled from Primary Data

Chart no.5 shows the demographic profile on the basis of caste category where 46% of migrants are ST category, 33% are OBC category and 21% are SC category. Needless to mention, people belonging to the poverty-stricken backward categories like ST and SC are migrating out in large numbers out of the KBK region of Odisha. Push factors do play a role here but there are behavioural issues which must not be lost sight off, being hooked into the traditional approach of looking at distress migration.

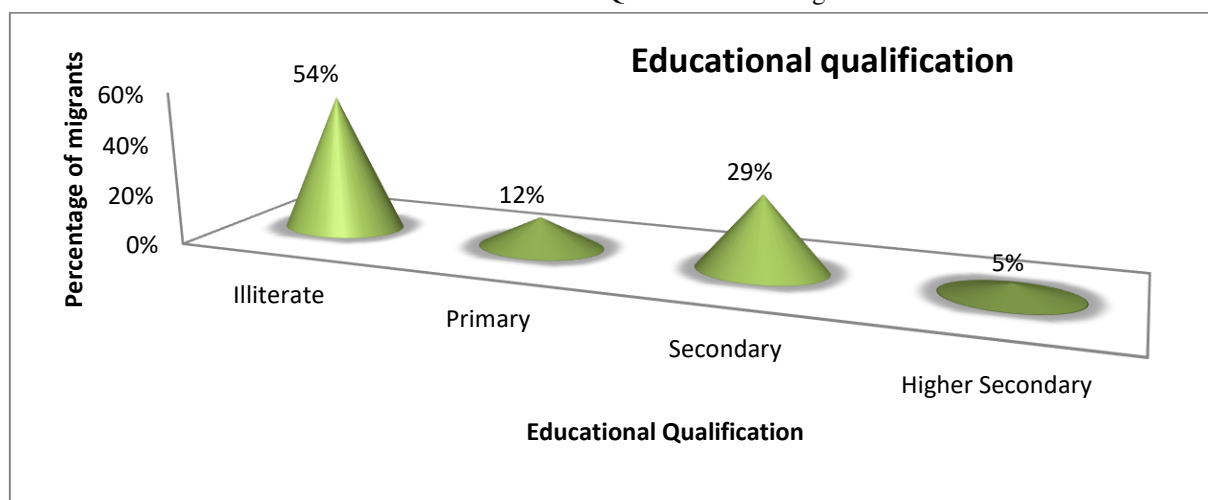
Chart No.6- Demographic profile on the basis of Economic Category:



Source: Compiled from Primary Data

Chart no.6. Seeing in terms of economic category, 82% of migrants are BPL card holders, 7% migrants are APL card holder and 9% migrants are having no card of any types. It implies that most of the migrants are from the poor or BPL category. It exemplifies the very nature of the problem of distress or forced migration.

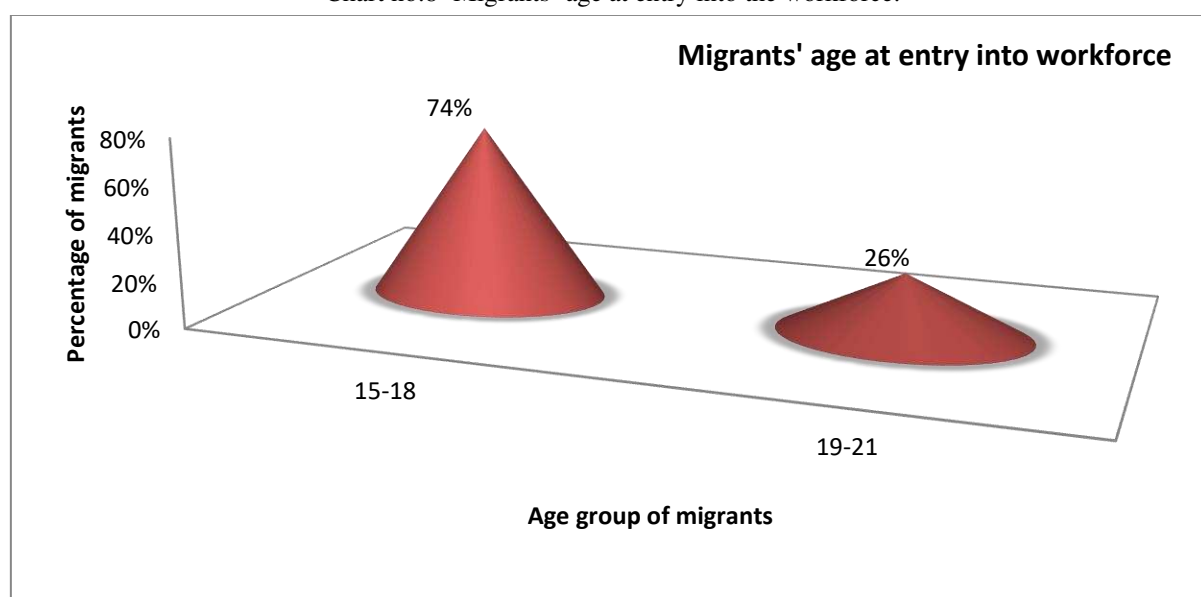
Chart no.7 –Educational Qualification of Migrants:



Source: Compiled from Primary Data

From the Chart no.7 the pattern that is emerging is, illiterates are the migrant lots but youths with secondary level education are also going out which is symptomatic of the withdrawal of youths from agriculture. Today's youths do not see their future in farming and low paid non-farm activities in the informal sector are attracting them to migrate out. The mushrooming growth of the urban informal sector at the cost of a dwindling agriculture has been creating conditions for a growth story which is lopsided and biased in favour of low-paid informal sector jobs. Distress migration is playing a major role in this story of an uneven socio-economic advancement.

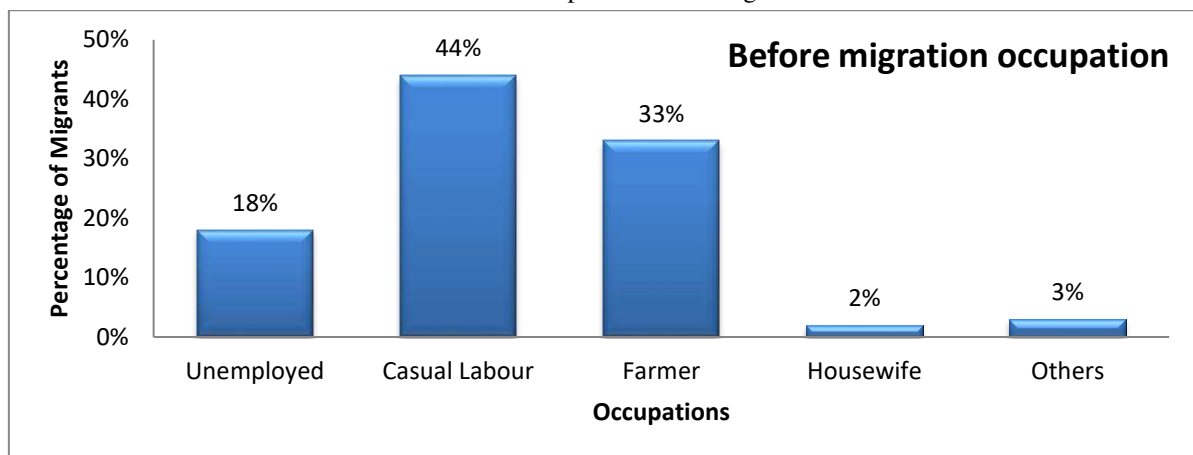
Chart no.8- Migrants' age at entry into the workforce:



Source: Compiled from primary data

Chart no.8 shows that, although majority of the migrants are from the age group of 20-30 years, nearly 74% migrants are joining the workforce between the age of 15 to 18 and 26% migrants are entering into the fray at the age between 19 to 21 years. It is not surprising because mostly youths are migrating out in search not only of non-farm jobs but also being driven by factors like social identity, emotional intelligence and behavioural familial considerations. The 21st century youths have their priorities tilted firmly towards the normative dimensions of life satisfaction rather than towards the traditional family-oriented earning avenues right at the doorstep.

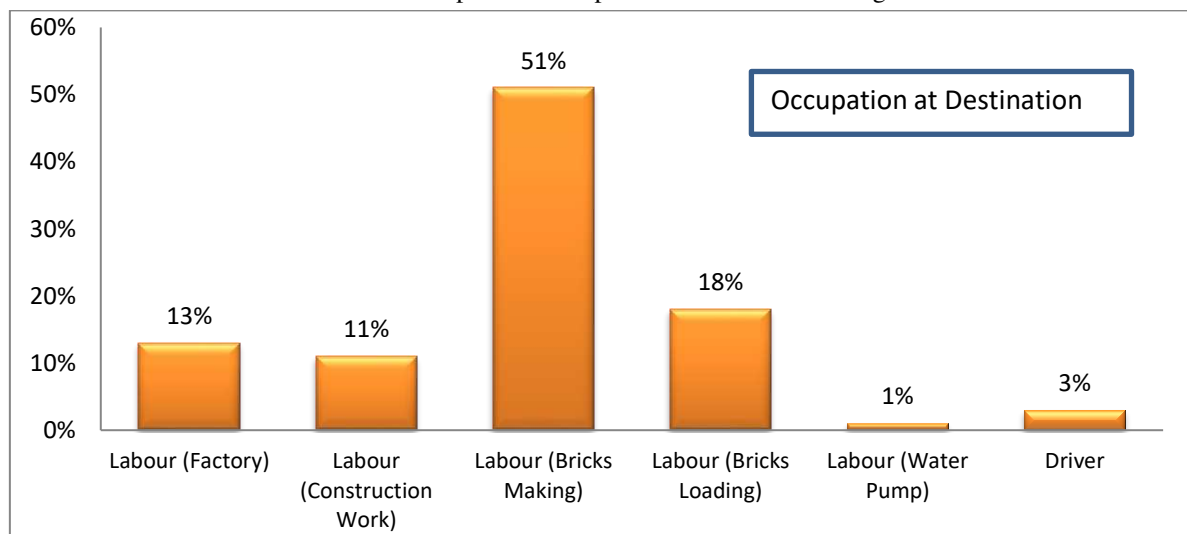
Chart no.9- Occupation before migration:



Source: Compiled from primary data

Chart no.9 shows that most of the migrant category workers are casual labour and small farmers without having a sound resource base in the village. People with low income capabilities and having no skills are the prime movers along with the youths of farmers' families.

Chart no.10- Occupation at the place of Destination of migrants:

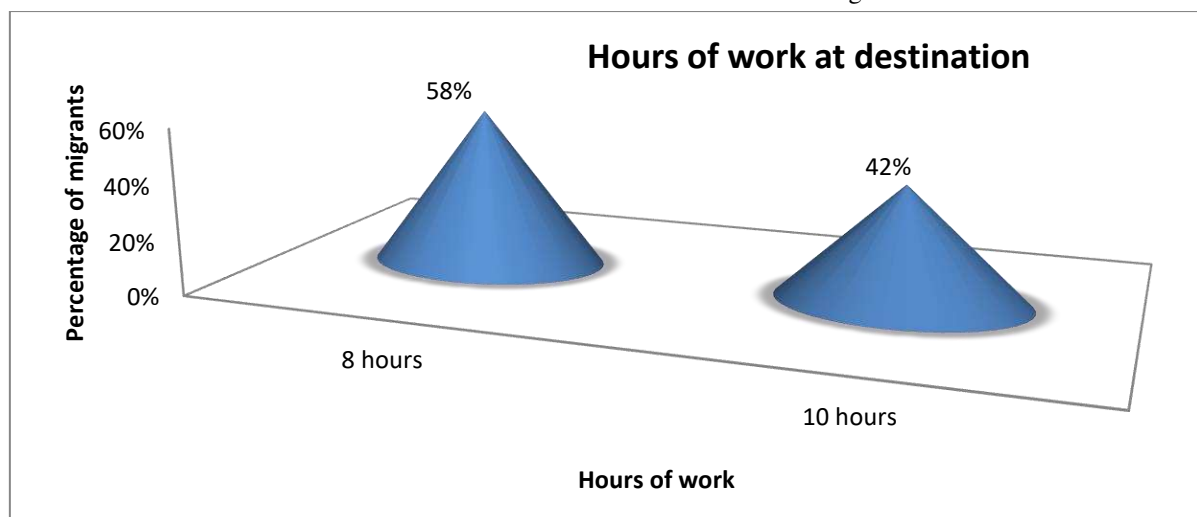


Source: Compiled from primary data

Chart no.10 shows migrants occupation at the place of destination where 51% of migrant's occupation is unskilled labour work (Bricks making) which is highest among all. 18% labourers are engaged in bricks loading meaning thereby almost 70% migrants are employed in bricks kilns. It implies that majority of the migrants of KBK region are working as labourers in Brick Kilns (Bricks Making) at the place of destination. Such work is not only unskilled but it allows the labourers to earn

very less and they are also subjected to various types of exploitations in the hands of the owners. Further research in this area will reveal the opportunity cost associated with such informal sector jobs as compared to the opportunity cost involved in the withdrawal of the same youths from agriculture.

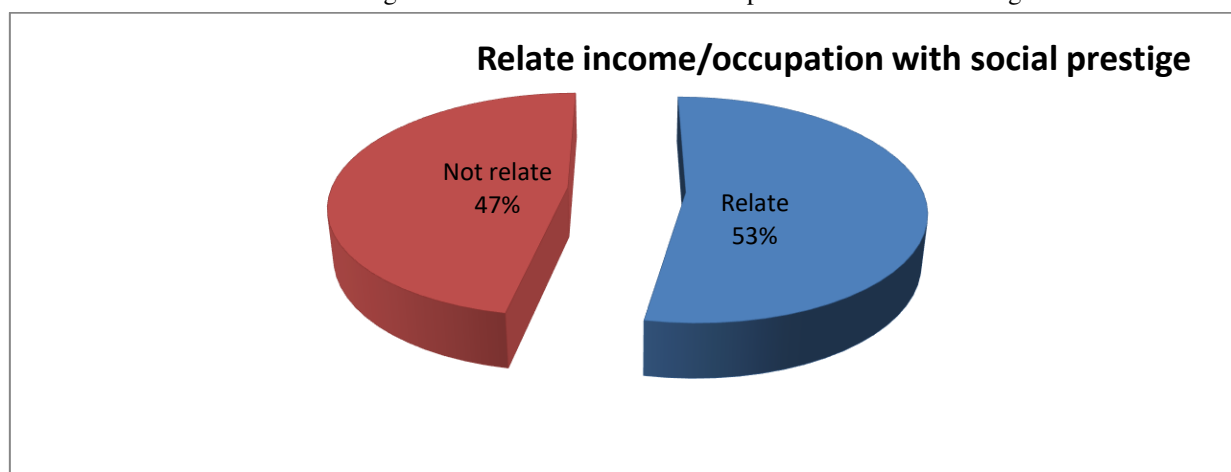
Chart no.11- Hours of work at the destination of migrants:



Source: Compiled from primary data

Chart no.11 shows the hours of work at destination of migrants where 58% migrants' working hour is 8 hours and 42% migrants' working hour is 10 hours. It implies that most of the migrants of KBK region of Odisha work more than 8 hours a day at work place. Long working hours with low wages at the destination speaks volumes about the kind of exploitative practices these migrants are subjected to. Hence, distress migration has to be seen from the normative perspective too.

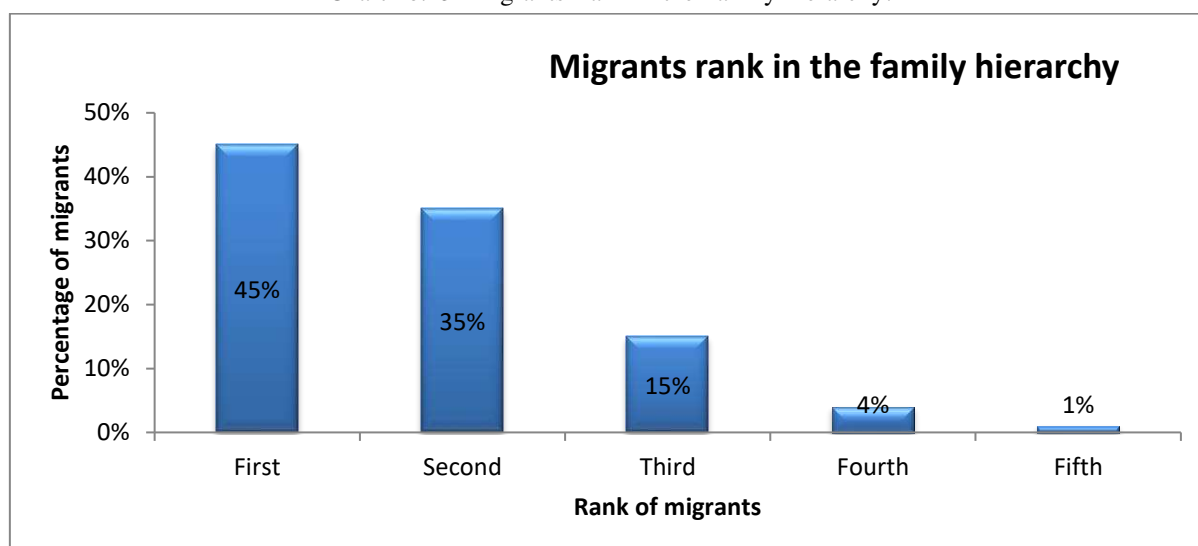
Chart no.12- Migrants relate their Income & Occupation with Social Prestige:



Source: Compiled from primary data

Chart no.12 shows the percentage of migrants relate their income & occupation with social prestige where 53% of migrants relate their occupation with social prestige. It is an indicator of identity aspect of a migrant. It implies that more than 50% migrants relate their income & occupation to their social prestige in the KBK region of Odisha. Identity does play a role although migrants are not aware of the same consciously. Mostly youths are leaving the villages in search of non-farm employment just as a matter of social prestige. Even if the wage rate is low, working condition is not favourable at the destination and most of the time they are subjected to various kinds of exploitations, today's youths withdraw themselves from agriculture and migrate out to show their worth to others. Working away from home has become a matter of prestige and recognition for such youths. This is indicative of the identity aspect of distress migration.

Chart no.13- Migrants' rank in the Family hierarchy:

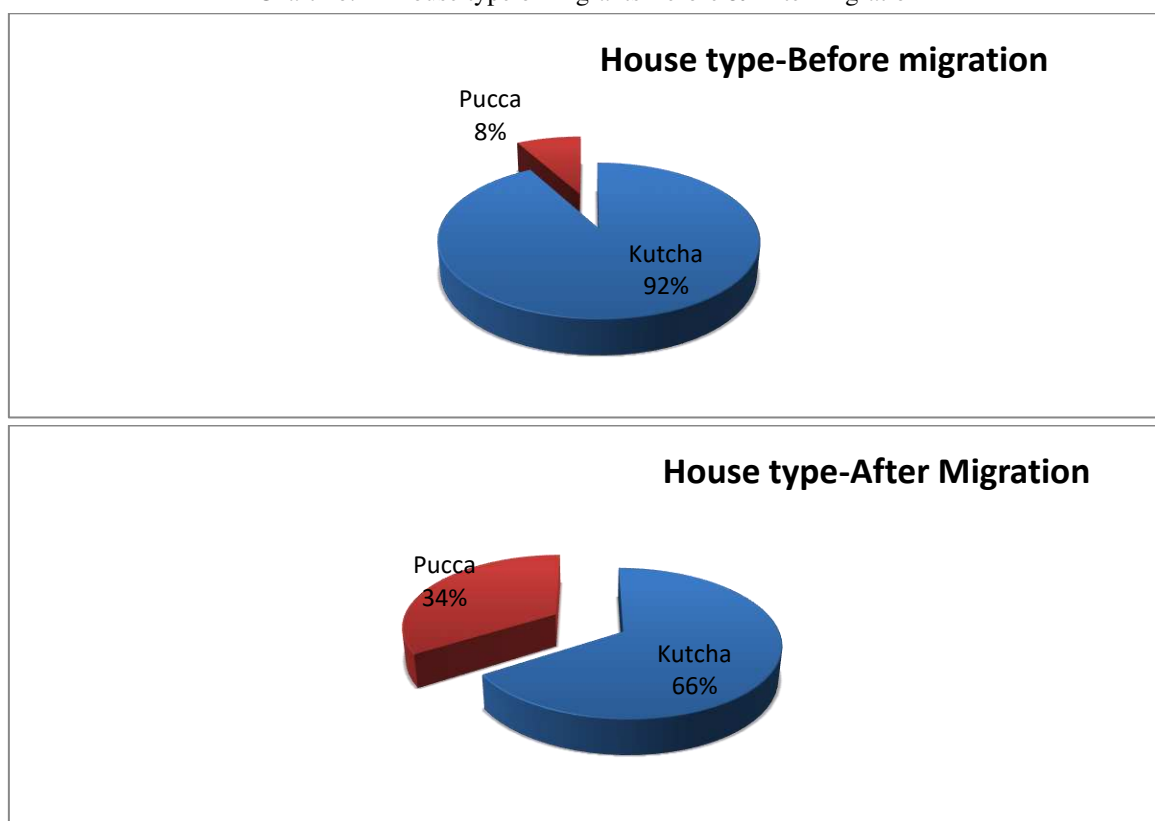


Source: Compiled from primary data

Chart no.14 shows the migrants' rank in the family according to their importance where 45% of migrants having rank first, 35% migrants having rank second, 15% of migrants having rank third, 4% of migrants having rank fourth and only 1% of migrants having rank fifth. It implies that in the family's hierarchy the decision making is in the hands of the head of the family in this part of Odisha. It is another aspect reflecting identity related behaviour while taking a decision to migrate. This is an indicator of decision making at the family level where nearly 50% migrants are the leader of their own families. Once the decision making is in a person's hands, he or she is free to take a decision in favour of migration. This is another aspect of identity related behaviour because the head of the family has to be respected at any cost.

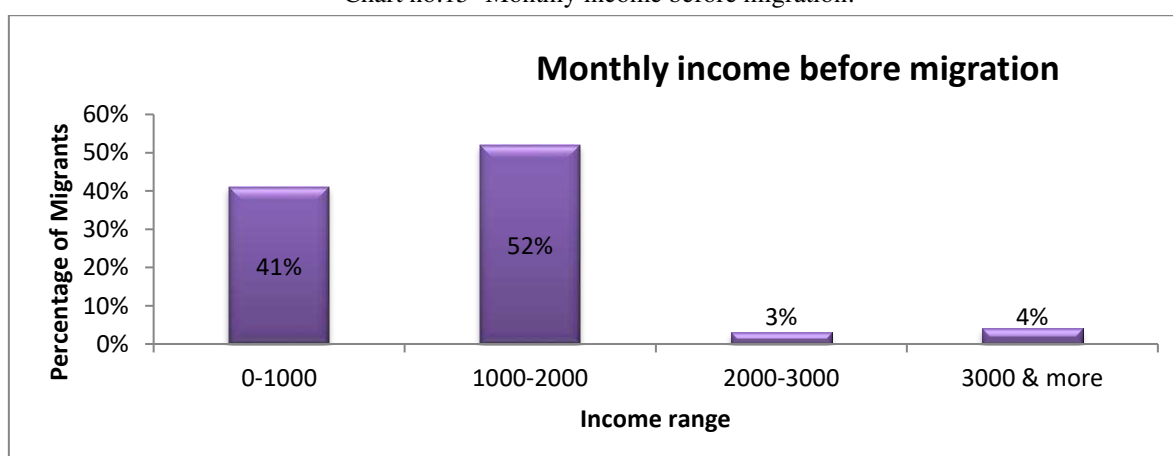
According to the Chart no.14 below, as far as improvement in the house type is concerned, migration and its related benefit has contributed to the slight improvement in the quality of housing. But the result is not that encouraging because of the government's program on subsidised housing. This is a quantitative contributor of migration which is less promising as compared to other qualitative attributes.

Chart no.14-House type of migrants Before & After migration



Source: Compiled from primary data

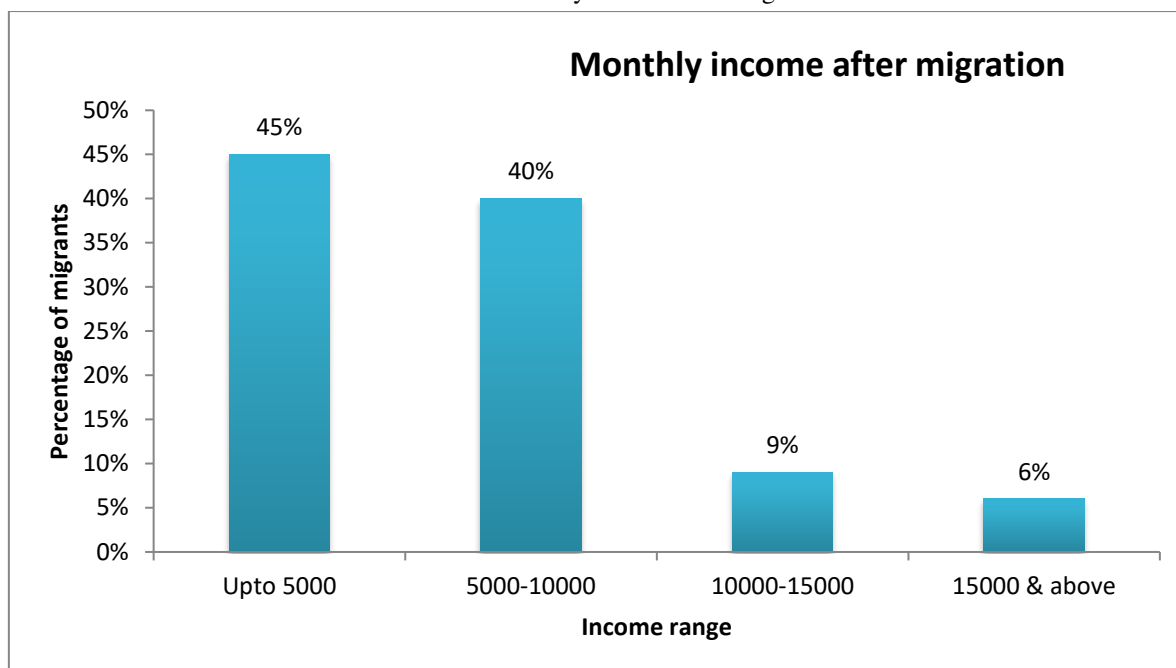
Chart no.15- Monthly income before migration:



Source: Compiled from primary data

Chart no.15 shows the monthly income before migration of migrants where 41% of migrant's income range was 0-1000, 52% of migrants' income range was 1000-2000, 3% of migrants' income range was 2000-3000 and only 4% migrants' income range was 3000 & more.

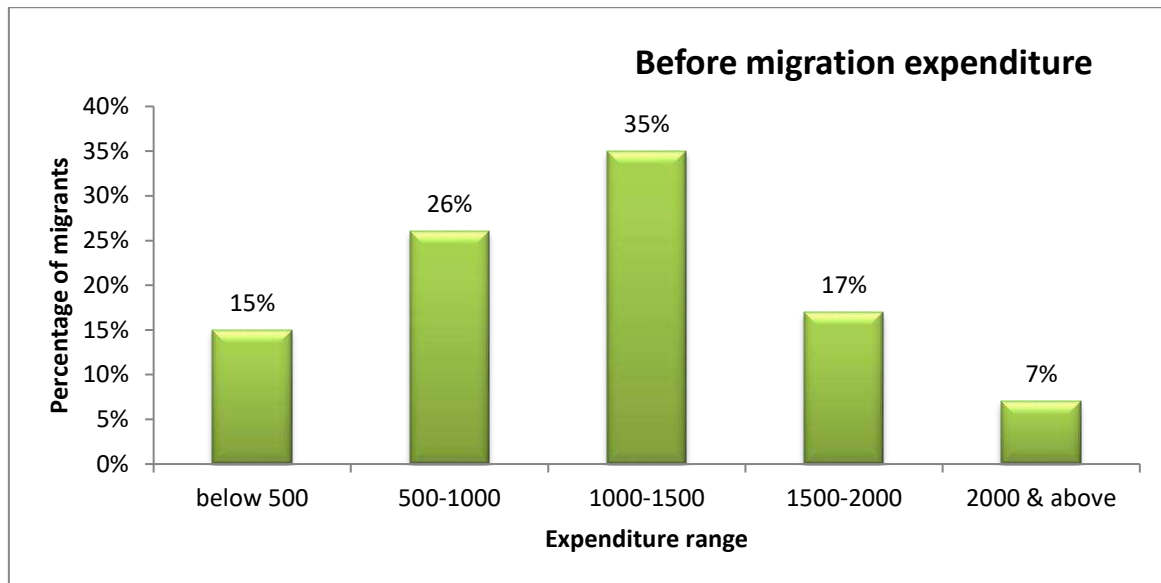
Chart no.16- Monthly income after migration:



Source: Compiled from primary data

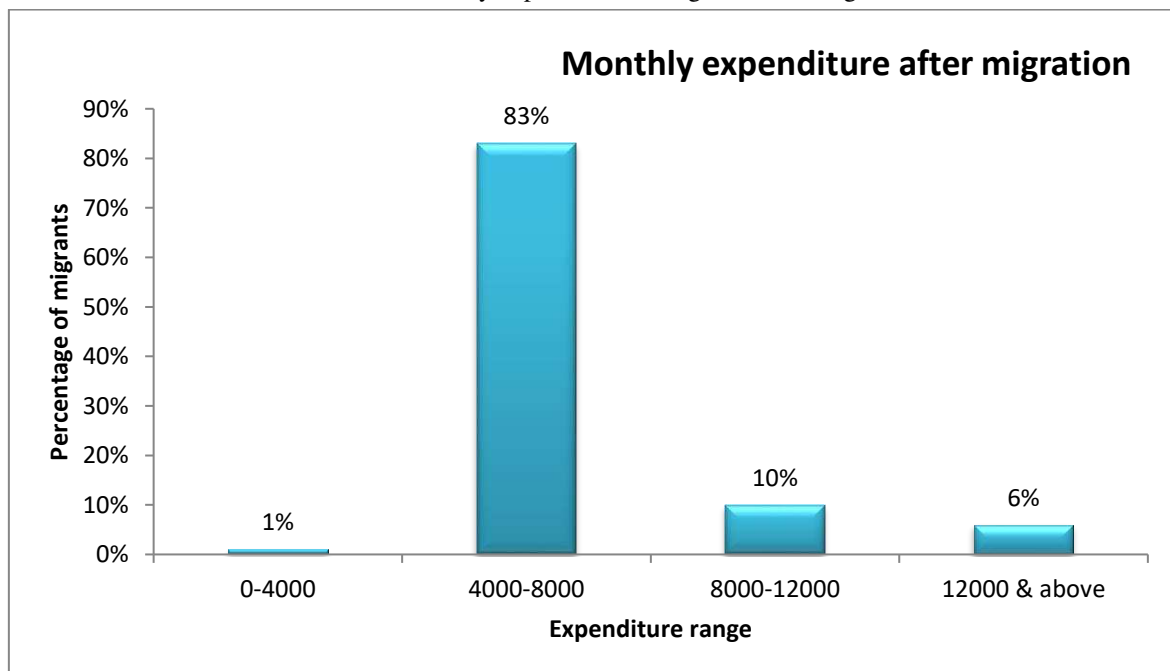
The other chart shows that the monthly income of migrants after migration has improved. Figures show that 45% migrants' income range was up to 5000, 40% migrants' income range was 5000-10000, 9% migrants' income range was 10000-15000 and only 6% migrants' income range was 15000 & above. It implies that after migration most of the migrants' monthly income has increased in the KBK region of Odisha. It clearly shows the quantitative dimension of improvement caused by migration in this part of the state. Although the migration type is forced or distressed type, there is growth in income level post-migration due to the availability of work with consistent earning for a longer period at the place of destination. Thus, migration has a positive impact on the quantitative dimensions of economic progress achieved by the migrants.

Chart no.17- Monthly Expenditure before migration:



Source: Compiled from primary data

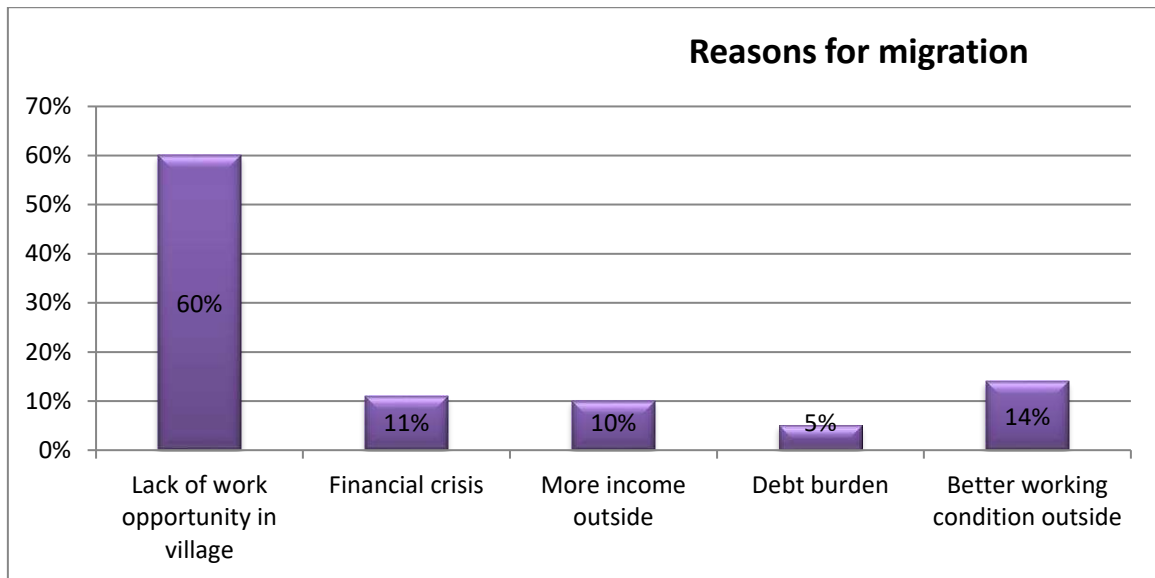
Chart no.18- Monthly expenditure of migrants after migration:



Source: Compiled from primary data

Study of the above two charts shows that migration, although distressed, has a positive quantitative impact on the spending capacity of the migrants in the post-migration phase. In other words, quantitative improvement in income and expenditure has been found to have happened as a result of migration.

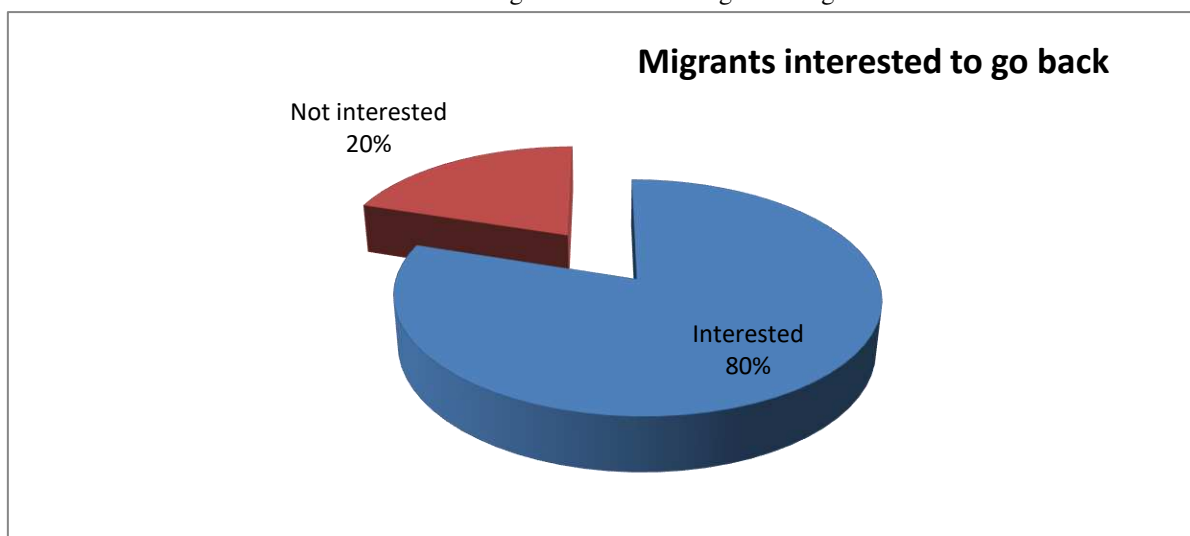
Chart no.19- Reasons for migration:



Source: Compiled from primary data

Chart no.19 shows that the most important reason for migration is the push factor like the lack of work opportunity in the villages. But there are some more factors associated with this decision. Behavioural factors do play a role in migration decision making besides the push factors like lack of employment opportunities in rural areas. But the fact of the matter is that normative behavioural factors are very difficult to be captured through the perception study of the migrants unlike the push-pull factors as mentioned above.

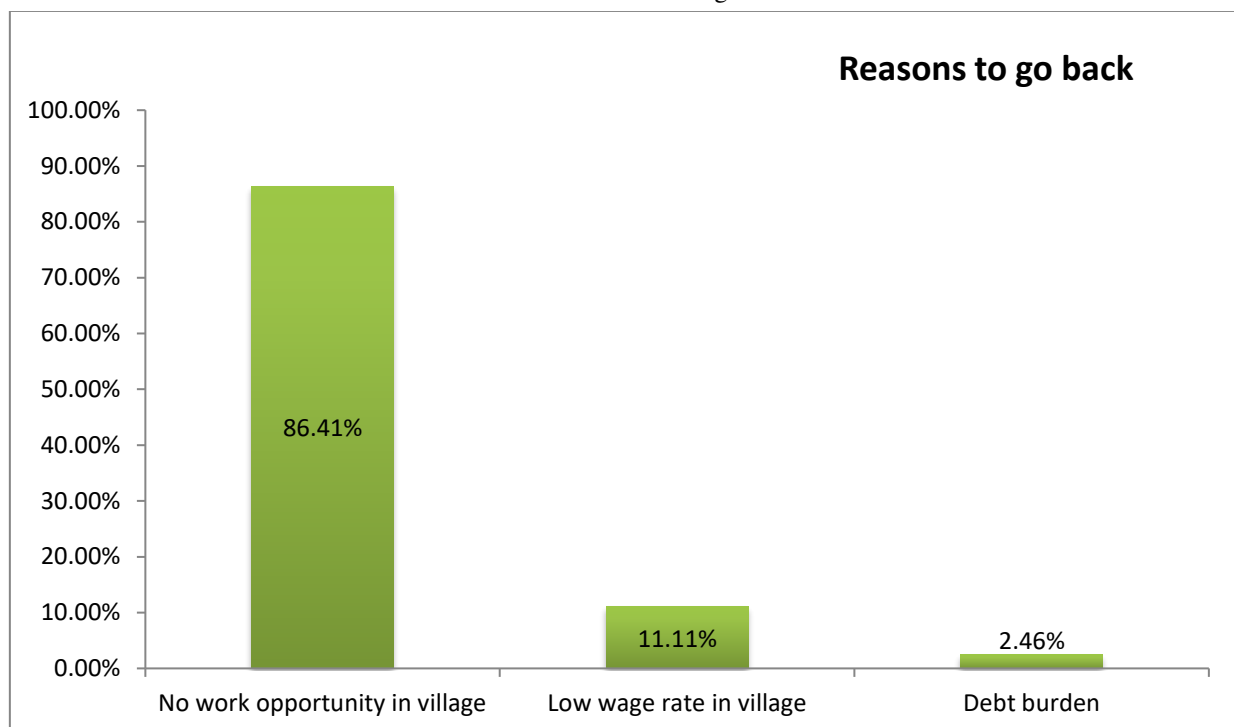
Chart no.20- Migrants interested to go back again



Source: Compiled from primary data

Chart no.23 shows that 80% migrants are interested to go back to their work place i.e the destination. It implies that most of the migrants want to go back to their work place despite the drudgery associated with it. The difficulties faced by the migrants during the covid-19 crisis and the life threatening experiences they had during the phase of reverse migration have not deterred them to return back. It is an indication of the perceived benefits more than the real costs associated with distress migration. The perception of the migrants seems to overestimate the short term quantitative benefits of migration as compared to the real costs associated with it. Hence, reverse migration has turned out to become situational and short term.

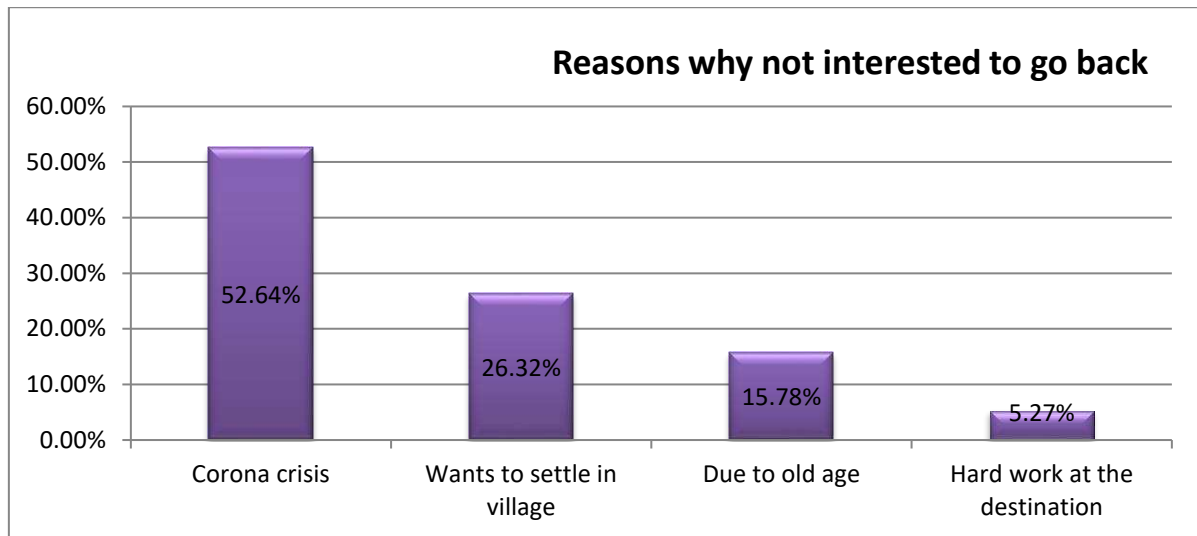
Chart no.21- Reasons to go back



Source: Compiled from primary data

Chart no.21 shows the reasons why people want to go back where 86.41% of migrants want to go back due to no work opportunity in villages which is highest and 2.46% of migrants want to go back due to high debt burden which is least. It implies that migrants want to go back because of not having work opportunity in villages of KBK region of Odisha. Hence, as per the perception of the migrants the push factors are the driving force but they are not aware of the behavioural dimensions of their decision to migrate out.

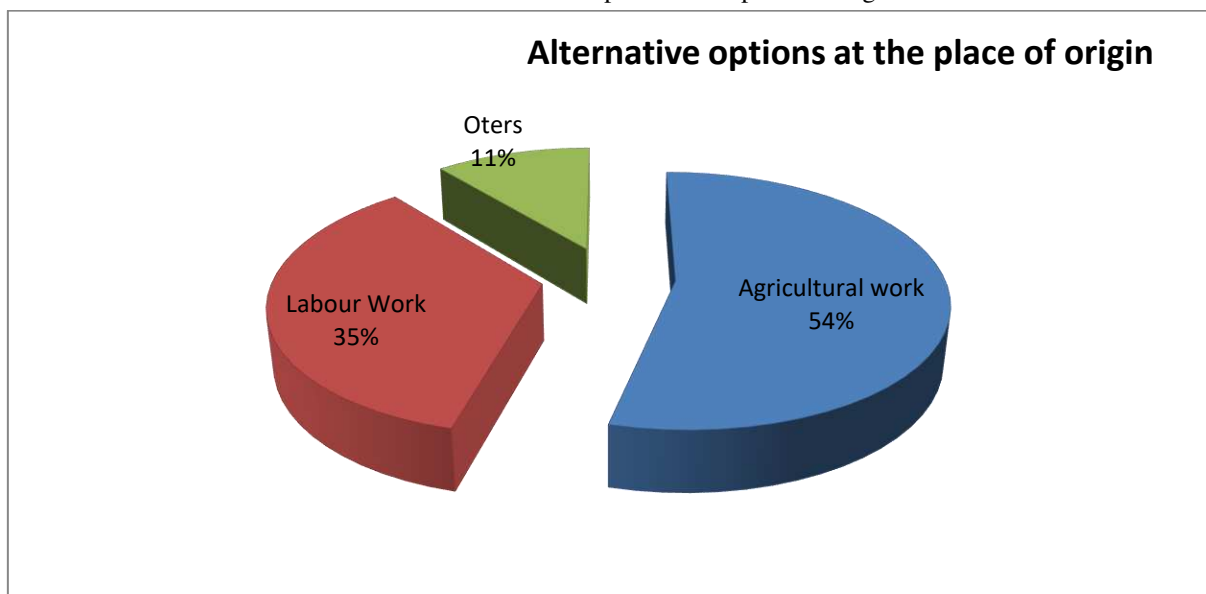
Chart no.22- Reasons why not interested to go back:



Source: Compiled from primary data

Chart no.22 is an indication of the fact that besides the corona crisis, nearly one-fourth people are not interested to leave their homeland again. That means, when the question is reversed it came out clearly that given a crisis, people are not interested to go back to their destination. Behavioural factors do play a role here.

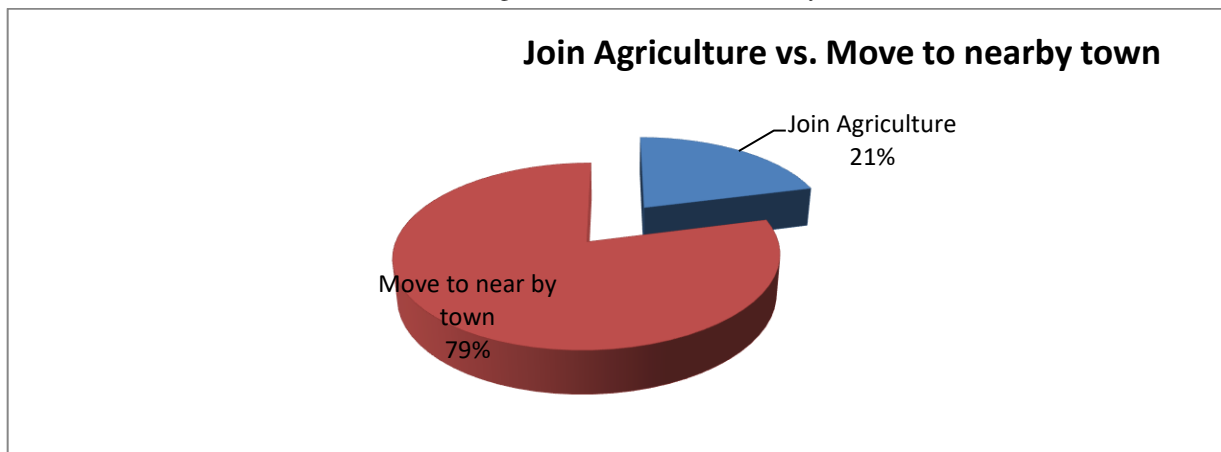
Chart no.23- Alternative options at the place of origin



Source: Compiled from primary data

Chart no. 23 shows agricultural labour and other casual labour work are the only options available for such people to fall back upon in the rural areas. Such issues are leading to casualization of labour and non-development of the non-farm sector in rural areas. Being driven by identity related behaviour and normative aspects like social prestige with socio-economic acceptability, youths are leaving the rural economy in search of informal sector jobs outside. The result is continuation of the issue of migration year after year.

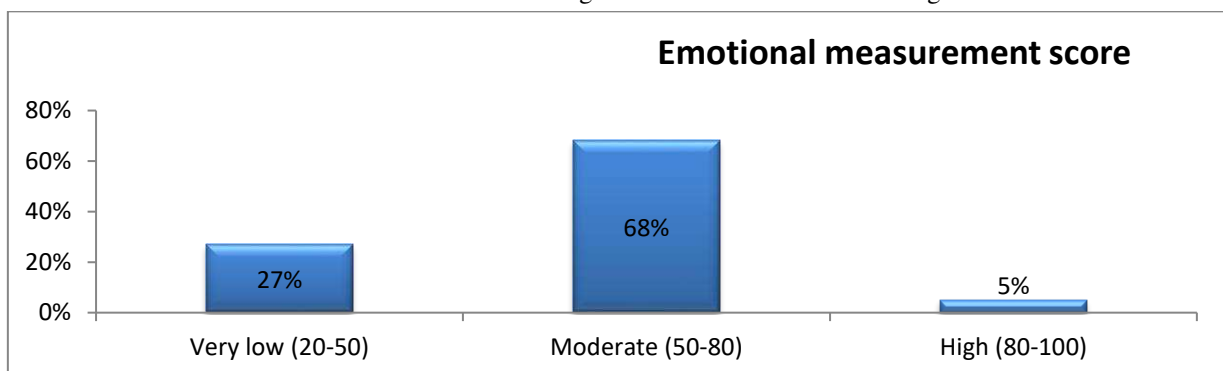
Chart no.24 – Join Agriculture vs. Move to Nearby Town:



Source: Compiled from primary data

Chart no.24 shows an interesting result wherein we can see that those who are not interested to migrate out, they want to move out within the state to the nearby urban centre. Thus, migration is a must and it is beneficial in this sense. Agriculture is not an option for the youth of today's world and that is the reason why there is withdrawal of youths from agriculture in this part of the country. Even if there is no inter-state migration, we find intra-state migration anyway.

Chart no. 25 – Emotional Intelligence Measurement Score of Migrants



Source: Compiled from primary data

Chart no.25 shows that the emotional measurement score of migrants is on the higher side. As per the figures obtained from the standardised scale of measurement of emotional intelligence, 73% migrants are more emotional. It implies that behavioural factors do play a role in the decision to migrate. The push and pull factors are not the only dominant factors causing migration. The Emotional Intelligence scale of Likert Type has been used to find out the level of emotional intelligence in the migrants and it has been found that a high majority of migrants are emotional and they take migration decisions being driven by behavioural factors.

7. Paired Z- Test for Hypothesis Testing

When the paired Z-test was run, it came to the fore that migration, whether distress or forced type has resulted in the growth of income, expenditure and savings of the migrants' families. All the results shown in the following table are significant at 5% level of significance.

The table clearly shows the paired z-test analysis of data to find out impact analysis of pre and post migration. From the table it is clear that the mean value of monthly income during pre-migration is 920.20 and post migration is 6825.83, level of significance is 0.05, z-stat is 19.71631, z-critical value is 1.959964 and p value is 0.00 which shows significance of the test.

The mean value of monthly expenditure during pre-migration is 920.20 and post migration is 6043.03, level of significance is 0.05, z-stat is 23.45835, z-critical value is 1.959964 and p value is 0.00 which shows that the z-test is significant at the 5% level.

The mean value of monthly saving during pre-migration is 3.23 and post migration is 772.70, level of significance is 0.05, z-stat is 7.010951, z-critical value is 1.959964 and p value is <0.00001 which shows significance of the z-test at the 5% level.

The mean value of monthly expenditure on children education during pre-migration is 30.30 and post migration is 268.68, level of significance is 0.05, z-stat is 5.342375, z-critical value is 1.959964 and p value is <0.00001 which shows that the z-statistics is significant at the 5% level.

Thus, above results proves the hypothesis that due to migration there is increase in monthly income, monthly expenditure, monthly saving and monthly expenditure on children education of migrants. Meaning thereby, even distress migration from the backward region like the KBK is quantitatively favourable and beneficial to the migrants and their families. This kind of results have also been established by a number of studies done earlier in the KBK region of Odisha and even in some other areas where forced migration has been a perennial issue of concern. The computation of the paired Z-test has been done with the help of the advanced excel program.

Hypothesis Testing

Table no.1 - Paired Z- TEST FOR HYPOTHESIS TESTING:

INDICATORS	PRE MIGRATION MEAN	POST MIGRATION MEAN	z-STAT	z CRITICAL VALUE TWO TAILED (\pm)	P ($z \leq Z$) TWO TAIL	LEVEL OF SIGNIFICANCE	RESULT
MONTHLY INCOME	920.202	6825.838	19.71631	1.959964	0.00	0.05	SIGNIFICANT
MONTHLY EXPENDITURE	920.202	6043.03	23.45835	1.959964	0.00	0.05	SIGNIFICANT
MONTHLY SAVING	3.232323	772.7071	7.010951	1.959964	<0.00001	0.05	SIGNIFICANT
MONTHLY EXPENDITURE ON CHILDREN EDUCATION	30.30303	268.6869	5.342375	1.959964	<0.00001	0.05	SIGNIFICANT

Source: Compiled from primary data

8. The Logistic Regression Model

The Logistic Regression Model has been used to find out the impact of a few important quantitative and behavioural factors on the qualitative decision variable or dummy variable i.e. migrants' interest to go back. In other words, the effort here is to find out what important factors mostly behavioural factors are responsible for the migrants' decision to go back to the place of destination once the covid-19 pandemic comes back to normalcy. It is expected to throw lights or indicate the importance of behavioural economic variables impacting distress migration besides the quantitative factors like income, expenditure or job opportunities at the place of destination.

Dependent variable- Interested to go back to the destination

Independent variables- Per capita Income, Emotional measurement score, Just world hypothesis bias, / no work opportunity

Model:

$I = f(\text{Per capita income/EI Score/ Just world hypothesis bias / no work opportunity})$

Variables not in the equation

Independent Variables	Score	df	Sig.
Per capita Income	1.186	1	.276
Emotional measurement score	0.546	1	.460
Just world hypothesis bias	0.92	1	.761
No work opportunity	61.207	1	.000
Overall Statistics	63.619	4	.000

Variables in the Equation

	B	S.E.	Wald	Df	Sig.	Exp(B)
constant	1.386	250	30.749	1	.000	4.000

The logistic regression model shows that migrants are interested to go back again have significant causal relationship with behavioural factors like emotional intelligence and presence of cognitive bias. The Just World Hypothesis bias is a cognitive bias or a fallacy which states that a person's good actions are eventually rewarded and evil actions get punished. It is the tendency to believe that the world is just/fair and that people get what actually they deserve in life. People believing in the just world hypothesis look for ways to rationalise injustice or bad socio-economic condition/situation they are in. Thus, the conclusion that can be drawn is, besides the push factors; there are behavioural factors on the demand side which influence the decision of a migrant to move out. Behavioural factors like emotional intelligence, cognitive biases and social prestige/identity influence the decision of the people to migrate out. The second hypothesis is proved that there is the importance of normative or psycho-economic dimensions in migration decision making which cannot be neglected in the development economics research and literature. Hence, the push pull hypothesis needs to be supplemented by the presence of such subjective factors which influence the behaviour of the migrants.

9. Conclusions

Form this study the conclusions that we can draw are that the push and pull factors are not the only determining factors in forcing people to migrate out from the backward KBK region of Odisha. There are a number of behavioural or psycho-economic factors like emotional intelligence, cognitive biases, identity of an individual in his family/village/society and his perception of exclusions which influence the decision to migrate. The *info-graphic method* adopted in this study revealed that the decision to migrate on the part of the people in distress has something to do with their state of mind, emotional assessment of their well-being & ill-being and their perception of who they are in the society

they are living in. Therefore, any program to control or stop seasonal distress migration in the backward regions like the KBK region of Odisha has to be seen from a micro-theoretic demand side perspective of behavioural economics.

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Growth and determinants of CO₂ emissions: evidence from selected Asian emerging economies

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Abstract

The study analyzes the impact of economic growth, energy consumption, foreign direct investment inflows, population, population density, labor force, and trade openness on carbon dioxide emissions in seven emerging Asian economies over the period 1991–2017. To this end, it uses cross-section dependence test, second-generation unit root test, panel cointegration, and the bound test for cointegration and the autoregressive distributed lag estimations. The findings of the study are as follows: first, the kinked exponential growth is estimated for all the variables on the individual data set of seven countries. Second, the study finds a positive association of economic growth, energy consumption, population, and population density on carbon dioxide emissions. Third, it finds that the foreign direct investment inflows are negatively associated with carbon dioxide emissions. The paper also suggests potential implications and some future research avenues.

Keywords CO₂ emissions · Economic variables · Asian emerging economies · Kinked exponential growth · Panel ARDL

JEL classification C50 · O13 · Q56

Introduction

Global climate change has eventually become one of the most challenging environmental issues, attracting incredible consideration of scientists and policymakers (Mujtaba et al. 2020; Mujtaba and Jena 2021). Global warming, the key progenitor of climate change, can be traced back to the industrial revolution, which replaced human capital and animal power with energy-consuming automated machines. Carbon dioxide

(CO₂) emissions are one of the significant sources of the global temperature boost, having the most elevated warmth-catching capacity among other ozone-harming substances in the atmosphere (Sarker et al. 2016). Many environmental economists found that global warming, which is fundamentally caused by greenhouse gas emissions, is a threat to the existence of human civilization (Gozgor 2017; Fodha and Zaghdoud 2010; Baek and Kim 2013). Moreover, Stern and Stern (2007) projected a much higher economic loss from global warming than that of World War I and II. The inter-governmental panel on climate change (IPCC)¹ has also reported that carbon dioxide is responsible for greenhouse gases, which is rapidly increasing over the last two decades. However, it is well established that fossil energy use and economic growth increase the discharge of carbon dioxide (Shahbaz et al. 2013; Jamel and Derbali 2016).

The Kyoto Protocol was adopted in 1997 and got implemented in 2005; it demanded a reduction of greenhouse gas (GHG) emissions to 5.2% lower than the 1990 level during the period from 2008 to 2012 (Pao and Tsai 2011). Currently, 192 countries have endorsed the protocol. The Kyoto Protocol

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¹ IPCC was set up by the United Nations Environment Programme (UNEP) and World Meteorological Organization (WMO) with an objective to disseminate information to the partner governments.