



# AL-SHODHANA

*A Multi Disciplinary Refereed Research Journal*

Vol. X No. 2 July 2022

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Yathish Kumar**

**St Aloysius College (Autonomous), Mangaluru, Karnataka**

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*A Multi Disciplinary Refereed Research Journal*

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# Principal's Message

Higher education institutions play a major role in shaping the society. These institutions must create knowledge and engage the learners in the present context to show the path for the future generations. Higher education institutions must help the students be aware of the inequalities of the present structure rather than helping the students to fit into to the existing world order. Questioning the existing inequalities and instilling critical thinking to foster the value systems strongly embedded in the culture is the need of the hour. *Al-Shodhana*, a research journal of St. Aloysius College (Autonomous), is an attempt to share the research output of renowned learned scholars in the form of articles across disciplines triggering and fostering new knowledges.

Engaging in research to understand and find new pathways leads to alternative ways of approaching the present realities of the society. Constant reflection and praxis have to be part of all the higher learning institutions. We need to constantly churn the minds and ideas to see the realities and provide alternative space in the education systems of today. When we engage and deepen the search it leads us to depth and creative ways of approaching the realities, this in turn will open newer pathways for a better society where justice, liberty and equality prevails.

*Al-Shodhana*, the multi-disciplinary research journal is an attempt by the College towards expanding the intellectual horizons of staff, students and scholars and open new avenues of knowledge creation, a potent tool for exploring innovative, futuristic solutions to contemporary issues and concerns.

I congratulate the editorial team for bringing out this edition of *Al-Shodhana* and wish that these research articles help you engage in deeper search and help us to understand the realities in an enlightened and informed manner.

# Editorial

Once, a Guru and his disciple were crossing a river. Before stepping into the river, the Guru said to the disciple, “hold on to my hands, and you too will reach the other side safely.” However, the disciple, on hearing this, said, “no master, I will never hold your hand.” Surprised, the Guru asked him, “why are you not holding my hand?” The disciple said, master, I am safer when you hold my hand than when I hold on to yours. If I hold your hand, my grip may slip away, but I have faith that you will never let go if you hold my hand. The Guru in this story is the researcher, and the disciple is our society or humanity. For the proper exchange of research and knowledge, every researcher should be close to the society and holds the society together. Those who understand this fact can dedicate their skills and intelligence to the betterment of society because research is an effort to simplify complex situations. A researcher’s job is to find answers to unsolved problems as part of intellectual curiosity or serve society by solving complex issues. The job of a research journal is to mediate between the researcher and society in terms of disseminating knowledge. Much of the valuable information or knowledge we lost in the past, or is even being lost now, is because of the absence of a proper channel to make it in the public domain. Humanity can only reduce its stress or strain on various problems, including pandemics, financial crises, share-market problems, and medical, ethical, logical, or even sociological issues. *Al-Shodhana*, the multi-disciplinary research journal, bids such a platform by publishing original research papers from the teaching faculty, research scholars, students and eminent personalities from different disciplines to serve this purpose.

The current issue provides an intense depiction of diverse perspectives through six research papers across different disciplines. The paper ‘The Indigenous Psychoanalysis of Girindrasekhar Bose and its Academic Context’ by Dolichan Kollareth beautifully highlights Bose’s association with the department of psychology at the University of Calcutta and the impact of this department on Bose’s psychoanalytic formulations. The paper ‘Prisoner’s Right to Free Legal Aid in India: A Critique’ by Dr. P.K. Pandey portrays the legal provisions relating to free legal aid to prisoners in addition to the contribution made by the Indian Judiciary.

'The Influence of U. S. Stock Market over the Indian Stock Market - A Comparative Analysis of Dow Jones Industrial Average and Nifty 50 by Mr Sanath Kumar K and Mr Deepak K V has analyzed how Dow Jones dictates the prices of Nifty 50 over a specified period of time. This study has found that Dow Jones Index indeed has a saying influence on the Nifty 50 Index and observed that Dow Jones industrial average Index and the Nifty 50 Index are positively correlated, where Dow Jones industrial average Index has more returns as compared to that of the Nifty 50. Mr. Sunny Kumar is presenting 'Basawan Singh: An Unsung Freedom Fighter of Bihar' indicate an important but forgotten freedom fighter who not only played a pivotal role in the Indian freedom struggle but also worked in parallel for the upliftment of workers, labourers, peasants and impacted the mainstream politics of both colonial and post-colonial India.

Dr Richard Gonsalves and Dr Ita D'Souza have discussed the various innovations that have taken place in batteries that are used in electric vehicles through their review paper 'A Review of the Innovations in battery technology for reduction of carbon dioxide emissions.' They thoroughly examine the advancement of research in LIBs, lithium-air batteries and sodium-ion batteries, how electric vehicles have a bright future, and how the reduction in the use of fossil fuels for transportation will bring down carbon emissions significantly. Mr Paul D'souza and Dr Yathish Kumar analysing the evolution of electronic rickshaws with a view to improve the economic status of auto-rickshaw drivers by reducing the additional maintenance and high initial costs through their study 'Evaluation of the Economic Status of Electric-rickshaw Drivers in Mangaluru.'

I express my wholehearted gratitude to the Principal of St Aloysius College (Autonomous), Rev Dr Praveen Martis S J, for his unwavering support. I would like to thank all the contributors, reviewers and members of the editorial board for their cooperation in publishing this issue.

**Dr P P Sajimon**  
**Editor-in-Chief**

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# THE INDIGENOUS PSYCHOANALYSIS OF GIRINDRASEKHAR BOSE AND ITS ACADEMIC CONTEXT

Dolichan Kollareth

## **Abstract**

*Girindrasekhar Bose (1887 - 1953) developed psychoanalysis in India. He did not inherit a system of theories from Freud. He originated his own version of psychoanalysis that differed markedly from that of Freud's. He did not agree with the Freudian theory of biological instincts--eros and aggression. Instead, he proposed a theoretical ego--a reservoir of mutually opposing pairs of wishes--that functions according to the principle of unity. Holding these mutually opposing wishes in a unified balance results in health. Historians explained Bose's theories as motivated by cultural factors and colonial politics. This paper highlights Bose's association with the department of psychology at the University of Calcutta and the impact of this department on Bose's psychoanalytic formulations.*

**Keywords:** history of psychoanalysis, transcultural psychoanalysis

## **Introduction**

Girindrasekhar Bose is rightly applauded as the founder of psychoanalysis in India. In 1920, he wrote his first book on psychoanalysis, *Concept of Repression*. From then on, he wrote numerous articles and books on psychoanalysis in English and Bengali (vernacular). From 1917 to 1949, he taught courses in psychoanalysis in the department of psychology at the University of Calcutta. From 1920 to 1937, he regularly corresponded with Freud on various issues related to psychoanalysis. In 1922, he founded the Indian Psychoanalytical Society, and had it affiliated with the International Society. Until his death in 1953, he remained its president. The Indian Psychoanalytic Society, under his presidency undertook initiatives to strengthen psychoanalysis in India. In 1947, he started *Samiksa* as the official Journal of the Indian Psychoanalytic Society. Thus, Bose institutionalized and popularized psychoanalysis in India.

## **How Bose Differed from Freud**

Even though Bose pioneered psychoanalysis in India, he was not a loyal disciple of Freud. On the contrary, Bose differed from Freud in fundamental ways. Two

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major differences were his theory of opposite wishes and his explanation of the oedipal complex. Bose posited that human psychological reality consists of a number of mutually opposing wishes. Examples: wish for homosexuality and heterosexuality, wish to be male and female, wish to aggress and to submit, wish for masochism and sadism. Repression and pathology resulted when a wish repeatedly blocked its opposing wish. Recognizing these opposing wishes in consciousness showed the way towards normalcy and health (Bose, 1933, 1949). In the light of his theory of opposite wishes, Bose rejected the Freudian notion of biological instincts (eros and aggressive instincts) and the Freudian tripartite structure of Id, Ego and Superego. Bose postulated a theoretical ego that was a reservoir of all wishes. The ego functioned by the principle of unity and not by pleasure or pain. Unlike Freud, for Bose, the fundamental opposition in the psyche was ultimately reconcilable (Bose, 1933). Bose defended his theory against Freud and was confident that his theory had explanatory power over the Freudian theory (Bose, 1933; letter from Bose to Freud dated April 11, 1929 in Ramana, 1964, all correspondence between Bose and Freud quoted in this paper are taken from Ramana, 1964).

Bose also differed from Freud in his explanations of the Oedipal complex. The difference was based on, again, the theory of opposite wishes. The Oedipus situation, Bose argued, resulted from the wish to be a male and, its opposite wish, to be a female. He explained the various dynamics that could emerge from these mutually opposing wishes. One major possibility for a boy was the following: the Oedipus complex arises when the boy wants to return his mother's kisses and caresses. He attempts to fulfill his wishes in two phases: he tries to imitate his mother's actions (act identity) and he tries to become the mother (ego-identity). In playing the mother through ego-identity, the boy wants to be his father's wife and bear him a child. Therefore, the boy desires to give up his penis to play the feminine role for his father. Thus, there is no fear of castration, but rather a desire for castration. Bose explained a number of symptoms found in male patients as arising from a repressed wish to be female (Bose, 1928; 1947/1978). Freud disagreed: "I still think that you underrate the efficiency of the castration fear" (Freud to Bose, letter dated March 9, 1929). Bose replied that he did not deny the importance of castration threat in European cases. Nevertheless, "the desire to be a female is more easily unearthed in Indian male

patients than in European” (Bose to Freud, letter dated April 11, 1929). Elsewhere Bose wrote: “superficial analysis of European patients seems to show the importance of the castration complex; but whenever the analysis is pushed deeper, the desire to be a woman is found to be the central element of the castration situation” (Bose, 1928 p.35). Therefore, Bose was not trying to stress cultural differences between Indian and European male patients. Instead, he firmly believed that a desire to be female was universally at the core of Oedipus situation. The castration complex in European patients was the result of superficial psychoanalysis. When analyzed deeper, one would confront the universal desire to be a female.

Despite major differences in their views, Bose and Freud exchanged letters for almost seventeen years (1920-1937). These letters demonstrate the way they negotiated their differences and the motivations behind those negotiations. Bose, in many of his articles, appreciated and credited Freud for a scientific explanation of the unconscious. His appreciation was obvious in the first letter that Bose sent to Freud in the year 1920. Bose wrote, “along with my friends and relations I have been a warm admirer of your theories and science” (Bose to Freud, letter dated December 1920). Beyond this appreciation, Bose had other interests. He was looking for an international audience for his ideas. About his book, *Concept of Repression*, Bose inquired, “my agent...enquires whether the book which is in English has got any chance of success in Austria and Germany and what periodicals would be most suitable for advertisement” (Bose to Freud, letter undated). Bose’s name was printed on the cover of the International Journal of Psychoanalysis as a representative of the Indian group. Back in India, his close association with Freud made him the undisputable authority of psychoanalysis in the country.

Freud, even when critical, was intrigued by the theory of opposite wishes. Freud wrote, “Dr. Bose is aiming at a philosophical evolution and elaboration of our crude, practical concepts and I can only wish that Psychoanalysis should soon reach up to the level, to which he strives to raise it” (letter from Freud to Bose, dated February 20, 1922). “Your theory of opposite wish appears to me to stress rather a formal element than a dynamic factor” (Freud to Bose, letter dated March 9, 1929). “The opposite wishes strikes me as something less dynamical than morphological which could not have been evolved from the study of our

pathological material” (Freud to Bose, letter dated January 1, 1933). Even when skeptical, Freud also expressed his interest in the theory: “I promise to keep my attention fixed on the problem of the opposite wish which you accentuate” (Freud to Bose, letter dated May 12, 1929). In 1933 January, Freud wrote a New Year letter to Bose: “I reproach myself for not having given attentions to your ideas before” (Freud to Bose, letter dated January 1, 1933). Beyond this ambivalence to Bose’s theory, the news that psychoanalysis had reached such faraway places was fascinating for Freud. Replying to the first letter from Bose, Freud wrote, “My surprise was great that Psycho-analysis should have met with so much interest and recognition in your far country” (Freud to Bose, letter dated May 29, 1921). On Freud’s seventy-fifth birthday, Bose sent him an ivory statuette of Lord Vishnu as a present. Freud replied, “The Statuette is charming, I gave it the place of honor on my desk. As long as I can enjoy life it will recall to my mind the progress of Psychoanalysis the proud conquests it had made in foreign countries” (Freud to Bose, letter dated December 13, 1931). For Freud, being in touch with Bose was, perhaps, a pleasurable reminder of his “proud conquests.”

### **Context of Bose’s Theoretical Formulations**

Bose’s career and writings highlight the clinical roots of his theories. Bose was a general physician who turned to psychoanalysis, looking for solutions to treat his mentally ill patients. Bose was educated as a physician and began a private practice in 1910 in Calcutta. He was intrigued by the patients with mental illness, and eventually restricted his practice to mental health issues. He also joined the department of psychology at Calcutta to find ways to treat mentally ill patients. He continued to treat mentally ill people using psychoanalysis until his health deteriorated in late 1940s (S.K. Bose & Deb, 1981). He instituted a psychoanalytic society and began formal psychoanalytic training. Under Bose’s supervision, R.G. Kar Medical College, Calcutta opened an outpatient mental health clinic. In 1940, he began the first non-official mental hospital in Calcutta, known as Lumbini Park Mental Hospital.

His writings justify the clinical roots of this theory: To Freud’s criticisms that Bose’s theories were rather philosophical, he insisted on the clinical base of his theories (letter from Bose to Freud dated April 11, 1929). Elsewhere he wrote,

“The desire to be a woman or its modification, the castration wish, is regularly discernible in all analyses” (Bose, 1928, p. 30). “The new theory of mental life that I propose to delineate here is the outcome of my psycho-analytical work during the past twenty-two years” (Bose, 1933, p. 85). He provided illustrative case studies to support his theory of the Oedipus complex (See Bose, 1928) and theory of opposite wishes (Bose, 1933).

Historians have examined the influence of cultural factors and colonial politics on Bose’s theories (Akhtar & Tummala-Narra, 2005; Hartnack, 1999; Kakar, 1990; Sharma, 2011). Kakar (1990) traces the roots of Bose’s psychoanalytic formulations to his deep knowledge of Hindu philosophy and Indian cultural tradition. According to Hartnack (1999), Bose’s version of psychoanalysis was a blend of Bengali Hindu thought and Freudian concepts. Hartnack (2008) argues that Bose’s writings expressed an explicit anti-colonial stance. He shows how Bose exempted revolutionary political activities from his definition of mental diseases. He reads anti-colonial sentiments in Bose’s representation of the Oedipus complex: “The Oedipus is resolved not by the threat of castration, but by the ability to castrate” (Bose, 1928 p.35). Nandy (1995) also finds anti-colonial motivations in Bose’s theories. While fully agreeing to the cultural and colonial contexts of Bose’s theories, what historians have overlooked is the fact that Bose spent long years both as a student and as a teacher in the department of psychology at the University of Calcutta. There was no scholarly attempt to examine the influence of this department on Bose’s theories.

### **Bose as an Academician**

Bose was part of the department of psychology at Calcutta University for approximately 35 years. In 1915, he joined the department to earn a Master’s degree, and in 1917, earned one in experimental psychology. From then on, he took up a part-time lectureship in the department. In 1921, the department awarded Bose a doctoral degree in psychology for his book, *Concept of Repression*. Others regarded this book as an important contribution. According to Mitra (1937), this book “propounded a new theory about Repression in particular and mental life in general” (p. 153). In 1929, the University appointed Bose as the Head (Chairman) of the department of psychology, an office he occupied for the following twenty years.

The department of psychology at the University of Calcutta was organized in similar lines to that of the Leipzig model. Danziger (1990) contrasts two models of psychology that were, among others, major influences on early years of psychology. What he calls the Leipzig model (named after the first psychological laboratory in Leipzig) was mainly academic in a sense that psychology was practiced in the universities in Germany oriented to research and teaching. By contrast, the clinical model was practiced in the hospitals in France oriented to treatment of mentally ill patients. The Leipzig model of psychology had the following features. First, psychology was predominantly academic – practiced in universities, and oriented towards teaching and research. The goal of psychology was to understand the generalized processes characteristic of the normal and mature human mind. Psychology, thus, was a close ally of philosophy in pursuit of understanding the human mind. Second, the method of doing psychology was experimentation (mainly on sensation and perception) in a psychological laboratory using various apparatuses. Because of the focus on the normal and mature human mind, the experimenter collected data from those he/she considered mature and psychologically sophisticated. Thus, Wundt – originator of the model – himself appeared regularly as a subject in the experiments published by his students. Relatedly, in experimental methods, introspection had a premier value.

The department of psychology at Calcutta University was very much an academic institution with a stated purpose of understanding the human mind. Bose joined the department looking for solution to treat his mentally ill patients. However, the department was more academic than clinical: the department was oriented more to research and teaching in psychology than to treating the mentally ill. One of the stated purposes of the department was to study ancient Indian Psychology, and the goal of psychology was to attain a deeper knowledge of the human mind. The department aimed to develop psychology as the science of human mind. For Bose, consistent with the department goals, the scope of psychology was to understand the normal and abnormal human mind (Bose, 1932; 1933). For Bose, psychology was the science of the mental world whereas the other sciences dealt with the physical world (Bose, 1932). Bose boldly asserts: “We can look forward to the day when Psychology will establish itself as our guide, friend and philosopher in all human affairs, and will be looked upon as the greatest of all the sciences” (Bose, 1932, p.29).

In his psychological research, Bose considered, very similar to the Leipzig model, philosophy a close ally. For Bose (1933), there was a need to link psychology and philosophy “to solve the riddle of the ultimate reality” (p.44). Bose appreciated the ancient Indian philosophers for their psychological insights (Bose, 1932; 1933). Indeed, at Calcutta University, the department of psychology remained closely associated with the department of philosophy. The department had branched off from the department of philosophy. Dr. N.N Sengupta, who first headed the department of psychology, was a philosopher.

Further, according to some authors, Bose developed psychoanalysis from a system of treatment to a philosophy of life. Basu (1999) compared Bose’s two Bengali works: *Swapna* and *Bhagavad Gita*, and concluded that *Swapna* published in 1928 is the Freudian Bose and *Bhagavad Gita* published in 1948 is notably non-psychoanalytical. According to Basu, “his interpretation of the *Bhagavad Gita* needs to be considered as an elaboration of a way of life” (p.47). According to Nandy (1995), Bose’s Bengali articles on *Bhagavad Gita* are “more social-philosophical than psychoanalytic” (p.87). T.C. Sinha, a student and close associate of Bose has the following on Bose’s psychanalysis: “This science was developed as a method of treating mental diseases. But in the course of its development, it has outgrown that limit and has become a living psychological search for truth embracing the life as a whole. One may, in a scientific sense, term this widened psychoanalytic approach as a new philosophy of life” (Sinha, 1967 p.167-168).

More generally, Bose’s psychoanalytic theory can be located within a lineage of *academic* responses to colonialism. Indian philosophy was dear to Bose: Bose expressed his appreciation for the insights of ancient Indian philosophers (Bose, 1932; 1933). Bose’s theory of opposite wishes, operating under the principle of unity, is very similar to the insights of some strands of Indian philosophy (Hartnack, 1999). However, Bose did not uncritically accept Indian philosophy; instead, he more creatively blended the western science (psychoanalysis) with Indian philosophy. There have been many such attempts in the Indian Universities, and University of Calcutta was an epicenter. Brojendra Nath Seal, a professor of mental and moral philosophy at the University of Calcutta, attempted to reclaim a scientific tradition in Indian philosophy. He published a book titled *The Positive Sciences of Ancient Hindus*. It is noteworthy that Brojendra Nath Seal, in 1905, also prepared a syllabus for the department of experimental psychology

that the Calcutta University was planning to begin (Mitra, 1937). Prafulla Chandra Ray, who was a professor at Presidency college Calcutta and Calcutta University college of science, published the book *A History of Hindu Chemistry from the Earliest Times to the Middle of Sixteenth Century*. Jagadish Chandra Bose, a professor of physics at Presidency college Calcutta made significant contributions to plant science by integrating modern science in Indian tradition (Kumar, 2000). The fact that J.C. Bose and Girindrasekhar Bose were friends who had shared views on science (Nandy, 1995) further support Bose's position within this academic lineage.

In addition to emphasizing the academic nature of psychology, similar to Wundt's Leipzig model, Bose considered experimentation as a major source of data for psychology. Indeed, the department at Calcutta had aspired to emulate Wundt's psychological laboratory in Leipzig and had experimental apparatuses imported from Germany and U.S.A (Mitra, 1937). Personally, Bose had a passion for planning and executing original experimental studies. Bose devised apparatuses for experimental studies (S.K. Bose & Deb present a list of tests/apparatus devised by Bose: Sand Motor, Group Passalong, Big Muscle Ergograph, Dotting Test, Neurotic Questionnaire, Word-association test, Group Matching test). Very similar to what Wundt did, Bose played the role of the subject in some of these experiments (S.K. Bose & Deb, 1981); thus fulfilling the need for examining mature minds in psychological experimentation. The department and Bose personally considered introspection to be the most valuable method for psychological experimentation (Bose, 1933; S.K. Bose & Deb, 1981). According to Nandy (1995), Bose considered Freudian free association to be an extension of introspection.

The influence of experimental psychology, characteristic of the department of psychology at Calcutta and the Leipzig model, is evident in some of Bose's theories. Bose supported his theoretical formulations using data from experimental psychology. He compared a wish to a sensation and proposed that similar to the features of sensation found by experimental psychologist, there are different features to any wish (Bose, 1951; 1952). In elaborating on his theory, he also refers to findings by experimental psychologists on pleasure and pain (Bose, 1933). In addition, for Bose, perception depends on wish, and according to him, Wundt supported a similar idea when he said that apperception and will have

ultimately the same function (Bose, 1926; 1933). Bose also opined that there is no contradiction between psychoanalysis and experimental psychology and both needs to be combined in pursuit of understanding human mind (Bose, 1933).

More generally, the influence of the academic context of Bose is evident in his perspectives on psychology and therapy. As head of an academic department, Bose did not restrict himself to the strict boundaries of psychoanalysis. Under his leadership, the department revised the psychology syllabus to include courses such as social psychology, industrial and vocational psychology, animal psychology, criminal psychology, and Indian psychology (S.K. Bose & Deb, 1981). He encouraged great diversity of psychological methods among students (S.K. Bose & Deb, 1981). Nandy (1995) cites some of Bose's associates: "He (Bose) used to say, an associate remembers, that psychoanalysis was a medical system like Ayurveda or homeopathy; it worked with some people, while other systems worked better with others. Others mention that Bose never pushed psychoanalysis with his students of psychology and his own psychological theories with his analytic trainees or colleagues" (p.104).

Perhaps the academic context influenced Bose in the method of therapy he preferred to use. Bose interacted with his patients as a teacher interacting with his or her students: "Therapy was viewed primarily as a cognitive venture, involving the acquisition of knowledge or information, and only secondarily as a matter of rearrangement or reinterpretation of emotions" (Nandy, 1995 p. 108). Kakar (1990) when speaking of the psychoanalysis that grew out of Bose wrote, "The actively didactic stance of the Indian analyst, as he engages in a lively interaction with the patient, fits more with the model of the guru-disciple than the doctor-patient relationship" (p.431). Thus, an academic (guru-disciple) image rather than a clinical (doctor-patient) image better captures the psychoanalytic practice of Bose.

## **Conclusion**

After the independence of India in 1947, there was a decline of psychoanalysis in Calcutta for various reasons. There was no one with the stature of Bose to carry on his legacy after his death in 1953. According to Akhtar and Tummala-Narra (2005), Bengal famine in 1943 and the country's partition in 1947 contributed to the decline of psychoanalysis in Calcutta. There was extensive poverty and an

upsurge of mental illness in Calcutta at the aftermath of the famine. Bose and colleagues were poorly prepared to handle the new situation. Calcutta was also under a political turmoil from country's independence and partition.

Psychoanalytic groups in other parts of the country never attained the popularity that Bose had enjoyed in Calcutta. The analytic training institute in Bombay (now Mumbai) was set up in 1945 with the leadership of Italian analyst Emilio Servidio. There were also groups of psychoanalysts in New Delhi and Ahmedabad, but mostly trained in foreign countries. According to Kakar (1997), the influence or popularity of these groups remained very small because of its western roots: Some of the psychoanalytic writing on Indian psyche was alien and insensitive to Indian culture. The anti-religious statements in psychoanalysis were a major issue. In addition, there was also the anti-colonial feeling, emphasizing the superiority of Indian philosophy over the western materialism.

Despite a decline of psychoanalysis in India, Bose's project remains relevant. Currently, in India, there is an increasing call for cultural sensitivity in psychological research, theory, and application (Barnes, 2004; Hoyer & Reddy, 2016; Misra & Mohanty, 2002; Misra et al., 1999; Pandey, 2004). Many highlight the psychoanalysis of Bose as a model of a culturally sensitive psychology (Akhtar & Tummala-Narra, 2005; Basu, 1999; Kakar, 1999). There is no doubt that Bose provides a great model. However, the contribution of Bose is not just his theoretical formulation, but also his ways of engaging with the discipline of psychology.

Bose's engagement with psychoanalysis is relevant in the political context of India today. An important concern is the contested nature of culture in India because of the multiple religious groups and the complex intergroup relations. In such a context of diversity, there is a danger of a culturally sensitive psychology remaining sensitive only to the urban upper caste Hindu men (Davar, 1999). More generally, an uncritical reliance on a particular strand of culture may be problematic for its exclusion of various other religious and caste groups (Banerjee, 2012). In this context of the politics of exclusion, Bose is a model for psychology in India. He neither uncritically accepted a western science nor uncritically relied on a set of cultural or philosophical categories. Instead, in pursuit of a universal science of psychology, Bose engaged and explored a diversity of sources available to him. This process of engagement and exploration should open up

new imagination, promote conceptual growth, and lead to a more culturally sensitive and inclusive application for psychology and psychoanalysis in India.

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# PRISONER'S RIGHT TO FREE LEGAL AID IN INDIA: A CRITIQUE

P. K. Pandey

*“Denial of legal aid causes violation of fair, reasonable and just procedure, unjustified incarceration, and curtailment of liberty.”*

- Allahabad High Court in *Anil Gaur v. State of U.P.*

## **Abstract**

*The prisoners, confined in the four-walls of the prison, are under the strict control and supervision of the prison administration wherein their presence, existence and survival are dependent on the State and its agencies dealing with criminal justice system. In respect of presentation in a criminal matter, a person, whose freedom is not curtailed, may easily arrange to defend his rights before a court but when he is in prison such type of freedom is not there. If his known persons or relatives are not coming forward to defend his rights in a court, there is none who can present his matter before the court consequently his rights and interests may be jeopardised. In such situation, the Constitution of India gives him fundamental right to access a legal expert at the cost of the State. This paper unearths the legal provisions relating to free legal aid to the prisoners in addition to the contribution made by the Indian Judiciary in this regard.*

**Keywords:** Constitutional right, Human rights, Legal aid, Prisoners.

## **Introduction**

In Indian criminal justice system, every person, against whom there is a criminal charge, is presumed to be innocent until and unless he is held guilty by a competent court. This concept is based on the Latin phrase '*item quilbetpresumiturinnocens nisi probeturnocens*'. The burden to prove guilt of an accused beyond reasonable doubt is always on the accuser (prosecutor) and the accused is not expected to prove his innocence. When the prosecution successfully discharges its obligation of proving levelled charges, the accused is given full, proper and effective platform wherein he can disprove levelled charges by introducing evidence and proof before the court.

For this purpose, every accused, in compliance of the principles of natural justice, fair trial and statutory provisions, is entitled to present his defence in the

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respective criminal proceedings. If an accused, due to poverty, social or financial exclusion, legal illiteracy, impersonal administration or any other cause, is not in a situation to defend his rights, the crucial responsibility is on the State which is under constitutional obligation to provide legal aid to every citizen of India. The whole purpose of such exercises is to deliver equal justice to everyone. The effective system of providing free legal aid to the prisoners is in tune with discharge of responsibilities of a welfare State which is based on the principle of just, fair and reasonable treatment with every human being.

### **Understanding Right to Free Legal Aid**

The concept of legal aid is in tune with the nature of a welfare state which is based on just, fair and reasonable procedure to be adopted in every activities of the State. "Free legal aid to the poor and marginalized members of the society is now viewed as a tool to empower them to use the power of the law to advance their rights and interests as citizens and as economic actors" as held by the Supreme Court of India in *K.N. Govindan Kutty Menon v. C.D. Shaji*. The United Nations Principles and Guidelines on Access to Legal Aid in Criminal Justice Systems, 2012 defines the term 'legal aid' in Para 8 as under-

"The term legal aid includes legal advice, assistance and representation for persons detained, arrested or imprisoned, suspected or accused of, or charged with a criminal offence and for victims and witnesses in the criminal justice process that is provided at no cost for those without sufficient means or when the interests of justice so require. Furthermore, "legal aid" is intended to include the concepts of legal education, access to legal information and other services provided for persons through alternative dispute resolution mechanisms and restorative justice processes."

The above definition of 'legal aid' is very wide and it includes all the requirements of an effective legal aid to be provided by the State.

In Indian legislation *viz.* Legal Services Authorities Act, 1987, the term 'legal service', as a wide term, has been used in place of legal aid. Section 2 (c) of the Legal Services Authorities Act, 1987 defines it as under-

“Legal service includes the rendering of any service in the conduct of any case or other legal proceeding before any court or other authority or tribunal and the giving of advice on any legal matter.”

Where a person is not able, due to any disability, to engage a legal professional for his defence/prosecution, the right to free legal aid is available at every point of the matter whether pre-trial, trial or appeal or revisional which he or she is prosecuting or defending. *The United Nations Principles and Guidelines on Access to Legal Aid in Criminal Justice Systems, 2012* in Para 20 provides that “States should ensure that anyone who is detained, arrested, suspected of, or charged with a criminal offence punishable by a term of imprisonment or the death penalty is entitled to legal aid at all stages of the criminal justice process.” The Law Commission of India in its Forty-Eighth Report on ‘Some Questions under the Code of Criminal Procedure Bill, 1970’ has also advocated for providing legal aid at every step of the proceeding as under-

“We are of the view that defence of the indigent accused by a pleader assigned by the State should be made available to every person accused of an offence, *i.e.* in all criminal trials, so that mere poverty may not stand in the way of adequate defence in a proceeding which may result in the deprivation of liberty or property or loss of reputation. In our view, representation by counsel is so basic an ingredient of a criminal trial that the law should go as far as possible in seeking that this requirement is not absent. The assistance of counsel is required at every step in the proceedings and irrespective of the nature of the offence under trial.”

Supreme Court in *Rajoo v. State of M.P.*, held that “neither the Constitution nor the Legal Services Authorities Act makes any distinction between a trial and an appeal for the purposes of providing free legal aid to an accused or a person in custody.”

In *Board of Trustees of the Port of Visakhapatnam v. Presiding Officer, District Legal Services Authority, Visakhapatnam*, Andhra High Court said that “the assistance as contemplated is at all levels, not restricted to only those on

approaching the Court of law or authority or Tribunal. Further, it is not only with a view to settle pending cases but to settle any impending matters and to provide such assistance.”

### **Right to Free Legal Aid: Constitutional and Statutory Provisions**

The Constitution of India, postulating a society in which socio-economic and legal justice is available equally to all, ensures delivery of justice to every citizen as guaranteed in its Preamble, Fundamental Rights and Directive Principles of State Policy without any discrimination. Further, it has established an effective system of judiciary which is authorised to deliver justice to every person approaching it. The concepts of fair trial, equal justice and rule of law also ensure availability of opportunity to seek justice through the justice delivery system. A duty is cast on the State, under Article 38, to secure a social order for the promotion of the welfare of the people. It has to minimise the inequalities in income, and endeavour to eliminate inequalities in status, facilities and opportunities. Supreme Court of India in *Steel Authority of India Ltd. V. National Union Water Front Workers*, observed that “Article 38 mandates the State to secure a social order for promotion of welfare of the people and to establish an egalitarian society.”

Particularly, under Article 39A which is inserted in the Constitution by the Constitution (Forty-second Amendment) Act, 1976, the State has been expected to ensure that any citizen is not deprived of accessing law and legal system due to economic or any other disability. Article 39A runs as under-

*“39A. Equal justice and free legal aid.—The State shall secure that the operation of the legal system promotes justice, on a basis of equal opportunity, and shall, in particular, provide free legal aid, by suitable legislation or schemes or in any other way, to ensure that opportunities for securing justice are not denied to any citizen by reason of economic or other disabilities.”*

Thus, the State is directed to promote equal opportunity of justice and remove all the obstacles in accessing justice. Further, through judicial interpretation of Article 21, the Indian judiciary has broadened the scope of right to life by including in its sphere free legal aid. The Constitution of India, being the fountain

of rights, liberty and powers, attempts to ensure justice to every person as Allahabad High Court in *Anil Gaur v. State of U.P.*, has rightly said that “Injustice is the birthmark of a slave nation. Justice is the birthright of a free people and our constitution says they shall have it.” Because of any disability or lack of resources on individual level, there should not be injustice and in such cases the State, in discharge of its obligations of a welfare State, is under obligation to come forward and take steps to protect the interests of every individual. At the same time, the judiciary, being the guarantor and custodian of fundamental rights and protector of the Indian Constitution, has delivered justice through its innovative decisions.

Justice P.N. Bhagwati in *Hussainara Khatoon v. Home Secretary, State of Bihar*, pointing out the importance of free legal aid, said that:

“The right to free legal services is, therefore, clearly an essential ingredient of ‘reasonable, fair and just, procedure for a person accused of an offence and it must be held implicit in the guarantee of Article 21. This is a constitutional right of every accused person who is unable to engage a lawyer and secure legal services on account of reasons such as poverty, indigence or incommunicado situation and the State is under a mandate to provide a lawyer to an accused person if the circumstances of the case and the needs of justice so required, provided of course the accused person does not object to the provision of such lawyer.”

Following the ratio of above case, the Supreme Court in *Khatri (II) v. State of Bihar*, expressed its displeasure for non-complying with the orders in above case and observed that “it is unfortunate that though this Court declared the right to legal aid as a Fundamental Right of an accused person by a process of judicial construction of Article 21, most of the States in the country have not taken note of this decision and provided free legal services to a person accused of an offence.” The Court held that “this constitutional obligation to provide free legal services to an indigent accused does not arise only when the trial commences but also attaches when the accused is for the first time produced before the magistrate. It is elementary that the jeopardy to his personal liberty arises as soon as a person is arrested and produced before a magistrate, for it is at that

stage that he gets the first opportunity to apply for bail and obtain his release as also to resist remand to police or jail custody. That is the stage at which an accused person needs competent legal advice and representation and no procedure can be said to be reasonable, fair and just which denies legal advice and representation to him at this stage.” Further, the Court said that “right to free legal services would be illusory for an indigent accused unless the magistrate or the Sessions Judge before whom he is produced informs him of such right. It is common knowledge that about 70 per cent of the people in the rural areas are illiterate and even more than that percentage of people are not aware of the rights conferred upon them by law. There is so much lack of legal awareness that it has always been recognised as one of the principal items of the programme of the legal aid movement in this country to promote legal literacy. It would make a mockery of legal aid if it were to be left to a poor ignorant and illiterate accused to ask for free legal services. Legal aid would become merely a paper promise and it would fail of its purpose. The magistrate or the Sessions Judge before whom the accused appears must be held to be under an obligation to inform the accused that if he is unable to engage the services of a lawyer on account of poverty or indigence, he is entitled to obtain free legal services at the cost of the State.”

Madras High Court in *S. Mazhaimeni Pandian v. State of Tamil Nadu*, said that “legal aid is required in many forms and at various stages, for obtaining guidance, for resolving disputes in courts, tribunals or other authorities. It has manifold facets.” In *Suk Das v. Union Territory of Arunachal Pradesh*, the Supreme Court reiterated that “free legal assistance at State cost is a fundamental right of a person accused of an offence which may involve jeopardy to his life or personal liberty and this fundamental right is implicit in the requirement of reasonable, fair and just procedure prescribed by Article 21.”

Thus, it is very much clear that the Indian judiciary has taken pro-active steps towards providing free legal services to the under-trial and convicted persons. To translate into reality the constitutional mandate given in Article 39A, the Indian Parliament enacted the Legal Services Authorities Act, 1987 with the objective of, *inter alia*, providing free and competent legal services to the weaker sections of the society to ensure that the opportunities for securing justice are not denied

to any citizen by reason of economic or other disabilities. Prior to implementation of this Act, there was no statutory body to implement the policy of legal aid as envisaged in Article 39A and such activities were performed by the non-governmental and voluntary organisations.

The Act of 1987 has established the National Legal Services Authority, the State Legal Services Authority and the District Legal Services Authority in addition to Legal Services Committees (Supreme Court Legal Services Committee, High Court Legal Services Committee, Taluk Legal Services Committee). Section 12 mentions the criteria for availing legal services to file or defend a case in which a person in custody [Section 12 (g)] is entitled for legal aid. Thus, it is clear that the prisoners have been given full opportunity to access this service to present their matters before any court, tribunal or any authority.

The constitutional directive under Article 39A has been manifested in section 304 of the Criminal Procedure Code, 1973 (CrPC). It provides in detail the procedure to provide free legal aid at the expense of the State in certain cases. This section runs as under-

- “304. Legal aid to accused at State expense in certain cases.—(1)*  
Where, in a trial before the Court of Session, the accused is not represented by a pleader, and where it appears to the Court that the accused has not sufficient means to engage a pleader, the Court shall assign a pleader for his defence at the expense of the State.
- (2) The High Court may, with the previous approval of the State Government, make rules providing for—
- (a) the mode of selecting pleaders for defence under sub-section (1);
  - (b) the facilities to be allowed to such pleaders by the Courts;
  - (c) the fees payable to such pleaders by the Government, and generally, for carrying out the purposes of sub-section (1).

- (3) The State Government may, by notification, direct that, as from such date as may be specified in the notification, the provisions of sub-sections (1) and (2) shall apply in relation to any class of trials before other Courts in the State as they apply in relation to trials before Courts of Session.”

Under section 304 CrPC, the accused persons have to be provided legal aid in the matters which are before the Sessions Court. The Law Commission of India in its Fourteenth Report on “Reform of Judicial Administration”, Volume I, recommended that “representation by a lawyer should be made available at Government expense to accused persons without means in all cases tried by a Court of Sessions”.

In short, the overall reading of the fundamental rights guaranteed to the persons under Articles 21 and 39A of the Constitution of India as well as the provisions of Section 304 CrPC guarantees the legal aid to be provided by the State to every person who does not have resources to engage a legal expert.

### **Legal Aid as a Part of the Rule of Law**

The mechanism of providing legal aid to the poor, needy and destitute is an attempt to fulfill the aspirations of citizens of a democratic country. A person should not be refused to access law and legal system only because of not having resources to engage a lawyer otherwise the judicial system will be centre of discrimination resulting in inequality. *The United Nations Principles and Guidelines on Access to Legal Aid in Criminal Justice Systems, 2012* mentions in Para 1 that “legal aid is an essential element of a fair, humane and efficient criminal justice system that is based on the rule of law. Legal aid is a foundation for the enjoyment of other rights, including the right to a fair trial a precondition to exercising such rights and an important safeguard that ensures fundamental fairness and public trust in the criminal justice process.”

Mentioning the significance of legal aid in India, the Division Bench of Gujarat High Court, in *Labhu Laxmanbhai Vaghasiya v. State of Gujarat*, observed as under-

“Let us, therefore, never forget that the right of free and competent legal aid, is, a ‘*sine-qua-non*’, for upkeepment and sustenance of the rule of law which is one of the important basic structures of the Constitution of India. The right to legal aid has become almost like a fundamental right by catena of judicial pronouncements by Constitutional Courts and the Honourable Supreme Court of India. It must be, seriously, noted that the legal aid is not a matter of charity or mercy. It is an important right backed by the Constitution and that is the reason why the Government of India in its national and legal aid policy programmes devised the Legal Services Authorities Act, 1987, and has amended from time to time and, thereby, translating the spirit of Article 39-A. The end result came to the constitutionalisation of legal aid.”

Thus, it is evident from the above discussion that in a society which is being governed by the rule of law, effective system of legal aid to the prisoners should be effectively provided.

### **Legal Aid Should be Effective and Meaningful**

The State can discharge its constitutional obligation of providing legal aid to the needy person only when it is effective and meaningful. It means a legal expert who is assigned the job to defend/prosecute a person, he should be well-acquainted with law and legal procedure otherwise there will be failure of this provision. If a youngster from the Bar who has either a little experience or no experience is assigned to defend a person, there cannot be proper defence. *The United Nations Principles and Guidelines on Access to Legal Aid in Criminal Justice Systems, 2012* in Principle 27 mentions that “States should ensure that effective legal aid is provided promptly at all stages of the criminal justice process. Effective legal aid includes, but is not limited to, unhindered access to legal aid providers for detained persons, confidentiality of communications, access to case files and adequate time and facilities to prepare their defence.” Apex Court in *Kishore Chand v. State of Himachal Pradesh*, observed that-

“The right to defence includes right to effective and meaningful defence at the trial. The poor accused cannot defend effectively

and adequately. Assigning an experienced defence counsel to an indigent accused is a facet of fair procedure and an inbuilt right to liberty and life envisaged under Articles 14, 19 and 21 of the Constitution. Weaker the person accused of an offence, greater the caution and higher the responsibility of the law enforcement agencies.”

Kerala High Court in *Abdul Razack v. State of Kerala*, found that due to ineffective cross-examination by the defence advocate the accused was held guilty. The Court held that there was incompetent advocacy attributable to lack of experience and the same resulted in vitiating the trial of the appellant. The Court, setting aside the conviction, ordered the trial court to arrange a competent lawyer to defend the appellant.

Supreme Court in *Ranchod Mathur v. State of Gujarat*, observed that “the Sessions Judge should view with sufficient seriousness the need to appoint State Counsel for undefended accused in grave cases. Indigence should never be a ground for denying fair trial or equal justice. Therefore, particular attention should be paid to appoint competent advocates, equal to handling the complex cases, not patronising gestures to raw entrants to the Bar. Sufficient time and complete papers should also be made available to the advocate chosen so that he may serve the cause of justice with all the ability at his command, and the accused also may feel confident that his counsel chosen by the court has had adequate time and material to defend him properly.”

Gujarat High Court in *State of Gujarat v. Manjuben*, warning on the current situation of providing ineffective legal aid, commented that “if inexperienced advocates alone are available to defend such unfortunate accused, the court has a primary duty to come to the aid of the accused by putting timely and useful questions and warning the advocates from treading on dangerous grounds.” It said that the presence of counsel on record means effective, genuine and faithful presence and not a mere farcical, sham or a virtual presence that is illusory, if not fraudulent. Further, it, *inter alia*, issued the following directions-

- (1) It should be also borne in mind by the trial Judges that, no criminal case particularly inviting the substantial sentence should be conducted without

appointment of advocate. If the accused is not represented, appropriate legal assistance should be provided to him at the state expenses.

- (2) In case of Sessions triable offence, it is the duty of the Sessions Judge that sufficiently experienced lawyer should be provided for conducting the case of accused person.
- (3) While appointing a lawyer at the State expenses, the trial court should disclose in its order the length of practice of the advocate appointed and his/her experience in conducting the criminal cases, sessions cases or sessions of particular type and his opinion that in the situation he/she was the competent person to be appointed for the accused particularly in cases where there is likelihood of conviction for major offences.

### **Failure to Provide Legal Aid as Miscarriage of Justice**

Every person, before a court, has right to be represented by a legal expert. This is part of fair trial. If a person does not get opportunity to defend/prosecute by a legal expert, it is completely miscarriage of justice as held by the courts in various cases.

Gujarat High Court in *Dineshbhai Dhemendrai v. State of Gujarat*, said that “the right of accused to enjoy the services of an Advocate or a Counsel in a criminal case is unfettered and unqualified. It is not restricted to a particular kind or classes of offences. Most of the countries in the world have made it a constitutional right to have the assistance of a lawyer or a Counsel in criminal proceedings.”

Honourable Supreme Court in *Tyron Nazareth v. State of Goa*, found that the accused, under the NDPS Act, was tried and held guilty without being defended by any lawyer. He was not given legal aid by the court as well. The order of conviction and sentence passed by the trial court and confirmed by the High Court was set aside and ordered to proceed with trial afresh.

Delhi High Court in *Khurshid v. State*, found that the accused (appellant) could not engage the services of a lawyer and no legal aid was provided to him at the trial level as well as appeal level. The Court set aside the conviction of appellant and was ordered to release him.

Recently, Karnataka High Court in *Sri Nagaraj v. State*, found that the appellant (convict), being in judicial custody, had no means to defend himself and finally was convicted. The Court set aside his conviction because of non-compliance of constitutional mandate of providing legal aid and the matter was remanded to trial court for fresh consideration. The same High Court ordered to provide legal aid under section 304 CrPC to the accused in *Somashekara v. State of Karnataka*.

### **Courts are under Obligation to Inform about Legal Aid**

Every judicial officer in whose court a person is brought, he has to inform the accused regarding free legal aid to be provided by the State. There is no provision that when the accused or prisoner will demand for legal service/aid only in that condition the court has to inform him. Actually, majority of the people who are brought before the court they are not legally aware or due to their legal illiteracy they may not claim for such service. If the accused/prisoners are not being informed/provided legal aid, the trial is vitiated as they are undefended. Gujarat High Court in *Labhu Laxmanbhai Vaghasiya v. State of Gujarat*, concluded that “the legal aid is not, merely, a right of the needy and the deserving but is, correspondingly, duty of the authority to make it available to the deserving and the needy and more so in a case of a person who is facing the charge in a criminal trial. Judges play a more important role in dispensation of justice and they can never afford to be oblivious to the constitutionalisation of legal services concept, particularly, when a poor, unsophisticated, rural labourer is facing capital charge in a criminal trial.”

Kerala High Court in *Sajeev v. Superintendent of Police*, said that the court being a functionary of the State through which the constitutional directives are implemented with to the benefit and welfare of the citizen, should be bound to inform the person devoid of legal assistance on account of his poor financial background and provide him with the required legal services by appointing a counsel having the capacity to defend him satisfactorily.

Gujarat High Court in *Ashok Kumar Prabhudasbhai Modi v. State of Gujarat*, said that “even if the accused refuses to take assistance of a lawyer or any legal aid, it is the duty of the Court to appoint an advocate as an amicus curiae to assist the court in arriving at the correct conclusion and to find out guilt or innocence of the accused.”

Allahabad High Court, dealing with the prisoner's rights, in *Anil Gaur v. State of U.P.*, observed that:

“The courts too have a duty to ensure that prisoners appearing in criminal proceedings have access to legal aid. Courts cannot remain mute spectators when legal aid is denied to prisoners in legal proceedings before them. The trial courts stand at a vantage point in these matters and are best circumstanced to understand the need of legal aid of the prisoners appearing before them.”

Karnataka High Court in *Govindaraju v. State of Karnataka*, held that “a fair trial is the main object of the criminal procedure and it is the duty of the Court to ensure that such fairness is not hampered or threatened. Further, the right of a person charged with crime to have the services of a lawyer is fundamental and essential to fair trial... it is the duty cast on the Court to ensure that opportunity should be given to the accused to engage the services of counsel or it is the duty of the Court to ensure to provide free legal assistance to the accused by appointing advocate from the Legal Services Authority, in order to provide fair trial.”

### **Providing Legal Aid to the Prisoners in India: Current Scenario**

The prisoners in India are being provided legal aid by the respective District Legal Services Authority. Table-1 presents the data on legal aid provided to the prisoners during the year 2021.

**Table-1: Number of Prisoners to whom Legal Aid Provided in 2021**

<b>States/UTs</b>	<b>Male</b>	<b>Female</b>	<b>Transg.</b>	<b>Total</b>
Andhra Pradesh	731	53	0	784
Arunachal Pradesh	130	15	0	145
Assam	3102	651	0	3753
Bihar	3594	213	0	3807
Chhattisgarh	4695	438	0	5133
Goa	45	7	0	52
Gujarat	11006	333	4	11343

Haryana	1753	160	6	1919
Himachal Pradesh	382	18	0	400
Jharkhand	3688	372	0	4060
Karnataka	3545	193	0	3738
Kerala	4516	313	0	4829
Madhya Pradesh	3883	102	1	3986
Maharashtra	6121	706	18	6845
Manipur	0	0	0	0
Meghalaya	450	5	0	455
Mizoram	752	127	0	879
Nagaland	104	2	0	106
Odisha	1052	87	0	1139
Punjab	4563	440	0	5003
Rajasthan	1752	43	0	1795
Sikkim	157	1	0	158
Tamil Nadu	7768	1071	0	8839
Telangana	1117	82	0	1199
Tripura	109	14	0	123
Uttar Pradesh	6250	244	1	6495
Uttarakhand	1729	103	0	1832
West Bengal	3824	216	0	4040
A & N Islands	20	0	0	20
Chandigarh	300	7	0	307
D&N Haveli & Daman & Diu	0	0	0	0
Delhi UT	71167	8065	42	79274
Jammu & Kashmir	165	9	0	174
Laddakh	0	0	0	0
Lakshadweep	0	0	0	0
Puducherry	20	2	0	22
<b>Total</b>	<b>148490</b>	<b>14092</b>	<b>72</b>	<b>162654</b>
<b>Source:</b> <i>Prison Statistics India</i> (2021), National Crime Records Bureau, Government of India.				

It is evident from the above Table that, in 2021, Delhi has provided free legal aid to the highest number of prisoners (79274) in total and in every category-male prisoners (71167), female prisoners (8065) and transgender prisoners (42)-also. The causes of best performance of Delhi are active staff and administration of the respective District Legal Services Authorities, high awareness level of the prisoners about their right and the system of reporting of activities regarding awareness in prisons. The other States/Union Territories like Manipur, D&N Haveli & Daman & Diu, Laddakh, and Lakshadweep have completely failed in this respect. Such States/UTs need more attention on its activities in its prisons h. It is evident from Table-1 that only few States have actively provided free legal aid to the transgender prisoners. Likewise, the other States/UTs must extend their activities. It is significant to note that the prisoners in itself is a class, hence they should not be divided or evaluated in terms of their caste, region or religion. Every prisoner is in equal condition within the four-walls of the prison and needs equally to be treated.

In Table-2 the data relating to legal aid provided to the prisoners in last five years have been presented in which it is very clear that Delhi's role and dedication is unique and praiseworthy in providing legal aid to the prisoners.

**Table-2: Number of Prisoners to whom Legal Aid Provided during Last Five Years**

States/UTs	2017	2018	2019	2020	2021
Andhra Pradesh	1476	1562	1357	916	784
Arunachal Pradesh	76	80	166	21	145
Assam	0	1298	3153	3222	3753
Bihar	1994	2853	3537	2338	3807
Chhattisgarh	5322	11463	13627	6350	5133
Goa	70	80	84	41	52
Gujarat	2891	4213	3695	5729	11343
Haryana	3019	8144	6273	1154	1919
Himachal Pradesh	455	389	280	570	400
Jharkhand	1587	4097	5412	4745	4060
Karnataka	337	4267	5789	3310	3738
Kerala	6795	17335	15216	6087	4829
Madhya Pradesh	3872	5023	6188	4890	3986

Maharashtra	6693	10549	10906	3911	6845
Manipur	564	1450	710	0	0
Meghalaya	680	564	546	481	455
Mizoram	1201	1879	1322	695	879
Nagaland	56	45	26	74	106
Odisha	452	1175	542	626	1139
Punjab	4722	3962	6948	2735	5003
Rajasthan	1618	1364	1851	1191	1795
Sikkim	681	387	295	282	158
Tamil Nadu	4535	5242	4227	5337	8839
Telangana	455	784	447	706	1199
Tripura	156	136	110	80	123
Uttar Pradesh	4575	7715	4909	8311	6495
Uttarakhand	1334	1372	1357	3389	1832
West Bengal	3063	3063	3063	5529	4040
A & N Islands	110	79	130	91	20
Chandigarh	532	480	501	145	307
D&N Haveli & Daman & Diu	0	0	0	0	0
Delhi	42750	62361	48783	72728	79274
Jammu & Kashmir*	51	36	72	118	174
Laddakh**	-	-	-	2	0
Lakshadweep	0	0	0	0	0
Puducherry	60	49	56	18	22
<b>Total</b>	<b>102182</b>	167469	<b>147605</b>	145822	<b>162654</b>

**Source:** *Prison Statistics India (2017-2021)*, National Crime Records Bureau, Government of India.

\*State of Jammu & Kashmir was converted into Union Territory under the provisions of the Jammu and Kashmir Reorganisation Act, 2019.

\*\*Laddakh, earlier the part of the State of Jammu & Kashmir, established as a Union Territory as per the Jammu and Kashmir Reorganisation Act, 2019.

It is evident from Table-2 that Delhi has performed as the best in providing legal aid to the prisoners in all the years of study *i.e.* 2017-2021. In the year 2021, it has provided legal aid to 79274 prisoners, followed by the States of Gujarat

(11343) and Tamil Nadu (8839). The State of Uttar Pradesh, the most populous State having the highest numbers of prisoners in its prisons, stands at 5<sup>th</sup> rank in the year 2021 in terms of providing legal aid to prisoners. In terms of total number of prisoners provided legal aid, there is increase during the period under study except the year 2020 wherein the number of prisoners provided has surprisingly reduced more than 2018 also. The other states/Union Territories need to learn from Delhi to adopt the attitude of prisoner welfare, reform and rehabilitation.

## **Conclusion**

The reliability, trust and faith in the criminal justice system is based on the fair and impartial criminal trial in which the representation of prosecutor as well as accused/ convict is of prime concern through which the respective court can reach at the correct conclusion of the matter. Where a person, due to any disability, is not in condition to engage a lawyer, the State, in discharge of its obligations as a welfare State, has to provide him a competent and experienced lawyer who can effectively present his matter before the court enabling it to dispense fair and impartial justice. In the whole process and procedure of criminal justice system, the prime duty of the courts is to maintain public confidence in the administration of justice. The Honourable Supreme Court in *Zahira Habibullah Shekh v. State of Gujarat*, has correctly portrayed the role of criminal court as under-

“If a criminal Court is to be an effective instrument in dispensing justice, the Presiding Judge must cease to be a spectator and a mere recording machine by becoming a participant in the trial evincing intelligence, active interest and elicit all relevant materials necessary for reaching the correct conclusion, to find out the truth, and administer justice with fairness and impartiality both to the parties and to the community it serves.”

The trial courts are under solemn responsibility to verify whether the accused, particularly who is in judicial custody (in prisons) as they may not have resources to engage a lawyer, is able to be defended by a competent lawyer or not. If it is found that the accused is not able to engage a lawyer, he should be provided effective legal services (aid) by the court at the expenses of the State. To prevent

the miscarriage of law and effectively adopt the principles of fair trial and rule of law in criminal justice system, the functioning of operational legal aid system should be ensured. Further, the States/ UTs, not effectively implementing the system of legal aid to the prisoners as shown in Table-2, must revise and review its system to identify the deficiencies and provide effective legal aid to the prisoners so that they may be provided justice as provisioned in the Constitution.

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# THE INFLUENCE OF U. S. STOCK MARKET OVER THE INDIAN STOCK MARKET - A COMPARATIVE ANALYSIS OF DOW JONES INDUSTRIAL AVERAGE AND NIFTY 50

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## **Abstract**

*Dow Jones Industrial Average is very likely to have an influence on the Indian stock market which is represented by Nifty 50. This study is an effort to analyze how the Dow Jones Index of the U. S. dictates the Index values of Nifty 50 over a specified period of time. Secondary data has been used and tabulated and analyzed using Microsoft Excel and SPSS wherein standard deviations and correlations were calculated and regression analysis was carried out for the index values. From the study, it became quite evident that Dow Jones Index indeed has a saying influence on the Index values of Nifty 50.*

**Keywords:** *Dow Jones Industrial Average, Nifty 50, Risk, Return, Index values.*

## **Introduction**

The Indian stock exchanges hold a place of prominence at the global stage. The Bombay Stock Exchange (BSE) is one of the oldest exchanges in the world, while the National Stock Exchange (NSE) is among the best in terms of superiority and advancement of technology. The Indian stock market really picked up after the opening up of the economy in the early nineties. The whole of nineties was used to experiment and tune for successful and effective system. The 'badla' system was stopped to control volatility while the derivatives segment started as late as 2000. The corporate governance regulations were slowly put in place which initiated the process of bringing the listed companies at a uniform level. On the global scale, the economic environment started taking a drastic shift with the 'dot com bubble burst', 9/11, and surging oil prices. The slowdown in the US economy and interest rate tightening made the situation more complex. However, after 2000 riding on a healthy growth and a maturing economy and comfortable

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regulations, foreign investors- institutional and others got more room to operate (Mukherjee, n.d.).

**National Stock Exchange of India Limited (NSE)** is the important stock exchange of India located in Mumbai, Maharashtra. NSE is ranked 4th in the world in cash equities by number of trades as per the statistics maintained by the World Federation of Exchanges (WFE) for the calendar year 2021. It is under the ownership of leading financial institutions, banks, and insurance corporations. NSE was established in 1992 as the first dematerialized exchange in the country. NSE was the foremost exchange in the country to provide a modern, fully automated screen-based electronic trading system that offered easy trading amenities to investors spread across the length and breadth of the country. Vikram Limaye is the Managing Director and Chief Executive Officer of NSE.

National Stock Exchange has market capitalization of more than US\$3.4 trillion, making it the world's 10th-largest stock exchange as of August 2021. NSE's flagship index, the NIFTY 50, a 50-stock index is used extensively by investors in India and around the world as a barometer of the Indian capital market. The NIFTY 50, index was launched in 1996 by NSE. (*National Stock Exchange of India - Wikipedia*, n.d.)

US is the world's major economy, accounting for nearly a quarter of global GDP at market exchange rates, 20% of global FDI, and in excess of one third of stock market capitalization. It is the most significant export destination for 20% of countries around the world. Stock market Index is an important indicator of the economic performance of any country and for US it is the Dow Jones Industrial Average. Dow Jones is a price-weighted measure stock market index of 30 major companies listed on stock exchange of United States. Dow Jones is one of the oldest and the most regularly followed equity indices which includes 30 large companies and is a price-weighted index, first calculated on May 26, 1896, the index is the second-oldest among U.S. market indices (V K Deepak, n.d.)

Dow Jones Industrial average outperformed the Indian stock market as per the previous studies, but market fluctuations influenced by many common factors in international level. Hence, the trend will be same in global level. This study evaluates whether Dow Jones Industrial average has an influence on Nifty 50.

## **Objectives of the Study**

This study is mainly undertaken to analyze how the Dow Jones Index of the U. S. dictates the Index values of Nifty 50 over a specified period of time.

## **Literature Review**

(Gajera, 2020)A stock market participant at some extent can expect the movement of stock indices opening later than other early opening stock indices constructed on the performance of those early opening stock indices. Positive correlation is observed between all stock indices which means all are moving in the same direction. Strength of movement depends upon the level of correlation. A good performance by the main stock indices of a country represents the good economic health and progress of that country.

(Raman, n.d.)For the regulators and policy maker the evidence about the performance, co-movement and linkages are important. It acts as a road map for the investors in scheming the diversified portfolio for the optimum return. Further, the growth of an economy is depending on the development of capital market. The investor needs to analyze the linkages exist between the indices of stock market and the information about the performance of financial market supports the investors for the further portfolio construction.

(Kaur, 2017)Indian Stock Market at Global Stage holds a predominant place in world's economy. Bombay Stock Exchange and National Stock Exchange are two stock exchanges with advance technologies. Globally India's stock exchange holds a great significance when it comes to comparison of all stock exchanges. Indian Stock exchanges have put in all effort to remove any ambiguity or problems that might occur while trading. International trading in the form of ADR's and GDRs are there which lead to smooth investment of Indian investors overseas. Understanding of similarities and dissimilarities is must for investors, issuers, regulators with expanding international business. Regulatory environment is overlapping among various global stock exchanges. With increasing trend of ADR and GDR it is necessary for all the stakeholder to know the regulations among all global stock exchanges and also how far the global indices are interrelated.

(Gupta & Kumar Shrivastav, n.d.)The economies of the world are now connected to each other and this is the result of openness and connectivity that when an

event happens in one particular economy, it leads to have an effect on other economies of the world too. The effect of one economy's event on another is dependent upon the fact that how strong these economies are connected with each other. Today the trade and investments restrictions are being narrowed down in order to permit the investors to make an investment not only in their own country but their chosen country too. This give rise to the international diversification of investments but before making an investment in a country we need to see that how the other country is connected to US.

*(Indian Stock Market vs US Stock Market: Difference Between Indian Stock Market & US Stock Market | Investology | Edelweiss, n.d.)* The US market offers the opportunity of investing in big global companies like Flipkart, Amazon, Instagram, etc. If the portfolio consists of such global companies, it will evolve with competitive trends. With these global companies, investors get an opportunity to grow the corpus more effectively. Whereas Indian stock market investment involves comparatively small companies. In India, a company can go public only after 3 years of consecutive profits whereas in the US investment can be finished in major corporations leading their sectors with innovative offerings. Dow has beaten the Sensex over 5- and 10-year time periods. Indian stock market trades at higher multiples and bids lower dividend yields as compared to the US market. But both the markets offer decent returns to their investors reason being few stocks which offer much of the gains.

*(Indian Markets vs US Markets | The Pros and Cons | Vested Finance, n.d.)*The US indices have outperformed Indian markets by 8-15% in the last decade but if investors give into such statements on face-value and expect the same level of performance in the future, they are likely to be met with dissatisfaction. Past performance is no assurance of future returns, after all. Which is why we have come up with some factors against which both the US markets and Indian markets can be compared, to make the right decision. Due to the ongoing covid pandemic, equities globally fell together, with decline in the range of over 20-30%. Diversification of investments would have proven to be effective and beneficial during this time. By 8<sup>th</sup> June 2020, the S&P500 had already recovered all of its coronavirus-induced losses. The Sensex meanwhile, was still 17% down.

(Ghosh & Hossain, 2009) share market indices of any country have sharp quantitative dependence on the following regular factors: i) results of different national indices, ii) rate of dollar in international market, iii) price of crude petroleum in international market, iv) inflation rate, v) monsoon and agricultural production, vi) growth rate, vii) results of leading companies, viii) volume of foreign investments in stock markets and ix) volume of local investments in long-term shares. Apart from these regular quantitative matters and certain other issues are there that generate qualitatively huge influence in share markets. Share market is very much sensitive to political upheavals. Any political turmoil in the elected Government creates a damping effect in the market. On the other hand, any post-turmoil stability in the Government boosts it up surely. Also, market gets deeply influenced by the financial policies taken by the Central Bank and Ministry of Finance as well as it has a soft dependence on the statements made by any leading individuals or by any political leader who has a bright chance to come into the limelight of the governance arena in near future. Additionally, any natural or social disaster in a broad perspective.

(Patel & Prajapat, 2018) With the beginning of globalization, world financial markets and economies are progressively combined due to free flow capital and international trade. Globalization has also enlarged co-movement in stock prices across international markets. This co-movement stimulates susceptibility to market shocks. Therefore, shocks originating in one market not only affect its own market but are also conveyed to other equity markets. Thus, any information about the economic fundamentals of one country gets spread to other markets and thus affects other's stock markets. This issue is a vital concern for portfolio investors because greater incorporation among world markets implies stronger co-movements between markets, thereby nullifying much of the gain out of diversification across borders.

(Subha & Nambi, n.d.) Diversification is worthwhile since stock indices of different countries are affected by numerous factors and hence need not always move in the same direction, or be perfectly correlated. In the recent capital markets in Asia have become the main destination for many investors to invest their money. International capital market relationships, not only have implications for portfolio divergence, but also have important implications on how economic policy changes can be initiated at the national level for various countries which will have a bearing on foreign trade and there by the foreign exchanges balances of a country. In a

country like India, where the stock market is experiencing significant transformation with the liberalization measures, there are also worries regarding its exposure to risk in case of a global and regional crisis, i.e., a need to know how far a depression or crisis in other market can affect the Indian stock market in a more globally unified environment. Hence, the analysis of the nature of co-movements or long-term dependencies with other developed and regional emerging markets would not only give an idea of the of thinkable gains out of portfolio diversification to be reaped from the Indian market but also may give some indication of the vulnerability of the country's stock market in case of a regional crisis.

## Methodology

This study is mainly undertaken to understand the influence of Dow Jones on Nifty 50. We have considered daily closing values of Dow Jones as well as Nifty 50 for 16 years starting from 2006 to May 2022(Kaur, 2017). The expected return has been designed by simply taking average of Index values for the said period. Yearly returns for both Dow Jones and Nifty 50 was calculated in the following:

- Yearly Returns of Dow Jones: (1)  

$$YR = \text{Current Year Returns} - \text{previous Year Returns}$$
 Percentage return has been calculated on the Yearly returns of Dow Jones (2)
- Yearly Returns of Nifty 50: (3)  

$$YR = \text{Current Year Returns} - \text{previous Year Returns}$$
 Percentage return has been calculated on the daily returns of Nifty 50 (4)
- Standard deviation has been determined for both Dow Jones Industrial Average and Nifty 50 in order to measure the risk of each of the index. The standard deviation is measured to understand how far the deviations of each index from the average, of which a higher reading is indicative of higher risk involved in each index and vice-versa. Here the formula to measure standard deviation ( $\sigma$ ):  

$$\sigma = \sqrt{\frac{1}{n-1} \sum (r - \bar{r})^2}$$
 Where:  $\sigma$  = standard deviation of Index.  
 n = number of observations.  
 r(s) = return of Index.
- Regression analysis has been done to know the extend of relationship between Dow Jones and the Nifty 50.
- Percentage returns are plotted on the scattered diagram for the analysis.

## Hypothesis

H0: There is no significant correlation between the Index values of Dow Jones industrial average and the Nifty 50.

H1: There is significant correlation between the Index values of Dow Jones industrial average and the Nifty 50.

## Data Analysis and Interpretation

Table 1 Indicates the Average Annual Returns and the percentage Annual Returns of both Dow Jones index and that of the Nifty 50 Index and the overall standard deviation of both.

**Table 1: Average Annual Returns and the percentage Annual Returns of Dow Jones and Nifty 50 Index values.**

	Dow Jones Industrial Average		Nifty Fifty	
	Annual return (1)	%Return (2)	Yearly Return (3)	% Return (4)
2022	-4,458.06	-14.0	505.50	3.115
2021	5,731.82	15.8	5,419.40	34.471
2020	2,068.04	6.8	-1,486.75	-14.432
2019	5,210.98	18.3	1,074.55	9.115
2018	-1,391.76	-6.0	1,193.40	11.138
2017	4,956.62	20.1	1,233.15	12.952
2016	2,337.57	11.8	-80.75	-0.974
2015	-398.04	-2.3	757.15	9.048
2014	1,246.41	7.0	1,769.15	23.244
2013	3,472.52	20.9	563.30	9.642
2012	886.58	6.8	-368.50	-6.981
2011	640.05	5.2	334.90	5.930
2010	1,149.46	9.9	2,437.70	45.886
2009	1,651.66	15.8	-1,165.75	-40.551
2008	-4,488.43	-51.1	-277.75	-6.874
2007	801.67	6.0	1,190.10	27.559
2006				
	SD		SD	
	2876.288		1546.801	

Source: As computed by the Authors

Observations;

- In the year 2008 we can observe effect of sub- prime rises which has more effect on US market, comparatively less effect on Indian market in 2008 but the effect of the event is observed in 2009.
- In 2018 we can observe negative correlation since global financial markets were struggling in the period but India had Highest GDP,
- In 2020 we can observe the effect of Covid- 19 pandemic, and in 2022 effects of Russia Ukraine war which has the less effect on Indian market.

Table 2 shows the correlation of the Dow Jones Index and the Nifty 50 Index. The Karl Pearson’s Correlation has been used to understand the relationship between the Dow Jones and the Nifty 50.

**Table 2: Independent Samples Test: Correlation between the Dow Jones Index and the Nifty 50 Index.**

		Levene’s Test for Equality of variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
values	Equal variances assumed	.364	.551	-.477	30	.637	-3.20550	6.72474	-16.93925	10.52825
	Equal variances not assumed			-.477	29.398	.637	-3.20550	6.72474	-16.95105	10.54005

**Group Statistics**

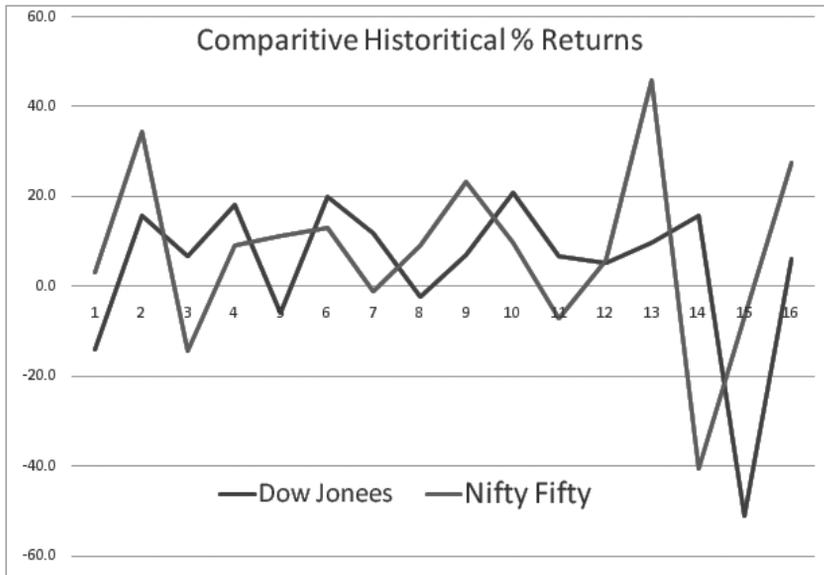
Group		N	Mean	Std. Deviation	Std. Error Mean
Values	Dow Jones	16	4.4375	17.60719	4.40180
	Nifty 50	16	7.6430	20.33569	5.08392

Source: As computed by the Authors

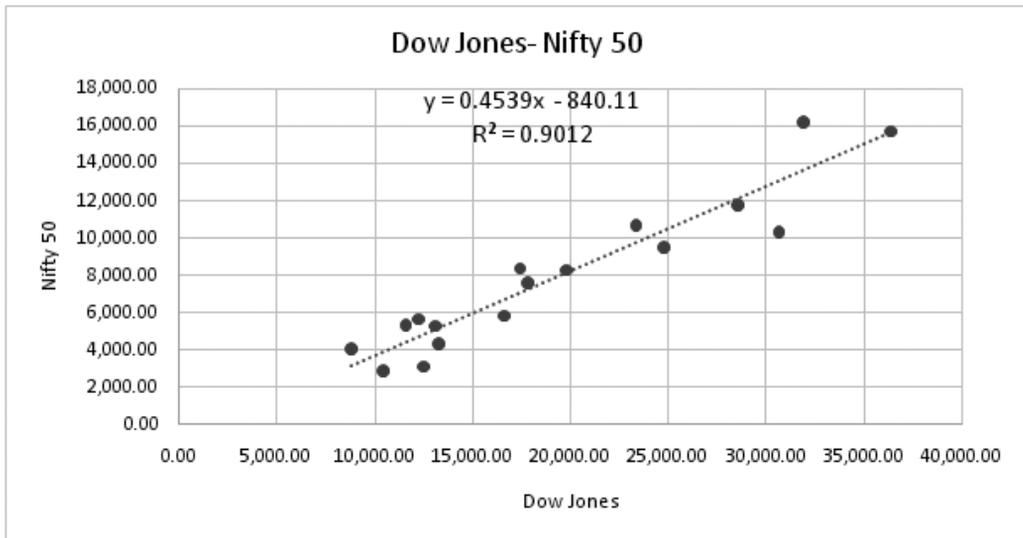
Correlation is significant at the 0.1 level (2-tailed).

The P value obtained is 0.637as a result of which the null Hypothesis is rejected at 0.10 level of significance implying that there is significant correlation between the Index values of Dow Jones industrial average and the Nifty 50.

**Chart 1: The chart Shows Historical % Returns by comparing percentage yearly returns of both Dow Jones the Nifty 50.**



**Chart 2: The table shows the regression between Dow Jones and the Nifty where in Dow Jones is the independent variable and Nifty 50 is the dependent variable.**



Source: As computed by the Authors

After the regression analysis the equation obtained is  $y = 0.4539x - 840.11$

$R^2 = 0.9012$  where Y stands for Nifty 50 Index values and X for Dow Jones index values and 1% increase or decrease in the value of Dow Jones causes 0.4539 corresponding increase or decrease in the Nifty 50 Index Values.

## **Findings**

From the above analysis we have found that:

- There is significant correlation between the Index values of Dow Jones industrial average and the Nifty 50 and therefore null hypothesis is rejected as per Independent Samples Test (Table-2).
- The movements in both the indices are correlated and in most of the cases DJIA has dictated the movements of Nifty 50 (Table-1) except in extreme cases like sub-prime crisis 2008-09, Crisis of 2018 where Indian market was not affected to a great extent and during the pandemic period of covid 19.
- In short run Nifty 50 responds more for changes in DJIA (Chart 1) where as in the long run the response to the fluctuation is less (Chart – 2) as regression equation proves that 1% increase or decrease in the value of Dow Jones causes 0.4539 corresponding increase or decrease in the Nifty 50 Index Values.

## **Conclusion**

Being the economic indicator of the biggest economy in the world the Dow Jones Industrial average is very likely to have an obvious influence on the Indian stock market which is represented by the Nifty 50. This study has analyzed how Dow Jones dictates the prices of Nifty 50 over a specified period of time. The study has found that Dow Jones Index indeed has a saying influence to Nifty 50 Index. In addition to that it has been observed that Dow Jones industrial average Index and Nifty 50 Index are positively correlated, where Dow Jones industrial average Index has more returns as compared to that of the Nifty 50. The study is useful for the investors, traders to predict the future price movements and trends in response to market information specially US market.

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# BASAWAN SINGH: AN UNSUNG FREEDOM FIGHTER OF BIHAR

Sunny Kumar

## **Abstract**

*The story of the Indian freedom struggle revolves around some of the eminent Indian leaders like Gandhi, Nehru, Rajendra Prasad, Jai, Prakash Narayan, Abul Kalam Azad and some more in the row but there are hundreds of leaders whose contribution to Indian freedom struggle and politics was not any how less important as the contribution of leaders like Gandhi and Nehru. Basawan Singh, who was popularly known as 'Lambdar' among his colleagues, was one of such important but forgotten freedom fighters who not only played a pivotal role in the Indian freedom struggle but also worked in parallel for the upliftment of weakers, labourers, peasants and impacted the mainstream politics of both colonial and post-colonial India. He was a renowned scholar and a celebrated socialist and trade union leader who was also involved in the revolutionary activities. He was more widely known for the role played by him in the historic 'Quit India' movement as the close associate of Jai Prakash Narayan and also during the emergency in independent India. After independence, he dedicated his life for the welfare of the downtrodden and the weaker sections of our society. He led many trade unions and was also instrumental for the formation of many. It was his contributions to the Indian freedom struggle and politics which have made this ordinary personality, extra-ordinary and impacted Indian history profoundly.*

*This paper is an effort to bring the forgotten heroes of the Indian freedom struggle to the audience of our country and make them aware about the struggles and achievements of such heroes whose contribution was ignored by the writers of History. It will also address and trace the constructive works of Basawan Singh, in Indian politics after Independence that shall be the true tribute and homage, paid to this unsung hero of Bihar. Apart from this, the paper will also focus on the social and political contributions of Basawan Singh to re-construct the Indian society by his unending movements up to death. He devoted himself to purify the political, socio-economic and moral aspects of the people.*

**Keywords:** Freedom, Indian, Upliftment, Revolutionary, Contribution, Movements.

## **Introduction**

Basawan Singh was one of the many notable freedom fighters and socialist leaders of Bihar. He was born in a poor Bhumihar-Brahmin family at Jamalpur (Shubhai), Hajipur on March 23, 1909. He was the only son of his parents.

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Basawan Singh was deprived of his father's love at a tender age of eight. At the small age of ten, like his all other village men, he ran to Hajipur to see Mahatma Gandhi, whose deeds had aroused a kind of curiosity in the childish heart of Basawan Singh. It was for the first time when he felt a kind of patriotism and fervor of nationalism. From here, a seed of patriotism was implanted in the tender heart of Basawan. Though, he came from a poor but awakened family, he was very good at studies since his childhood. He had to walk eight miles to reach the nearest school to get education. Being a brilliant student, he secured scholarships in both primary as well as in middle schools. Hereafter, he joined Dighi High School for his further studies. He used to teach students of higher classes to meet the expenses of his studies and aid his help to his mother in domestic income. Basawan Singh passed his matriculation exams with flying colors in first division in 1926 at the age of seventeen which was a spectacular achievement for any student at those days because there was a very low literacy rate in the state at that time. After completing his matriculation, he was admitted to G.B.B. College for his further studies but his formal education came to an abrupt end when he was rusticated from the college just after completing his matriculation because of joining revolutionary activities.

### **Entry into the Freedom Movement**

Basawan Singh was a tall and strong personality with fair complexion who was popularly known as 'Lambdar' among his colleagues. He was in a close contact with the revolutionaries since his school days, more particularly with Yogendra Shukla, who was the head of 'Hindustan Socialist Republican Army' at that time. His first participation in any movement in India was in 'Non-Cooperation Movement' after Gandhi's visit to Hajipur in 1920-21, when he was only 11 years old. After his rustication from G.B.B. College, he was subsequently involved with 'Bihar Vidyapeeth' at Sadakat Ashram in Patna where he got intensive military training with a small group of youth. Hereafter, he was active in almost all freedom movements in Bihar and other parts of India and was treated brutally like other freedom fighters of that time. His close contacts with revolutionaries and his nationalist zeal, earned him the enmity of the colonial government who charged and trialed Basawan Singh in a number of cases like 'Lahore conspiracy case', 'Bhusawal', 'Kakori', 'Tirhut' and 'Deluaha' cases. He carried on the revolutionary movement along with Chandrashekhar Azad and Keshav Chakravarty.

He was arrested in 1930 and was put behind the bars for seven years in 'Bankipore Central Jail' but he managed to escape from there after three days of his imprisonment, but luck favored the British and he was again re-arrested and this time he was sent to Bhagalpur Central Jail. While at Bhagalpur, Basawan, undertook a fast unto death as a protest against the inhuman conditions of prisoners in the jail. On the 12<sup>th</sup> day of his fast, he was moved to Gaya Central Jail and kept in a solitary confinement, because, at Bhagalpur Central Jail, prisoners had united under the leadership of Basawan Singh, and the British government was in no mood to take it lightly because, Bihar had already become the hotspot of 'Civil Disobedience Movement' at that time. Due to a long hunger strike in the jail Basawan's health deteriorated, so, he was shifted to the jail's hospital. There, all efforts of feeding him forcibly went into vain. Seeing his critical condition, Sir Ganesh Dutta, the then minister of Bihar asked Basawan's mother, Daulat Kher, to attend to urge him to give up his fast. When she attended on the 50<sup>th</sup> day of his fast, she blessed him for the successful continuation of his fast as this hunger strike was for the common welfare of all the prisoners. Consequently, the fast continued with much more intensity. People of Bihar, had left their hope for seeing Basawan Singh alive, so, they waited daily at the jail gate to receive Basawan's body. Seeing Basawan's rigorous effort to improve the condition of the prisoners, all other political prisoners, in the jail went also on the fast for the last few days in solidarity with him. On the 58<sup>th</sup> day of his hunger-strike, Basawan broke his fast after being informed by Gandhiji that his demands had been met. He was released from the jail in June 1936 because of his poor health but imposition of City Act, on Basawan Singh restricted his movement. He violated the restrictions and was arrested again in April 1937, along with Jai Prakash Narayan, Ramvriksha Benipuri and others in Patna for "unconstitutional works" for six months. During the Second World War, he was the first man in Bihar to be arrested under 'Defense of India Ordinance' on 26<sup>th</sup> January 1940, in Hussainabad, Palamu and released after 18 months.

### **Second World War and His Role in Quit India Movement**

Subsequent to the making of India, a participant in the Second World War, the ministry in Bihar headed by Congress leader Krishna Singh, tendered resignation on 31<sup>st</sup> October, 1939. Basawan Singh was the first Bihari who observed the Independence Day, on 26<sup>th</sup> January 1940, by taking out an unlicensed procession

and delivering an anti-war speech at Japla, in the state of Jharkhand. Consequently, a warrant was issued by the deputy commissioner of Palamu, under the 'Defence of India Act' for an objectionable speech delivered at Japla. He was convicted at Daltonganj and was sentenced for 18 months of rigorous imprisonment under the Defense of India rules.

After the inception of 'Quit India' movement and call of 'do or die' by Gandhiji, Basawan Singh, like other nationalist leaders, actively participated in it and was instrumental in its expansion. He played an outstanding role in the historic 'Quit India' movement. It is indispensable to note that on 12<sup>th</sup> April 1942, he addressed the Palamu District Political Conference, attended by thousands of nationalists including a large number of tribal people. In the next week, he delivered a highly motivating speech with Risat Karim of Dehri in the conference of Socialist Group of Kisan Sabha, held on 18<sup>th</sup> and 19<sup>th</sup> April, 1942, at Patepur in Muzaffarpur district of Bihar which was presided over by Abdul Hayat Chand of Patna. During the august rebellion, Basawn Singh was blacklisted in group 'A' as labour, socialist and terrorist leader with some other notable leaders of that time.

During this movement, he was in close contact with Jai Prakash Narayan. On the instructions of Jai Prakash Narayan, he became underground in 1941 and went to Afghanistan to collect firearms and ammunitions which was to be used by the leaders of Azad Dasta during 'Quit India' movement against the brutal response of colonial government. After the arrest of Jai Prakash Narayan he undertook the leadership of Azad Dasta. He again went underground and organised his guerilla band of freedom fighters in the dense forests of Palamu. The fiery activities of this socialist leader encouraged the escape of six socialist leaders along with Jai Prakash Narayan, from Hazaribagh Central Jail, on the Deepawali night on 9<sup>th</sup> November 1942. Meanwhile, he was arrested on 7<sup>th</sup> January, 1943 in Delhi and kept behind the bars at the Red Fort. He was released from the jail in April, 1947, subsequent to the formation of the Congress ministry in Bihar headed by Dr. Krishna Singh, on 2<sup>nd</sup> April, 1946.

### **Trade Union Movement and Basawan Singh**

In spite of his dominant role in the Indian freedom struggle, Basawan Singh, was also actively involved in the trade union activities. He joined Congress Socialist

Party in December, 1936 and was appointed as its labour secretary. Before independence, Basawan Singh, worked for the trade union movement, with unabated zeal for the cause of democratic socialism, because trade unionism was one of the major factors for social change and social justice. He established many trade unions in the coal fields, sugar mills, mica mines and railways of Bihar. He formed 'Japla Labor Union in 1937, organized the workers of Jamalpur workshop along with Shivnath Bannerjee, formed the Gaya Cotton and Jute Mill Labor Union, formed the Tata Collieries Labour Association along with Subhash Chandra Bose. He went on to become its president when Bose left India in 1941. He organized coal workers of Talcher with close co-ordination and support of Dukhabandu Mishra, Rajgangpur (Odisha), and Satna (M.P.); established Mica Workers Union, Gomia Labour Union. Later, these Unions affiliated to 'Hind Mazdoor Sabha.' He was active in AIRF since 1936, president of OT Railway Union from Agra to NEFA and the Railway Mazdoor union. Subsequent to Second World War, the trade Union movement gained urgency and strength on account of the untiring efforts of Basawan Singh. He organized the workers on various fields such as sugar, coal, cement, mica, Aluminium, Iron and Steel Industries, Railways, Post-Offices and Banks etc. He was one of the founders of the 'Hind Mazdoor Sabha', and worked as its president at the state and the national levels. Similarly, he was actively involved with the All India Railway men's federation since 1936 onwards. He was the president of the 'Awadh Tirhut Railway Union' and the 'North East Railway Mazdoor Union' for several years. He worked as the vice-president of the all India Railway men's Federation since 1946. For trade union activities, he was sent to jail a number of times, like in October, 1938, he was arrested at Dalmianagar, under section 107 of Cr.P.C. with six other leaders for his regular meetings and organizing an intensive strike of about 2400 men. In the course of the trade union movement, this prominent socialist leader often resorted to the Gandhian method of fasting, to protest against the injustice meted out to the workers. On January 12, 1949, he was once again arrested at Dalmianagar, under the 'Bihar Maintenance of Public Order Act' and was released at the end of March. Afterwards, he undertook hunger strike for thirty days at Dalmianagar for the cause of workers. He broke his hunger-strike only with the intervention of leaders like Pandit Nehru, Rajendra Prasad and Jai Prakash Narayan.

## **His Profound Role in Independent India**

After playing a successful role in the Indian freedom struggle, he continued his socialist activities even after the independence of India. He was the member of the Congress Socialist Party from 1939 to 1977 and for many years remained its state president. He worked for the rights and upliftment of workers, downtrodden and other weaker sections of the society. Apart from the trade union activities and struggle for the weaker sections of the society, he was also engaged in the politics of Bihar and India. He won his first Lok Sabha elections in 1952 from Dehri-On-Son and remained an important opposition leader from 1952 to 1962. Further, he became one of the most powerful cabinet ministers in the 1967 coalition government. He was a close associate of Jai Prakash Narayan in the politics of the country and played an important role during the emergency in 1975. He stayed underground for twenty months and conducted the movement along with his wife Kamala Sinha, for which his wife was jailed under MISA Act as a potential threat to the central government. After emergency, he again won Lok Sabha elections from Dehri-On-Son in 1977 and became the cabinet minister in the Janta Party government. In the meantime, he visited many countries for the purpose of labour union activities and left his stark impression on the labour Union Proceedings in both India and abroad. He lived within very frugal means and was respected for his honesty and forthrightness. He was committed to the country. He kept guiding and working for the underprivileged, working class and agricultural labourers, till the last day of his life. He did not believe in the existence of God, much like the rest of his socialist comrades. He rejected the caste system, so, he did not wear the sacred thread because he did not believe in segregation from the rest. His mother too supported the ideas of her son. When he used to take his fellow revolutionaries to his house to have food, his mother never inquired about their caste even after being an orthodox Brahmin and used to serve them food.

This great freedom fighter and an ardent socialist and labour leader breathed last on 7<sup>th</sup> of April, 1989. The government of India recognized his achievements and honoured him by issuing a commemorative stamp in his name on 23<sup>rd</sup> March, 2000. There is also an indoor stadium named 'Basawan Singh indoor stadium' at the city of Hajipur in the state of Bihar. The nation will never forget his priceless contributions in the freedom struggle and in the politics of independent India.

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# A REVIEW OF THE INNOVATIONS IN BATTERY TECHNOLOGY FOR REDUCTION OF CARBON DIOXIDE EMISSIONS

Richard Gonsalves  
Ita D'Souza

## **Abstract**

*Burning of fossil fuels like coal, oil and gas has increased the concentration of atmospheric carbon dioxide (CO<sub>2</sub>). This has led to global warming to a large extent. Several countries have passed legislation to reduce passenger vehicle emissions over the long term. This review discusses the various innovations that have taken place in the batteries that are used in electric vehicles. The different types of LiBs and the recent advances in cathode, anode and electrolyte materials is discussed along with lithium air batteries and sodium-ion batteries. The review concludes with insights into potential future developments in electric vehicles.*

**Keywords:** lithium-ion batteries, electric vehicles, sodium-ion batteries, lithium-air batteries

## **Introduction**

Global warming takes place when carbon dioxide and other air pollutants are present in large quantities in the atmosphere. Over the last century, burning of fossil fuels like coal, oil and gas has increased the concentration of atmospheric carbon dioxide (CO<sub>2</sub>). Therefore, it is necessary that CO<sub>2</sub> emissions must be substantially reduced in order to prevent climate change. Transport has the highest reliance on fossil fuels and accounted for 37% of CO<sub>2</sub> emissions from end use sectors in 2021. This number is set to rise with the easing of the Covid-19 pandemic, rising incomes and increase in global population. It is important therefore that a reduction of CO<sub>2</sub> emissions is necessary to reduce global warming. With this as a target, several countries have passed laws to reduce passenger vehicle emissions over the long term. For e.g., the Indian standard of 113g CO<sub>2</sub>/km is based on an average industry kerb weight of 1,145kg from 2022-2023 onwards.

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The only type of vehicles which could meet this target of 113g CO<sub>2</sub>/km target are pure battery electric vehicles. For electricity produced entirely by renewable energy sources, the 113g CO<sub>2</sub>/km target could also be met if 50% of electric vehicles are powered by battery. While this idea looks promising, its contribution to CO<sub>2</sub> emission savings in the transportation sector would be meaningful only if their market penetration were considerable. In the absence of government regulations, the acceptance of electric vehicles is largely dependent on consumer acceptance, which again is strongly subject to cost.

### **Historical Evolution of Battery Vehicles**

Transport is a pivotal means to connect people and services. An efficient transport system helps in increasing productivity and enhances competitiveness of the economy. However, it accounts for around one-fifth of global carbon dioxide (CO<sub>2</sub>) emissions[1]. The International Energy Agency (IEA) expects to phase-out of emissions from motorcycles by 2040; rail by 2050; small trucks by 2060; and obtain net-zero emissions from cars and buses by 2070. Therefore, in order to overcome these problems, it is necessary to develop green, sustainable energy together with alternative-fuel vehicles, particularly battery-powered vehicles. Although electric vehicles (EVs) have recently gained widespread attention, they are not a new technology. In 1828, Hungarian Ányos Jedlik invented a small-scale model car powered by an electric motor that he designed. It was not until 1859, that the electric car became more practical with the invention of the rechargeable lead-acid battery by Gaston Plante (France) [2]. In 1898, Ferdinand Porsche created the world's first hybrid electric car. Thomas Alva Edison also worked to build a better electric vehicle battery. But it was Henry Ford's mass-produced Model T in 1908 that dealt a blow to the electric car.

The idea of Electric automobiles was revived once again during the 1970s, because of the 1973 Arab Oil Embargo and energy crisis,[3] which resulted in a rapid rise in the price of gasoline[4,5]. During the next several decades, the EV market was covered by lead-acid batteries (the first generation), [6,7] and nickel-metal hydride (Ni-MH) batteries (the second generation)[8,9]. The Toyota Prius released in Japan in 1997 was the world's first hybrid car and used nickel-metal hydride (Ni-MH) battery. In 2006, a small Silicon Valley startup, Tesla Motors,

started producing a luxury electric sports car that could go more than 200 miles on a single charge.

In 1991, the rechargeable lithium-ion batteries (LIBs) were successfully commercialised by Sony and Asahi Kasei. This led to the reduction of market shares of conventional Ni-MH batteries and nickel-cadmium (Ni-Cd) batteries[10-12]. LIBs are most suitable to fulfill the requirements of next-generation EVs owing to their higher energy and power densities, flexibility, relatively less pollution, lower cost and smaller and lighter cell designs[13,14]. Moreover, since the signing of the Paris Agreement in 2016 for reducing global GHG emissions [15-17], global carmakers are escalating research into LIB-powered EV development. Battery performance and lifetime (at least 10 years), cost and other crucial factors like safety, and reliability, and charging infrastructure will influence the extensive market penetration of electric automobiles [18].

In this article, we present a comprehensive review of the latest advances and challenges of LIB powered EVs. In addition, lithium-air batteries and sodium-ion batteries and innovative battery chemistries including solid-state batteries (SSBs) are also evaluated and discussed.

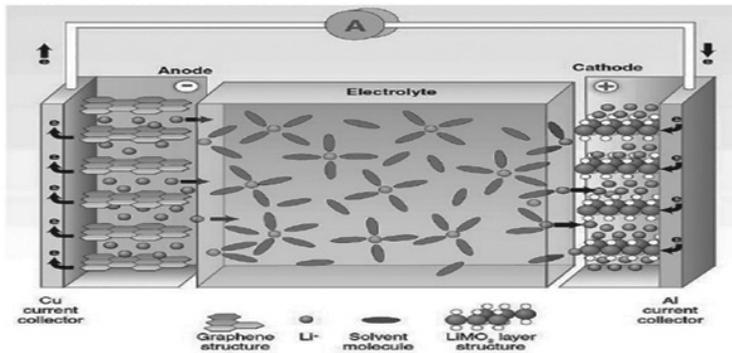
### **Types of LIBs**

Depending on the composition of positive electrodes (cathodes), LIBs are classified into lithium titanate, lithium manganese oxide batteries, Li-Co oxide batteries, lithium iron phosphate, Li-Ni-Mn-Co oxide batteries.

### **Working of LIBs**

Lithium-ion battery comprises of an anode, a cathode, a separator and an electrolyte. Lithium ions shuttle back and forth between the anode and cathode between charge and discharge from one side to another. When a lithium ion moves from cathode to anode during the discharge process, an electron passes through the external circuit from anode to cathode to maintain the charge balance. During the charging the process is opposite [19]. The most common lithium-ion batteries possess carbon as anode, lithium manganese dioxide as

Fig 1: Schematic diagram of Lithium-ion Battery [20]



cathode and ethylene carbonate and dimethyl carbonate to dissolve lithium hexafluorophosphate solution as electrolyte [21]. Binders and conductive materials are added to enhance the battery electrode's adhesion and increase the conductivity. Polytetrafluoroethylene and polyvinylidene difluoride are generally used as binders. The porous separator separates battery electrodes and is made of polypropylene or polyethylene. The separator is a film and its thickness varies from 10 to 20  $\mu\text{m}$ . It is immersed in an electrolyte. The ionic conductivity of the electrolyte and separator should be high and the casing of the cell is made of metal [22].

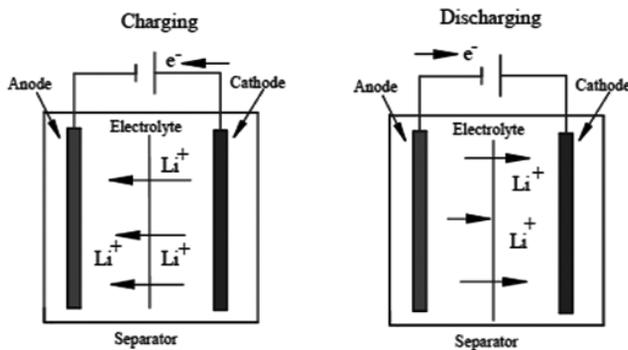


Fig 2: Charging and discharging in Lithium-ion Battery [23].

Lithium compounds  $\text{LiNi}_{(1-x-y)}\text{Co}_x\text{Mn}_y\text{O}_2$  containing Nickel, Cobalt and Manganese oxides (NCM) materials are considered to be ideal choices for their high capacity, great cyclability and lower cost. To increase the energy density and specific energies of lithium-ion batteries the anode volume and weight need to be

reduced. Graphite is the most common anode material(negative electrode) in the recent years. Proper choice of electrolytes is also important to stabilise and protect the electrodes.

Lithium-ion batteries can work at relatively a wide range of temperatures whose working range is  $-20$  to  $45^{\circ}\text{C}$ . Lithium-ion batteries have a best prospect for further development and large-scale applications in electric vehicles due to their superior performance, long cycle life and safety. Lithium-ion batteries dominate high charge and discharge efficiency and the energy conversion efficiency of lithium-ion batteries during cycling can reach more than 90%. The following modifications are made in lithium-ion batteries to improve the driving range after one charge.

### **Recent Advances of Lithium-ion Batteries**

**(a) Cathode materials:** Lithium nickel oxide, Lithium cobalt oxide, and lithium manganese oxide are commonly used as cathode materials. Lithium nickel oxide is a much cheaper cathode material compared to cobalt but it causes safety issues while lithium manganese oxide materials are low cost and safe but are difficult to recycle. Hence ternary oxides especially NCM materials are considered as promising for their low cost, high capacity and safety [24].

The properties of NCM materials could be adjusted by the customising of the composition of its elements. Higher Nickel would result in higher capacity while higher cobalt reduces the phase change and higher Manganese would enhance overall structural stability. NCM 811 ( $\text{LiNi}_{0.8}\text{Co}_{0.1}\text{Mn}_{0.1}$ ) is considered a possible next generation cathode material. The structure of NCM811 is rich in holes around 300nm in diameter which helps in better contact between electrodes and electrolyte. [24].The performance of NCM materials can be improved either by ion doping or surface coating. Doping of NCM with  $\text{Mg}^{2+}$  and  $\text{Al}^{3+}$  increases the stability. Doping could improve the overall performance but it reduces the activity. To compensate this one could use surface coating. Coating materials such as  $\text{Al}_2\text{O}_3$  and  $\text{MgO}$  could increase its cycle performance. Phosphate coating can be adopted to improve NCM resistance against corrosion. Even organic coating could be used to build 3D structures to improve their activity [25].

**(b) Anode materials:** Materials like graphite, lithium titanate, silicon-based material, metallic lithium, hard carbon and tin-based alloy are used in the preparation of anode. In most of the LIB graphite is used as the anode. Lithium titanate and tin-based alloy improve the capacity and functioning of the anode.

Among the current anode materials adopted, silicon is the most preferred one due to its low cost and large storage. The main obstacle for the development of silicon anode is its poor mechanical structure. Silicon nanowire anode focuses on improving the mechanical property of silicon, which gives excellent electric performance, high specific capacity and maintains great cyclability.

**(c) Electrolytes:** The role of electrolyte is related to enhancing the cycle stability of battery [26]. In LIBs, the liquid electrolytes consist of salts such as  $\text{LiClO}_4$ ,  $\text{LiPF}_6$ ,  $\text{LiBF}_4$ , solvents like dimethyl carbonate, diethyl carbonate, and ethylene carbonate. During discharge, the cations move from negative to positive electrodes.

Electrolytes of LIB are organic solutions with ionic conductivity that dissolve Lithium salts in them. During the battery's charge and discharge process, a redox reaction between the electrode and the electrolyte takes place at liquid solid interface forming a passivation layer at the electrode-electrolyte interface. The stability of electrode-electrolyte interface plays an important role in cycle performance and life of the battery. On the one hand, the interface consumes lithium ions resulting in loss of battery capacity while on the other hand, the interfacial film has ionic conductance and electronic insulation properties which prevent the continuous decomposition of electrolyte. Researchers continue to develop more advanced electrolytes by regulating electrode-electrolyte interface by electrolyte additives. For eg: Aurbach et al confirmed that the addition of propylene carbonate in the electrolyte generates polyalkyl lithium carbonate on the surface of graphite anode which improves the stability of solid electrolyte interface (SEI) [27]. Liao et al proved that electrode discharge capacity and rate performance could be improved by adding 2% fluoro ethylene carbonate (FEC) in lithium  $\text{LiFePO}_4$  electrolyte [28].

### **New Battery chemistries for next generation EV's**

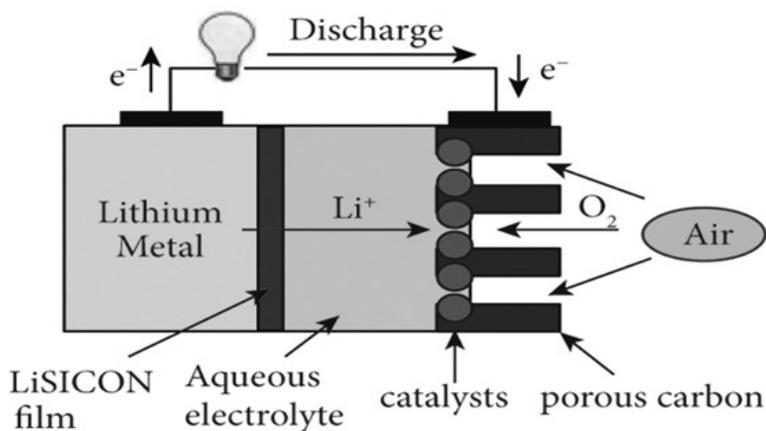
The conventional LIBs are limited in terms of energy densities and element resources. Therefore, developing new types of batteries has become an important

task for meeting the requirements of the next-generation of long-range EVs. At present, lithium-air batteries and all-solid-state batteries (SSBs) have received considerable attention owing to their higher specific energy and lower cost.

### Lithium-air batteries

In Li-air/O<sub>2</sub> batteries the cathode can obtain oxygen readily from the surrounding environment resulting in high-energy density. Among different kinds of metal-air battery systems, lithium (Li)-air batteries (LABs) show the highest specific energy with respect to the anode (13,000 Whkg<sup>-1</sup>), which is highly comparable to that of carbonaceous fuel (13,200 Whkg<sup>-1</sup>). The energy of these batteries is due to the oxidation of lithium and the reduction of oxygen and varies depending on the type of organic or aqueous electrolyte. In this type of battery, the cathode has to not only act as a conductor of oxygen and electrons but needs to be porous to provide oxygen penetration so that it is conducive to provide electron transfer, and not to react. Due to the above reasons, porous carbon which has a low price is used as one of the options [29-31].

Fig 3: Schematic diagram of Lithium-air Battery (Lithium Super Ionic



To increase the safety of Lithium-air batteries and to prevent the reactions such as lithium with water, a solid type of electrolyte, in which a combination of solid layers replaces the liquid electrolyte, was invented [33,34]. Graphene nanosheets (GNSs) have been reported as ideal cathode materials for lithium-air batteries due to their unique morphology and structure. It provides both diffusion channels for O<sub>2</sub> and active sites for cathode reactions. Chemical doping by nitrogen atoms into Graphene

nanosheets has been shown to provide more active sites, modify the electronic property, and enhance the interaction between carbon structure and other molecules, thus improving the performance in various applications,

**Solid state batteries:** Conventional LIBs normally use organic liquid electrolytes, which have some drawbacks such as thermal instability and complex reactions at the solid/liquid interface. In this regard, SSBs are a superior alternative due to their non-flammable solid electrolyte and higher thermal stability [35]. In SSB the solid electrolyte possesses some advantages as they act not only as separator but also as ionic transport support. It prevents ionic short circuit and also higher specific energy. To improve the electrochemical performance of SSB interlayer's such as solid polymers and gel polymers have been effectively used to reduce the interfacial resistance and to prevent undesirable side reactions. Solid state batteries showed superior rate capabilities than the conventional LIBs. They provide high power density, ultra-charging capability, promising a bright future in electric vehicles[36].

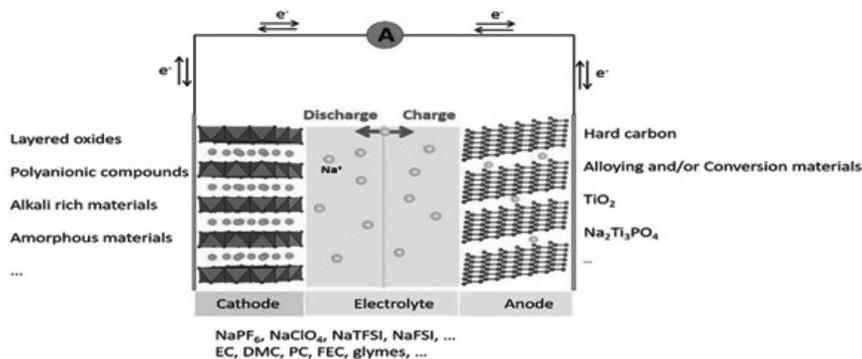
**Lithium metal anode based SSBs:** Lithium metal anodes have a high theoretical specific capacity and low electrochemical potential. Due to these merits lithium metal anodes have been revised recently. Lithium dendrites which are formed by the rapid deposition on lithium metal surface gives rise to internal short circuits. The large volume expansion of the electrode during repeated deposition and dissolution deteriorates the interfacial stability. To eliminate these problems solid state electrolytes can be used to replace conventional liquid electrolytes to prevent lithium dendrites an increased safety. To achieve high ionic conductivity sulfide/thiophosphate and oxide garnet type electrodes are two promising electrodes for SSBs with lithium metal anodes.

When graphite anode is replaced by lithium metal and SSE the energy density will be increased by 70% [37]. Although all solid-state batteries provide a great possibility for application in EVs there is still a long way to go for their practical implementation.

**Sodium ion batteries:** Lithium-ion batteries are extensively used in mobile communication, laptops, cameras, smart phones and electric vehicles however due to capacity fading; safety issues and increased cost, sodium ion batteries are under development. Sodium minerals are 20-30times cheaper than lithium [38]. Multilayer graphene anode can host higher sodium ions than the graphite, which increases

the storage capacity of sodium ions [39]. Sodium ion batteries will significantly bring down the cost of anode, cathode and electrolyte. For long cycle life and high storage efficiencies a new cathode material like  $\text{Na}_3\text{V}_2(\text{PO}_4)_3$  and its composites seems to be achievable [40].

Fig 4: Schematic diagram of Sodium-ion Battery [41].



Discovering advanced anode and cathode materials for Na-ion batteries with higher specific capacities and voltages should be the focus of future research so as to produce working Na-ion batteries. There should be development of advanced electrolytes that enable Na-ion battery to perform at high charge-discharge rates over a wide temperature range. These batteries will then be able to exhibit long cycle-life and shelf life which are required for large-scale energy storage applications. In order to systematically design and develop high-capacity, reversible electrodes for Na-ion batteries, focus of research and development efforts should aim at gaining a deeper awareness into the crystal structure-ion transport property relationships in Na intercalation electrodes. Research should also focus on developing Na-ion batteries which work at room temperature and are safe [42].

## Conclusion

At present because of their high operating voltage and high energy density lithium-ion batteries are the best choice for electric vehicles. Graphite anode materials and NCM cathode materials are promising choices to reduce efficiency loss from the electrodes. Efforts are made to improve the performance of lithium batteries by replacing liquid electrolyte by solid electrolytes. With the advancement of research in LIBs, lithium-air batteries and sodium-ion batteries electric vehicles have a bright

future and thus reduction in the use of fossil fuels for transportation will bring down carbon emissions significantly.

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# EVALUATION OF ECONOMIC STATUS OF ELECTRIC-RICKSHAW DRIVERS IN MANGALURU

Paul D'souza  
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## **Abstract**

*Most used public transport facility in India is auto rickshaw. The auto rickshaw driver's role in transport sector for the smooth flow of the economic, industrial, service activities is very significant, relevant and need of the hour. The persons who play an important role in the nation's economic activity are struggling to put themselves in their economic growth. The social, economic and psychological issues of auto rickshaw drivers are distracting condition. Majority of the younger and middle age population groups consider the driving job as key profession because of lack of other opportunities. Lack of employment opportunity influenced individuals to get into driving job or they find themselves as entrepreneurs in this line. Cost of maintaining of auto rickshaw and other expenses increasing which leads these people to shift their profession which is also sometimes very difficult for them. The revolution of electronic rickshaws brought some hopes in these people as it is cost effective and reduces additional cost of maintenance. In this juncture the study was conducted to evaluate the economic status of the electronic auto rickshaw drivers in Mangaluru.*

**Keywords:** *Electronic Auto Rickshaw, Economic Status*

## **Introduction**

Drivers' role in the economic development is very significant. Majority from the youth group chose driving as their profession with interest and majority of the unemployed in India go for this profession for not having other options. The highly qualified and also with basic primary education are found in this profession. Lack of self-confidence in getting in to other profession or failed to get good desired government job majority have opted this profession in India.

Working as drivers is not an easy profession, lot of challenges need to be faced by them. Financial support for their startup and establish themselves with their family members for living a good standard of life is a toughest task for them in this profession. The major reason for lower standard of living of the drivers is,

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revenue generation from their profession is at very minimal range. The high and volatile fuel price, high maintenance cost for the vehicles are the major challenges for the drivers to establish themselves with sound financial status. In this profession many will hire the vehicle to do their work and some invest for new vehicles through the assistance of the financial institutions and only few will have their own source of fund to invest in buying vehicle. The auto rickshaw drivers are facing these challenges in larger extend where by their socio-economic status is at moderate standard.

Auto rickshaws were initially run with fuel then the innovations brought the auto rickshaws which run with gas and now we can see the use of electric auto rickshaws. The economic status of the rickshaw driver's changed by shifting their vehicles from fuel auto rickshaws to rickshaws run with gas. Now there we see electric auto rickshaws and it is hypothesized that electronic auto rickshaws can improve the economic status of drivers by reducing their additional maintenance expenses and burden from the volatile fuel price.

### **Objectives of the Study**

1. To know the perception on E-rickshaws
2. To know the economic benefits of E-rickshaw drivers
3. Analyze the advantages of E-rickshaws compared to the fuel-based autos

### **Literature Review**

The huge density of the population and economic industrial development in the country created major economic demands. The demand for transportation is one among this. In India, auto-rickshaws are an important form of intermediate public transportation (IPT), accounting for about 75% of the world's total auto-rickshaw population (Reynolds et al., 2009). Compared to private motor vehicles, they provide cheaper, quicker, and more comfortable transportation with lower emissions (ITDP, 2009).

Gupta (1995) the study discovered that most of the auto drivers are illiterate and married. The family size is too big and one third of auto drivers are migrated peoples. Gupta (1995) the revealed that in the angles of religion majority of auto-

rickshaw drivers are Hindus. Though drivers are belonging to four religions such as Islam, Hindus and Christianity, Jainism. Further in the dimension of caste more than 75% of drivers are belonging to backward communities. Anand & Ravi (2003) the study discovered that from the process of licensing to driving his vehicle on the road the auto rickshaw driver suffers from a lack of information and awareness. There is no transparency in issuing license to him. Rane & Sasikumar (2002) the study found that most of auto drivers are speaking through local language or mother tongue with passengers. Mohan and Roy (2003) investigated the characteristics of auto-rickshaw drivers in Delhi, including age and family size. They claim that, at the time of their study, more than 90% of the drivers polled were under the age of 50, and more than 60% of drivers supported families of 5-8 people, showing that auto-rickshaws were an important source of employment for working-age men with dependents. Harding and Hussain (2010) in Delhi and Garg et al. (2010) in Chennai revealed that the majority of the drivers interviewed were between the ages of 30 and 50. Harding and Hussain (2010) investigated the educational qualities of Delhi drivers and discovered that drivers ranged from illiterate to a handful with 8th and 9th standard schooling. It was discovered that drivers with higher levels of education were generally migrants who were unable to find work that matched their educational degrees in their home areas. Most cities' auto-rickshaw services are disorganized, with services offered by individual drivers (owner-drivers or renter-drivers) rather than organised fleet businesses. Owner-drivers own the car and the permit, whereas renter-drivers rent the vehicle from the vehicle owners for a single shift (10-12 hours) or an entire day (24 hours) The use of kerosene mixed with petrol as fuel for transportation vehicles created problem of huge pollution. So these kind of transport vehicles can be used in the less density places like rural and remote places (Dutta A and Jash T, 2013). In India, Nagpur has the highest number of registered rickshaw pullers in the country (Walker, 1981). The socio-economic conditions of the cycle rickshaw pullers in Tiruchirappalli district of Tamil Nâdu is very poor as their earnings are very low which itself creates scarcity in meeting their day to day expenses and all these rickshaw pullers finding difficult in making money for savings, meeting their family and future needs (Christ raja, 2006). To reduce human toil and reduced the carbon emission for environmental friendly transport facility, the rickshaws came with enhanced designs of electric and battery rickshaw. Innovations need to be done for solar rickshaws which

utilizes the non-conventional energy resources and save electric energy (Chandran, N. and Brahmachari, S.K, 2015). The urban transport system of the Bangladesh is battery operated e-rickshaws. Most of the people in the urban and its outskirts areas prefer e-rickshaws as it is at affordable price and available at doorsteps, (Rana, S., Hossian, F., Roy, S. S. et. al., 2018).

### **E-rickshaw in India**

A revolution in transport sector of India in the modern era is innovation of the E-Rickshaw. There are more than two million battery operated electric vehicle which serve half of the Indian population. Electronic vehicle usage is promoted in the country because it provides a safe, environmental friendly, energy efficient and cost effective mechanism and so it is very popular in the country wide cities and rural places.

The initial cost of e-rickshaw is quite low compared to other modes of auto. The running cost of an e-rickshaw is only up to a rupee where as fuel based autos costs more than Rs 10 per km. The maintenance cost is also very low. The reduced cost of maintenance and initial investment in rickshaw will results in creating an opportunity to improve their economic and social standards.

E-Rickshaw usage in the society has its own advantage in terms of its users and the society as well.

Following are the benefits of use of E-Rickshaws;

1. Use of E-rickshaws will result in betterment of living standard of the auto rickshaw drivers by way of reducing cost of maintenance of vehicle and other utilities.
2. Government is having specific subsidy schemes for buying these E-rickshaws and which made more affordable for the rickshaw drivers.
3. E-Rickshaws are best suitable transport system as it helps in Solving Short Distance Journey at very low cost.
4. Uses of E-Rickshaws are considered as sustainable and Eco-Friendly models.
5. E-Rickshaws will provide very flexible and easy accessible transport services.

6. As it is a green transport system it will be considered as a best alternative vehicle for substituting the fuel vehicles.
7. Use of E-Rickshaws results in less noise pollution and also results in reducing the air pollution.

### **Research Methodology**

Descriptive study was conducted to evaluate the economic status of auto rickshaw drivers by shifting their vehicles from fuel or gas auto rickshaws to electric auto rickshaws. For this study the secondary data available in the scholarly articles were used to identify the problems and define the research objectives. Literature review was done to identify the research gap and to know the fundamental issues in use of different category of auto rickshaws. The primary data collected through interaction with auto rickshaw drivers were considered for this study. A structured questionnaire was prepared to collect the response from the auto rickshaw drivers. The questionnaire contained questions related to the socio-economic profile of the auto rickshaw drivers after their shift to the electric vehicles in their profession.

Based on the auto rickshaw driver's total population and the users of electric auto rickshaws, total 50 sample E-rickshaw drivers from Mangalore District were identified and considered as sample size for the study and with the scheduled questionnaire information required for the study was collected and analyzed using statistical tools for the significant findings and conclusion.

### **Data Analysis and Discussion:**

**Table no. 1, Age of the Respondents**

<b>Age group</b>	<b>Frequency</b>	<b>Percent</b>
Below 25	12	24
25 to 35	9	18
35 to 45	23	46
Above 45	6	12
Total	50	100

**(Source: Primary Data, field survey)**

The above table no. 1 shows the age of the respondents, majority of the auto rickshaw drivers are aged above 45 years while 18% of the drivers age group is between 25 years to 35 years. Whereas below 25 years' age group drivers seen at 24 percent of the total sample size.

**Table no. 2, Family Income of the Auto Drivers**

Income group	Frequency	Percent
Less than 5000	4	8
5000-10000	33	66
10000-25000	9	18
More than 25000	4	8
Total	50	100

**(Source: Primary Data, field survey)**

The above table shows the family income of the auto drivers. Majority of the auto rickshaw driver's family income fall below 10,000 rupees. Whereas, 18% of the driver's family income falls between 10,000 to 25,000 rupees. It is also found that only 8% of the sample size is having more than 25,000 rupees as family income.

**Table no. 3, Reason for Choosing this Profession**

Reason	Frequency	Percent
Family Profession	2	4
Self-employment	22	44
Lack of opportunities	23	46
Other	03	6
Total	50	100

**(Source: Primary Data, field survey)**

The above table states that, 44 percent of the drivers came to auto rickshaw profession considering it as their self-employment whereas 46% of the sample respondents chosen this profession because of the lack of opportunities in the other profession and jobs.

**Table no. 4, Average earning per day**

<b>Earning Group (Rs)</b>	<b>Frequency</b>	<b>Percent</b>
Rs 100-200	4	8
Rs 200-300	7	14
Rs 300-500	11	22
Above Rs 500	28	56
Total	50	100

**(Source: Primary Data, field survey)**

The above table shows the average earning per day of the auto rickshaw drivers. 56 percent of the respondent's state that, their average earning per day is above 500 rupees whereas 22 percent of sample respondents average earning per day is between rupee 300 to 500.

**Table no. 5, House ownership status**

<b>Ownership Status</b>	<b>Frequency</b>	<b>Percent</b>
Own	43	86
Rented	7	14
Leased	0	0
Total	50	100

**(Source: Primary Data, field survey)**

House ownership status of the sample respondents is presented in the above table no 5. The majority,86 percent of the respondents are residing in their own house, where as 14 percent of the sample respondents are residing in the rented house.

**Table no. 6, Other Sources of Income**

<b>Source</b>	<b>Frequency</b>	<b>Percent</b>
No	34	68
Agricultural income	2	4
Small shop business	9	18
Wage income	2	4
Salary income	3	6
Total	50	100

**(Source: Primary Data, field survey)**

Other sources of income of the auto rickshaw drivers were shown in the above table no 6. The majority, 68 percent of the respondents are not involved in any other income generation activities, where as 4 percent of drivers go for labour work and earn wage and 6 percent of the drivers work for salary during their shift times.

**Table no. 7, opinion of the respondents on use of CNG/LPG/Petrol**

Indicators	Strongly Agree (4)		Agree (3)		Disagree (2)		Strongly Disagree (1)		Mean	Std. D
	N	%	N	%	N	%	N	%		
High Maintenance Cost of the Vehicle	43	86.0	7	14.0	0	0	0	0	<b>3.86</b>	.351
High Fuel cost for running	45	90.0	5	10.0	0	0	0	0	<b>3.90</b>	.303
There is Necessary of Emission test	50	100.0	0	0	0	0	0	0	<b>4.00</b>	.000
High Revenue Generation	2	4.0	5	10.0	36	72.0	7	14.0	<b>2.04</b>	.638
Very Good in terms of Safety based on body of the vehicle	0	0	40	80.0	6	12.0	4	8.0	<b>2.72</b>	.607
Government support Schemes are available	0	0	0	0	29	58.0	21	42.0	<b>1.58</b>	.499
Very High Pollution by use of Vehicles	27	54.0	23	46.0	0	0	0	0	<b>3.54</b>	.503
Cost per Km is Very High	11	22.0	22	44.0	17	34.0	0	0	<b>2.88</b>	.746
High Satisfaction Level	0	0	10	20.0	35	70.0	5	10.0	<b>2.10</b>	.544

**(Source: Primary Data, field survey-interaction)**

An analysis was done with respect to auto rickshaw drivers and their opinion towards use of CNG/LPG/Petrol auto rickshaw and E-rickshaws. Analysis was done considering the various key indicators which represent socio-economic parameters such as, Maintenance Cost of the Vehicle, Fuel cost for running, Necessity of Emission test, Revenue Generation, Safety based on body of the vehicle, available Government Support Schemes, Pollution by use of Vehicles, Cost per Km and Satisfaction Level. The response of drivers is presented in table no.7 and table no. 8.

The table no. 7 describes the opinion of the auto rickshaw drivers on usage of CNG/LPG/Petrol vehicles. The mean values of the indicators such as, Maintenance Cost of the Vehicle, Fuel cost for running, Necessity of Emission test, and Very High Pollution by use of Vehicle is >3. Which means these are the

issues for the drivers while using CNG/LPG/Petrol auto rickshaw whereas the mean values of indicators such as, cost per kilometer is Very High, High Satisfaction Level, and High Revenue Generation is <3. Which also indicates driver's opinion on use of CNG/LPG/Petrol vehicle is not satisfactory, not yielding expected high income and the positive opinion of the drivers is that, the cost per kilometer in fuel vehicle is not high.

Opinion of the drivers after shifting from CNG/LPG/Petrol vehicle to electric vehicle were collected. The table no. 8 depicts the opinion of the auto rickshaw drivers with respect to use of E-rickshaws.

The opinion of the drivers compared to table no 7 is positive as the table no 8 states that, E-rickshaw is having less maintenance cost, less fuel cost, no need of having emission test, pollution free, cost per kilometer is less as the mean value shows <2 value. The table also states that, the opinion of the drivers with respect to revenue generation from e-rickshaw, Government support Schemes for e-rickshaw, Satisfaction Level in profession using e-rickshaw is positive as mean value is >3.

**Table no. 8, opinion of the respondents after using Electric Vehicle**

Indicators	Strongly Agree (4)		Agree (3)		Disagree (2)		Strongly Disagree (1)		Mean	Std. D
	N	%	N	%	N	%	N	%		
High Maintenance Cost of the Vehicle	0	0	0	0	7	14.0	43	86.0	1.14	.351
High Fuel cost for running	0	0	0	0	6	12.0	44	88.0	1.12	.328
There is Necessary of Emission test	0	0	0	0	0	0	50	100.0	1.00	.000
High Revenue Generation	36	72.0	14	28.0	0	0	0	0	3.72	.454
Very Good in terms of Safety based on body of the vehicle	6	12.0	10	20.0	34	68.0	0	0	2.44	.705
Government support Schemes are available	50	100.0	0	0	0	0	0	0	4.00	.000
Very High Pollution by use of Vehicles	0	0	0	0	0	0	50	100.0	1.00	.000
Cost per Km is Very High	4	8.0	4	8.0	40	80.0	2	4.0	2.20	.639
High Satisfaction Level	40	80.0	0	0	10	20.0	0	0	3.60	.808

(Source: Primary Data, field survey-interaction)

## **Findings of the Study**

Following are the findings from the evaluation of economic status of E-rickshaw driver's in Dakshina Kannada district:

1. Majority 44 percent of the auto rickshaw drivers chosen this profession to become self-employed and by this they can avoid depending on others.
2. The Study also found that 46 percent of the respondents became auto rickshaw drivers because of lack of employment.
3. Earning from the profession to the drivers is very less (77 percent) and the majority have not opted second profession for the purpose of additional earnings.
4. Auto drivers changed their vehicle to electronic rickshaws as it gives more benefit in terms of cost, revenue generation and the other features of the vehicle.
5. Less cost of maintenance, environmental friendly, good milage at less cost, noise free engine are the features which attracted auto rickshaw drivers to shift from fuel rickshaws to electronic rickshaws.
6. Compared to the fuel auto rickshaw usage, the electronic auto rickshaw gives benefits in terms of increase in savings and overall satisfaction level
7. Compared to the fuel auto rickshaws, electronic auto rickshaw drivers got more benefits from the government for electronic rickshaw in terms subsidy and easy loan facility from the financial institutions.

## **Suggestions**

Following are the suggestions for the auto rickshaw drivers to improve their economic status and standard of living:

1. As there is a rapid increase of E-rickshaws, a favorable environment should be created for the same
2. Government is having many schemes for the self-employment. The MUDRA scheme which offers financial assistance to the people need to utilized for other sources of income generation activities

3. Being part of SHG's, trade unions and other social programs will give better results in the longer period.
4. 46 percent of the sample respondents opted driving profession because there is no other option for them. In this case governments and policy makers must think about creating employment and helping them to get the desired jobs

## Conclusion

It is assumed that the evolution of electronic rickshaw results in improving economic status of the auto rickshaw drivers by reducing the additional cost of maintenance and high price in initial cost. It is slow approach, improving economic standard of the e-rickshaw professional will take time. Depending upon the single source of income will not make any changes in the life of the individuals. People must have many sources of income for the drastic changes in their economic life. The second source of income generation activity, parking of the earned money in the products yields or appreciates the value over a period need to be focused by the individuals.

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