



# ICOSTART'22

INTERNATIONAL RESEARCH CONFERENCE ON  
INNOVATIONS, STARTUPS AND INVESTMENTS

18-19 Nov'22 | RK University Main Campus, Rajkot, India

## CONFERENCE PROCEEDINGS



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## **Preface**

In this section of ICOSTART Conference Proceedings, the authors/presenters of conference share their opinion on recent innovations and startups. Editorials team believed that the participants put enough efforts to make this international conference a grand success. The conference was held on November 18-19, 2022, at RK University Rajkot, India. More than 300 participants took part in the two-days international research conference and summit on Innovations, Startups. Total 122 research papers have been presented in this event and amongst these sixteen best paper presentation awards were given away. The event would not have been possible without the involvement of management of RK University who actively led from the front especially Shri. Denish Patel, EVP RKU and Shri. Mohit Patel, VP RKU, Dr. Vishal Doshi, Head Incubation Cell & Convener of the conference as well as faculty members and staff of various schools of the university and support from Industries Commissionerate, Govt. of Gujarat, Startup Gujarat Cell, SSIP- Govt. of Gujarat, in association with Flair College of Management & Technology, Concord, Canada, Western Sydney University, Australia, Nativelead Foundation, GVFL Limited and INNOTAL. This conference proceedings comprising of selected full research/review papers of participants. The proceedings have been gone through rigorous review process with help of international domain experts. Hope this book of proceedings provides interesting content to the readers their research journey.

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## A Survey on Difficulties Faced by Liberian Farmers for Irrigation

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### Abstract

More than 80% of Liberians rely on agriculture as their main source of income. Many households produce a wide range of agricultural goods. Liberia is vulnerable to global food insecurity since it imports 95% of its rice and has a small agriculture sector. The country lacks fundamental facilities like farming equipment, food storage, etc. In Liberia, cassava, rice, and potatoes are frequently used in cooking. Liberians have recently seen a lot of issues with food shortages due to the lack of advanced machinery to manufacture its country's staple commodities. In less than three months, the country has gone through four revolutions because of shortage of rice on its market, which is the most staple food. Due to a lack of modern technology, farmers in Liberia are forced to employ minors to work on their farms, increasing child labor by 75% in less than three months.

According to data gathered in four counties, between 25 and 50 % of minors will be driven into child labor in 2023 because of inadequate technology to manage productivity.

To deal with some of these challenges, Liberia must now apply the Non-Conventional Method of Irrigation. With this method the number of citizens in to farming in the country will increase, and productivity will increase, and there will also be a drop in child labor. If Liberians have access to modern technology, it will enable farmers to manage their crops effectively and boost food production. It will also help to reduce labor force, save time and increase income in less than six months. Additionally, the irrigation system will help farmers understand how technology works and how it helps to ensure the livelihood of all farmers worldwide.

**Keywords:** *Liberian Farming, Irrigation System, Child labor in farming, Lack of infrastructure in crop storage.*

### Introduction

Agriculture has been the mainstay of human life support for a longer time. Currently, more than 80% of Liberia's population relies on agricultural revenue, which sustains many households in the production of cassava, rubber, rice, oil palm, cocoa, or sugarcane. Compared to other crops, rice is produced by most households. However, due to low agricultural production generally, Liberia imports more than 80% of its rice, rendering the nation susceptible to fluctuations in the price of food on a worldwide scale. Lacking essential infrastructures, such as machinery, farming tools, farm-to-market routes, fertilizers and pesticides, and food storage capacity, the sector is poorly integrated. The two main crops for staple foods are cassava and rice. In Liberia

there is only one type of farm which is the flat farm.



Fig. 1: Types of Farms

A developing country with a population of roughly 4.5 million, Liberia. Most of the population consumes rice at least twice daily, making it the main staple diet of the country. However, due to a lack of modern technologies for agricultural management, Liberia no longer grows rice for commercial purposes. Just enough rice is grown by rural farmers to supply their household's food needs. The lack of contemporary technologies in the farming sector is the main issue. The United States Foreign Operations Administration (now USAID) and Liberia started a project in 2008 that was intended to start with a 25-hectare parcel and expand more land as experience accrued. The project was reported as a success, but the irrigation system of rice culture was not maintained. Later, heavy rains washed out the dams and canals, and the area reverted to the original swampland. [1]

But in Liberia, it is clear what a change in rice prices will mean. Most of the rice used is imported, and most of the locally produced rice is used by farmers for their own domestic consumption. Because rice accounts for such a significant portion of the nation's food intake, any increase in the price of rice, whether imported or grown domestically, will undoubtedly result in an increase in poverty. All of this is taking place as a result of the agriculture industry's lack of access to contemporary technologies, such as irrigation systems for managing farms. [2]

Some significant obstacles also contribute to the lack of contemporary technology and its application in the agricultural industry. Liberia must first overcome certain major obstacles before successfully implementing these eco-friendly technologies in the agricultural sector. As a result, the focus of this report is solely on overcoming the barriers to the transfer and diffusion of the three technologies mentioned above for the Liberian agriculture sector. This report uses the Barrier Analysis and Enabling Framework (BA&EF) to assess potential obstacles that might prevent the transfer and diffusion of the three technologies. [3]

The agricultural sector in Liberia has seen a severe decline in output. The labor force has

decreased due to a lack of technology and the ongoing usage of youngsters in agriculture. A kid under the age of 16 may not be employed or hired in Liberia (Section 74) during any period throughout the month when school is in session if the child is required to attend school. [4] Because of un-optimized irrigation practices, most Liberian farmers are only producing what they and their house can eat, which reduces the chances of earning as they are not able to produce more so growth is very limited.

**Insite on Liberian Population and Methods they used for Irrigation**

Table 1: Response from Different County (Region)

County	% of Responses
Lofa	20.8
Bong	15.6
Nimba	15.6
Bomi	16
Grand Capemount	15.1
Grand Bassa	17

There are sixteen counties in Liberia these county was selected because they are the most Agriculture counties. Among these counties, Liberia has the best result in Agriculture and the high child labor because of the activities that are going on. In these counties you have agricultural activities like fishing, farming, and hunting. These activities are often carried on by underage children and older people.

In Liberia there are so many types of farms which are large farms in the range of three to six acre of land, small farms which are in the range of one acre of land, and backyard farms which is also less than one acre of land. The amount of large farms is 16.5% which is less because there are so many issues with the labor force, these farm owners do not employ older people because the cost of labor will be very high. Backyard farms have a large percentage because the owner of those farms is using their children to do the farming work and there is no labor cost. In these cases, you will find a high rate of child labor in this sector of farming.

Table 2: Age Range of Farm owners

Age	% of population from response
18 - 25	15.5
26 – 35	16
36 – 45	18.8
46 – 56	24.9
57 - 67	24.5

Looking at the chat above, older people in the range of 46 to 67 years have more farms. The number of young people between the range of 18 to 36 has their own farm is less because most of the young force are engaged in the mineral sector than the agriculture sector. The chat

shows that older people are investing in farming more than young people. The total amount of percentage showing in the survey suggests that 31.5% Liberia's youthful population is also getting involved in Agriculture.

Table 3: Source of getting water to farms

Sources	% of sources from response
Well	47.4
Creek	23.9
Hand Pump	15
Others	34.70

Liberia as a country has goon through (14) fourteen years of civil war which allow the country to a breakdown in every sector. The survey shows the difficult situations of our farmers. The chat shows that 47% of our farmers in Liberia get water from the well which is very difficult and takes much time and more energy. Take a look at these photos below you will see the used of well.



Fig. 2: Source of water (Well)

Table 4: Equipment used for watering plants

Equipment	% of sources from response
Bucket	38.2
Pan	9.4
Cup	1.9
Water tank	38.2
Other	12.3



The larger population of Liberia farmers do not have any modern form of technology that can be used to water their crops. The chart shows that 38.2% of the Liberian farming population is still using buckets to water their crops and 38.2% also use watering tanks also. The picture below shows the most difficult life of a Liberian farmer.



Fig.3: Equipment used for watering plants (Bucket)

### **Solution**

These are some solutions that can help Liberian farmers:

1. The use of a wind irrigation system, this system will help transport water from wells to the surface of the crops with and without electricity.
2. The use of solar irrigation systems. Solar irrigation will produce water during day time and when there is enough sun.
3. The open channel system. The open channel system will help to collect overflow water from the rainfall. We are recommending the open channel because of climate change. In Liberia when there is a rainy season you have heavy rainfall, and there is no system put in place to control the flow of water, most of the water flow into farm damaging most of the crops.

Water proportioning devices. Proportioning water division structure divides the water in a canal into two or more part that corresponds to the water shares due to each framer or farmer's group served by the branching canals. The proportioning device is usually a wooden block with rectangular notches. The structure is linear and is placed level in the canal perpendicular to the flow of water.

### **Conclusion**

Most Liberian farmers are losing their crops in huge number daily without knowing their main problem. This survey show that Liberian farmers are using more energy and much time on farm work, making them not to do other work when the farm work is over. With these different irrigation methods, our Liberian farmers will have enough of time to do other work and safe their crops and also benefit from their labour.

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## Cloud Computing and its challenges

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### Abstract:

In cloud computing, the “Cloud” refers to a set of networks using that the user able to access computing services on demand over the Internet, like hardware, software, storage, servers and networking. The cloud computing provides principally 3 varieties of services: IaaS (Infrastructure-as-a-Service), PaaS (Platform-as-a-Service) and SaaS (Software-as-a-Service). The cloud computing isn't something that suddenly are available into the existence. The cloud computing is evolving speedily in today's modern era. And this trend will increase in coming days as the corporate firms of all types adapting this technology whole heartedly. In this paper I have discuss the introduction, evolution, benefits, components, types, services and challenges of Cloud computing.

**Keywords:** *Cloud computing, Cloud, IaaS, PaaS, SaaS*

### Introduction:

"The cloud" refer [6] to the servers that can be accessible over the Internet, and the software and databases that run on those servers. The user can explore the cloud computing endlessly as per their need. The cloud computing plays a role of facilitator for the service of the internet instead of establishing their own physical infrastructure. The users have to pay only for the services which they utilized. We only need a web browser like Chrome to use an application, because the main burden of service is handled by the cloud's networks. Consequently, running an application does not burden local computers much.

This paper is an introduction to the terms, components and services associated with internet-based computing, commonly referred to as cloud computing. Components such as, clients, servers and data centers are discussed. The service models that mainly used (such as software, platform, and infrastructure as a service) and common deployment models employed by service providers and users to use and maintain the cloud services (such as the private, public and hybrid clouds) are discussed. I have also stated the benefits and challenges associated with cloud computing in the paper.

### Evolution:

In an amazingly short span of few years [10], Cloud Computing has become an integral, perhaps even the most vital part of an enterprise's IT Strategy. It has helped free-up a huge portion of the IT from the constraints of legacy software and hardware licensing data centre

models, and has opened, revolutionized and to an extent change the way IT delivers services and how the users access information, applications and services.

According to John McCarthy at MIT in 1960's, computers can also be sold as utilities like water, electricity, etc. And, in 1999, the Salesforce company started to distribute their applications online. AWS (Amazon Web Services) were started by Amazon in 2002 and they were delivering the services of storage and computation. In 2009 big corporate giants like Google, Microsoft, HP, Oracle had begun to deliver cloud computing services. In today's modern era, it is very common that every person uses the services of cloud computing in their day-to-day life. For ex., Google Photos, Google Calendar, Gmail, Google Drive, and iCloud etc. In the coming days cloud computing will be the basic necessity of IT Industries.

### Evolution of Cloud Computing

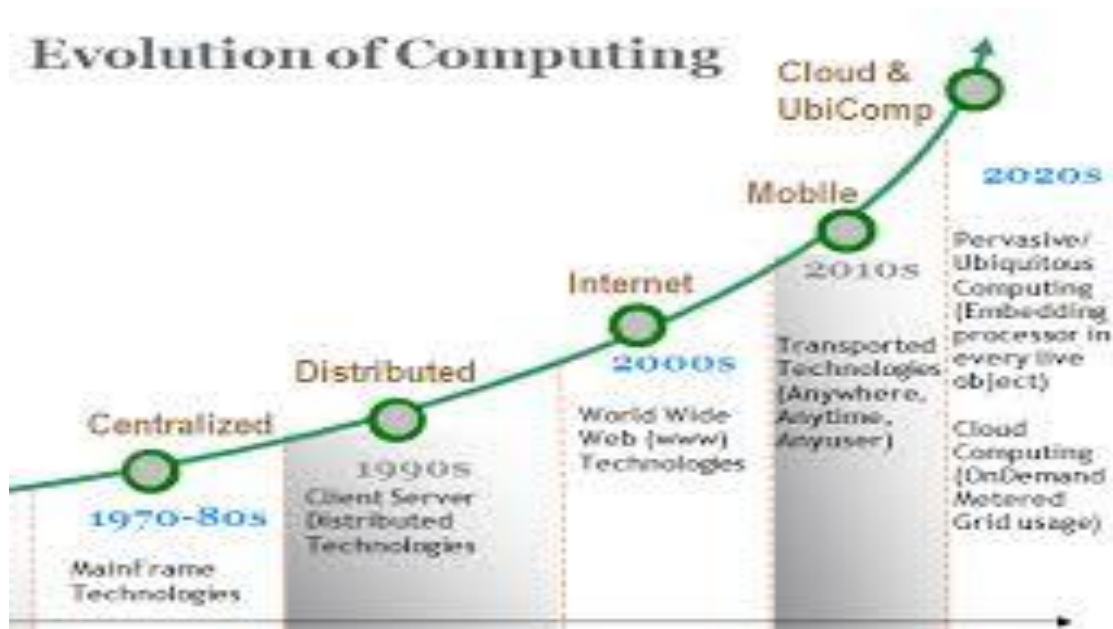


Figure 1

### Benefits of Cloud Computing

Following are just seven among numerous benefits of cloud computing that continuously push its popularity in the Ecommerce industry.



Figure 2

1. Software updates are always available

Cloud computing software as a Service (SaaS) offers businesses the convenience of having up-to-date applications and updates to meet their daily needs. With SaaS, frequent updates are delivered which may include additional features or enhancements on top of the standard functions. Additionally, [7] these updates can generally be delivered in a shorter period of time than those from purchased software.

2. Less computing resources are needed

The company may experience cost savings from reduced network infrastructure, such as fewer servers, lower software costs, and less staff for network management. This may result in a decreased need for their own data centers, or none at all.

3. Prices and capacity are flexible

Cloud computing offers more flexibility [8] than traditional methods when it comes to the budget. Instead of having to pay for fixed service packages, you can pay only for the resources you need. This could mean you end up paying more or less than you were previously, but it ensures you are making the most of your money. Additionally, your site's capacity for heavy or light traffic can be adapted to suit the demands of any given season, so there is less risk of crashing during peak times.

4. Uptime is always guaranteed

Cloud computing offers distributed computing resources through the internet, which can lead to increased uptime and availability. With access to the internet, users can access applications from anywhere, typically with 99.99% uptime. This reliability can be beneficial to businesses in terms of customer reach and availability.

5. Accessibility is everywhere

In today's world, mobility is a key factor in staying connected. Being able to access one's data from anywhere using any device is a great convenience and eliminates the need for physical storage.

6. Teamwork is highly supported

Cloud computing offers applications that enable teams to work remotely by providing access to shared data stored on a single network. This technology enables collaboration between individuals regardless of their physical locations, leading to increased productivity and convenience.

7. Contributes to conservation of environment

By reducing the number of data centers worldwide while maintaining effective operations, it is possible to lessen the utilization of non-renewable resources and consequently reduce the environmental impact of network management. This can be achieved through the collective effort of sharing resources.

Components of Cloud Computing:

Cloud computing is a framework that consists of three distinct components: clients, distributed servers, and datacenters. These cloud components provides services such as front-end service, back-end service and cloud-dependent delivery through network by working with each other. The responsibilities of the three components in this computing framework can be outlined as follows.

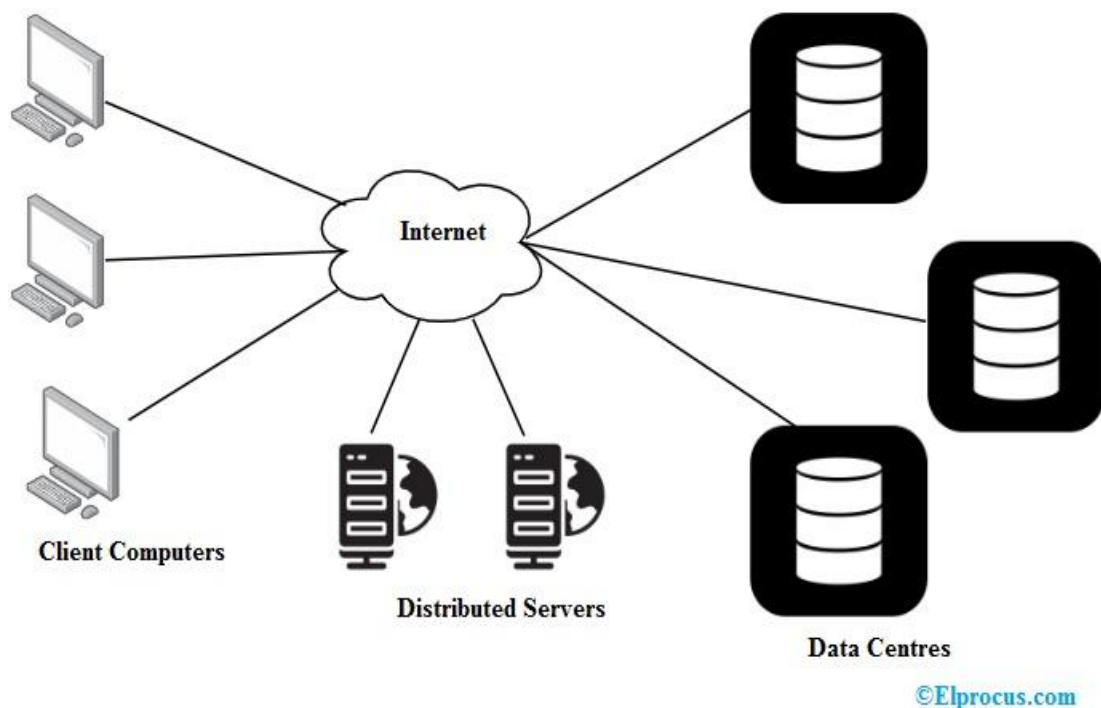


Figure 3

Client Computers: The client computers allow the user to communicate with the cloud.

Distributed Servers: The servers behave like they are working with each other even though they are distributed among the various places.

Data Centres: Data centres are the compilation of servers.

Types of Cloud Computing:

The cloud deployment model [1] characterizes the particulars of a cloud foundation, like its proprietorship, scale, access, reason and nature. It decides the area of the servers being utilized and who has command over them, as well as the connected connections between the foundation and clients. Contingent upon the sending type picked, the necessary administrations might be given or should be made by the client. Various sorts of cloud computing arrangement models are:

1. Public cloud
2. Private cloud
3. Hybrid cloud

Public Cloud

Public cloud is a large collection of Memory, CPU, Networking and storage like various available resources. You can rent these resources to create an IT infrastructure because they are hosted by one of the global distributed and managed public cloud vendors.

These fundamental computing resources are connected to managed services including application servers, security systems, and database servers. The managed services are there for you to lease in the event that You don't need to worry about organising and managing the complete setup. There are additional cloud service companies than Google Cloud Platform (GCP), Amazon Web Service (AWS), and Microsoft Azure that offer this type of service. Accessing your resources in this kind of cloud is as simple as using a web browser.

Private Cloud:

Single private organisations and associations can access and use private clouds. They have typically been physically located in the company's own server farm and using its own technology.

However, a company may use a third-party supplier to host its private cloud on its hardware. Because the assets are located in a server farm that is managed remotely, private cloud in this scenario shares certain similarities with public cloud. In any case, albeit these suppliers will offer managerial administrations, they may have the option to offer a small level of the worldwide administrations of a public cloud.

Hybrid Cloud:

A hybrid cloud is made up of components from both the public and private clouds that are securely connected via a Virtual Private Network (VPN) or other private channel over the internet.

For instance, you may use the public cloud's limitless storage space for archiving while data processing takes place on your premises. Or on the other hand you could stretch out your PC network into the cloud to save purchasing in extra long-lasting equipment.

#### Cloud Computing Services:

##### Software as a Service (SaaS)

It is an approach to conveying administrations and applications over the Web. Rather than introducing and keeping up with programming, we basically access it through the Web, liberating ourselves from the perplexing programming and equipment the board. It eliminates the need to introduce and run applications on our own PCs or in the server farms killing the costs of equipment as well as programming support.

SaaS gives a total programming arrangement that you buy on a pay-more only as costs arise premise from a cloud specialist organization. Most SaaS applications can be run straightforwardly from an internet browser with next to no downloads or establishments required. The SaaS applications are now and again called Electronic programming, on-request programming, or facilitated programming.

Examples: There are loads: Google G-Suite, Dropbox, Cisco Webex, Agree, Microsoft O365, Genesys, PayPal

Normal Use Cases: SaaS is an agreeable help model for applications that are exceptionally interoperable - utilized by various clients inside and remotely - and for transient undertakings. SaaS models are liked by little and medium-sized organizations that don't wish to put vigorously in IT support.

##### Platform as a Service (PaaS)

PaaS is a classification of distributed computing that gives a stage and climate to permit designers to fabricate applications and administrations over the web. PaaS administrations are facilitated in the cloud and got to by clients just by means of their internet browser.

A PaaS supplier has the equipment and programming on its own foundation. Thus, PaaS liberates clients from being required to introduce in-house equipment and programming to create or run another application. In this way, the turn of events and sending of the application happen free of the equipment.

The purchaser doesn't oversee or control the basic cloud foundation including network, servers, working frameworks, or capacity, yet has command over the sent applications and potentially arrangement settings for the application-facilitating climate. To simplify it, take the case of a yearly day capability, you will have two choices either to make a setting or to lease a scene yet the capability is something similar.

Examples: Salesforce, AWS Flexible Beanstalk, Heroku, Google Application Motor (GAE), and OpenShift



Normal Use Cases: PaaS is exceptionally accessible and profoundly versatile, and it empowers associations to fabricate and make new administrations and arrangements without the requirement for profoundly gifted designers zeroed in on programming upkeep. PaaS is liked by IT in half breed cloud conditions.

#### Infrastructure as a Service (IaaS)

It is a help model that conveys PC framework on a re-appropriated premise to help different tasks. Ordinarily IaaS is a help where framework is given as moving to ventures, for example, organizing gear, gadgets, information base, and web servers.

It is otherwise called Hardware as a Service (HaaS). IaaS clients pay on a for every client premise, commonly constantly, week, or month. A few suppliers likewise charge clients in view of how much virtual machine space they use.

It basically gives the fundamental working frameworks, security, systems administration, and servers for growing such applications, and administrations, and conveying advancement instruments, data sets, and so on.

Examples: Rackspace, Advanced Sea, Google Process Motor, and a few organizations of Microsoft Purplish blue and Amazon Web Administrations (AWS)

Normal Use Cases: IaaS is the most adaptable assistance model for distributed computing, so it is particularly successful for new companies and associations searching for lithe scaling. It is additionally liked by organizations that look for more noteworthy command over their assets.

#### XaaS - Anything as a Service

"Anything as a Service" (XaaS) portrays an overall class of distributed computing and remote access administrations. It perceives the tremendous number of items, devices, and innovations currently conveyed to clients as a help over the Web.

Basically, any IT capability can be a help for big business utilization. The help is paid for in an adaptable utilization model as opposed to a development buy or permit.

It is otherwise called Everything as a Help. The vast majority of the cloud specialist organizations these days offer anything as a help that is a gathering of each of the above administrations including a few extra administrations.

#### Function as a Service (FaaS):

FaaS is a sort of cloud computing administration. It gives a stage to its clients or clients to create, register, run and send the code or whole application as capabilities. It permits the client to foster the code and update it whenever without stressing over the upkeep of the fundamental framework altogether. The created code can be executed with reaction to the particular occasion. It is likewise all around as same as PaaS.

FaaS is an occasion driven execution model. It is executed in the serverless compartment. At the point when the application is grown totally, the client will presently set off the occasion to execute the code. Presently, the set off occasion makes reaction and initiates the servers to execute it. The servers are only the Linux servers or whatever other servers which is overseen by the seller totally. Client doesn't have hint about any servers which is the reason they don't have to keep up with the server thus it is serverless design.

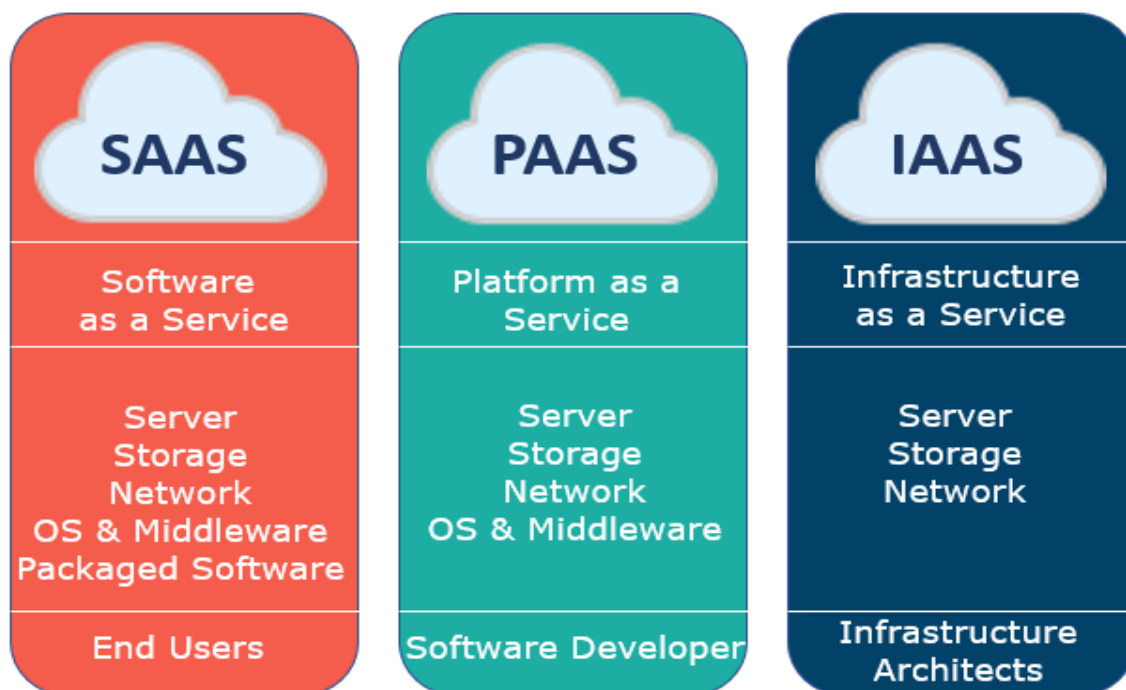


Figure 4

Challenges of Cloud computing:

Coming up next are a portion of the eminent difficulties [3] related with distributed computing, and albeit a portion of these may cause a log jam while conveying more administrations in the cloud, most likewise can give open doors, whenever settled with due care and consideration in the arranging stages.

Security and Privacy — Maybe two of the more "hot button" issues [4][5] encompassing distributed computing connect with putting away and getting information, and observing the utilization of the cloud by the specialist organizations. These issues are by and large credited to easing back the organization of cloud administrations. These difficulties can be tended to, for instance, by putting away the data inward to the association, however permitting it to be utilized in the cloud. For this to happen, however, the security systems among association and the cloud should be strong and a Half and half cloud could support such an organization.

Lack of Standards — Mists have recorded interfaces; in any case, no guidelines are related with these, and hence it is improbable that most mists will be interoperable. The Open

Framework Gathering is fostering an Open Distributed computing Connection point to determine this issue and the Open Cloud Consortium is dealing with distributed computing norms and practices. The discoveries of these gatherings should develop, yet it isn't known whether they will address the necessities of individuals sending the administrations and the particular points of interaction these administrations need. Notwithstanding, staying up with the latest on the most recent norms as they advance will permit them to be utilized, if relevant. Continuously Evolving — Client necessities are persistently developing, similar to the prerequisites for interfaces, systems administration, and capacity. This implies that a "cloud," particularly a public one, doesn't stay static and is likewise consistently developing.

Compliance Concerns —The EU has an official support for information security across all part states, yet in the US information assurance is unique and can fluctuate from one state to another. Likewise with security and protection referenced beforehand, these normally bring about Half breed cloud arrangement with one cloud putting away the information inside to the association High Dependence on Network

Because cloud computing works with real-time resource provisioning, it handles massive amounts of data flow to and from the servers. The high-speed network's availability is the sole thing that makes this possible. Although these resources and data are exchanged through the network, this can prove to be quite vulnerable in situations where there is a sudden outage or a bandwidth issue. Even if the businesses are able to reduce their hardware expenditures, they still need to make sure that the internet bandwidth is high and that there are no network disruptions since otherwise it could result in a potential loss of business. Due to the high expense of maintaining network bandwidth, it presents a significant barrier for smaller businesses.

#### Lack of Knowledge and Expertise

Working with the cloud can be extremely tedious due to the complexity and the demand for research. It requires immense knowledge and expertise on the subject. Due to the significant mismatch between supply and demand, cloud computing is a well-paid profession. While there are several openings, there are comparatively few qualified cloud engineers, developers, and experts. Because of this, there is a need for upskilling so that these professionals can actively comprehend, manage, and construct cloud-based applications with a minimum number of problems and a maximum level of dependability.

#### Future of cloud computing:

Organizations [2] these days are looking for creative ways of developing and achieve their business objectives. With the assistance of distributed computing, this business will continue to fill from now on. Distributed computing is strong and extensive and will keep on filling from here on out and give many advantages. Distributed computing [9] is incredibly savvy and organizations can involve it for their development. The fate of distributed computing is brilliant and will give advantages to both the host and the client. One ought to remember that the

proprietor of the organization ought to be known about the most recent advancement occurring in Cloud innovation.

### **Conclusion:**

In this review paper I have portrayed the presentation, development, types and parts of distributed computing and furthermore various methodologies of distributed computing and a portion of its benefits. Distributed computing's potential applications will keep growing. Today, nearly all small and large businesses use distributed computing to manage capacity, traffic, and equipment requirements. Along these lines, it is obvious that distributed computing has a significant impact on business and society.

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## Feasibility Study on Investment in Electric Vehicle Battery Manufacturing

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### Abstract

In engineering, particularly for electrical engineers, a new business line is going to open in India. The government of India has taken some steps toward achieving India's long-term goal of reaching net zero carbon emissions by 2070. E-mobility is one of the initiatives taken to achieve this goal. Most parts of electric vehicles are equivalent to those of petrol vehicles, but the battery and motor have some differentiation from ordinary vehicles. In electric vehicles, BLCD motors are used, which can be manufactured through the relevant technology of BLDC fan, but for EV batteries, we need to develop a new process plant with precise technology because recently there have been so many burnt EV cases, which may be due to the heat of the battery or a fault in the battery management system. In this research paper, we discuss the feasibility study on investment in an electric vehicle battery manufacturing plant.

*Keywords: Battery, Machine, Electric vehicle, Tools, Market analysis*

### Introduction

The electric vehicle industry is at a rising stage in India. The Indian automobile industry is the fifth largest in the world and is expected to become the third largest by 2030[1]. As per the India Energy Storage Alliance (IESA), the Indian EV industry is expected to expand at a CAGR of 36%. As the population rises and grows for vehicles, dependence on conventional energy resources is not a sustainable option as India imports close to 80% of its crude oil requirements. At present, more than 5 Lakh two wheelers and some thousand four-wheelers running electric vehicles on the road. It mainly depends on the policy offered by the government, awareness, among consumers related to climate change's impact on their lives. NITI Aayog aims to achieve EV sales penetration of 70% for all commercial cars, 30% for private cars, 40% for buses and 80% for two and three-wheelers by 2030. This is in line with the goal to achieve net Zero carbon emissions by 2070. E-mobility is one of the initiatives taken to achieve this goal.

Most parts of electric vehicles are equivalent to those of petrol vehicles, but the battery and motor have some differentiation from ordinary vehicles. In electric vehicles, BLCD motors are used, which can be manufactured through the relevant technology of BLDC fan, but for EV batteries, we need to develop a new process plant with precise technology because recently there have been so many burnt EV cases, which may be due to the heat of the battery or a fault in the battery management system.

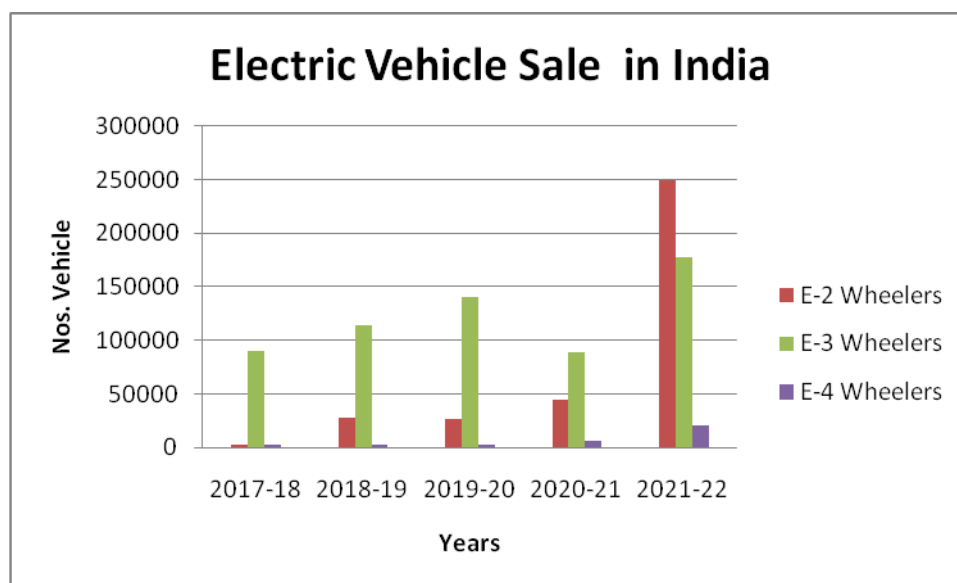


Figure 1: EV sales in India [1]

Electric Vehicle Sale in India					
Category	2017-18	2018-19	2019-20	2020-21	2021-22
E-2 Wheelers	1981	27478	26512	44394	249615
E-3 Wheelers	90411	114136	140754	88497	178169
E-4 Wheelers	2433	2460	2740	5952	20172

The most common battery type in modern electric vehicles is,[1]

1. Lead–acid
2. Nickel–metal hydride
3. Sodium nickel chloride batteries
4. Lithium-ion

Table 1: Comparative of EV batteries

Particular	Lead–acid	Nickel–metal hydride	Sodium nickel chloride batteries	Lithium-ion
First came into existence in the year of ,	1859	1980	1985	1991
Energy density (Wh/L)	80-90	100-140	160	250-400
Energy Efficiency (%)	85	85	75	90

## II. Market Scenario

India is at a critical juncture in its infrastructure, energy, and mobility development. The nation has seen a 10 percent annual increase in vehicle registrations over the last decade and

is set to surpass Germany as the world's fourth-largest car market by domestic sales by the end of 2017. If current mobility trends continue, the number of personal vehicles in India could increase three- to four-fold by 2030, at significant direct and indirect costs to India's citizens, economy, and environment. [2] Now, India has set ambitious targets of installing 175 gigawatts of renewable energy generation by 2022, and a draft government target aims to generate 57 percent of India's electricity from non-fossil sources by 2027. These targets, coupled with India's electric mobility vision, can create more value and be more readily achieved when pursued together, rather than separately. And as mobility costs impact low- and moderate-income citizens the most, this transformation could provide important economic and social benefits to this population segment.[3]

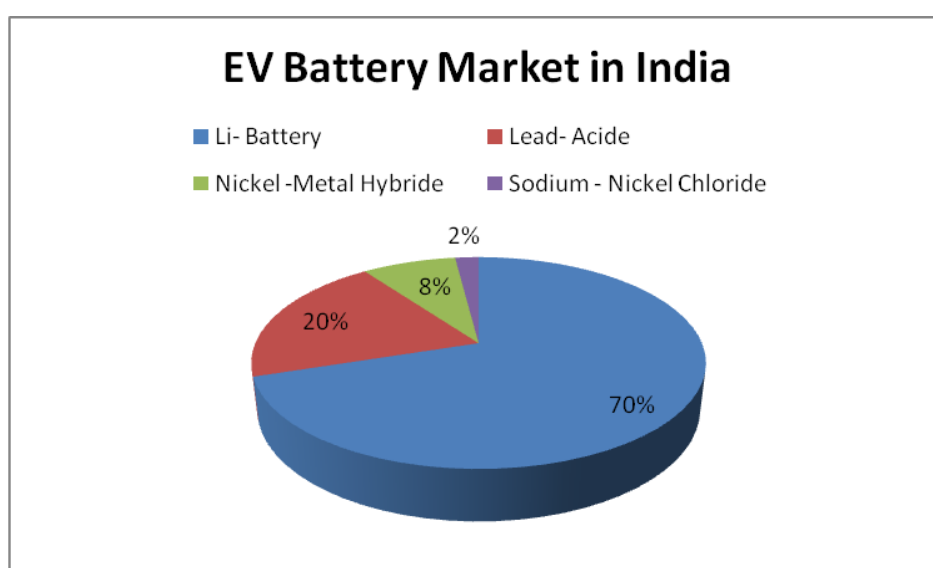


Figure 2: EV Battery market in India [4]

The rising adoption of electric vehicles among consumers has helped boost the market for these energy- saving, pollution-reducing vehicle. The numbers of automobile companies involved in the development of new and improved EVs has also increased. For instance Tesla Motors, General Motors Company, Toyota Motor Corporation, Ford Motor Company, Nissan Motor Company and Jaguar Land Rover Limited are also involved in the production of EVs. [2]

The India lithium-ion battery market is fragmented. Some of the major players operating in the market include TDS Lithium-Ion Battery Gujarat Private Limited (TDSG), Bharat Electronics Limited (BEL), Okaya Power Group, Telexmax India Industries Pvt Ltd, and Toshiba Corporation. [2]



### III. Lithium – Ion Battery Manufacturing Process

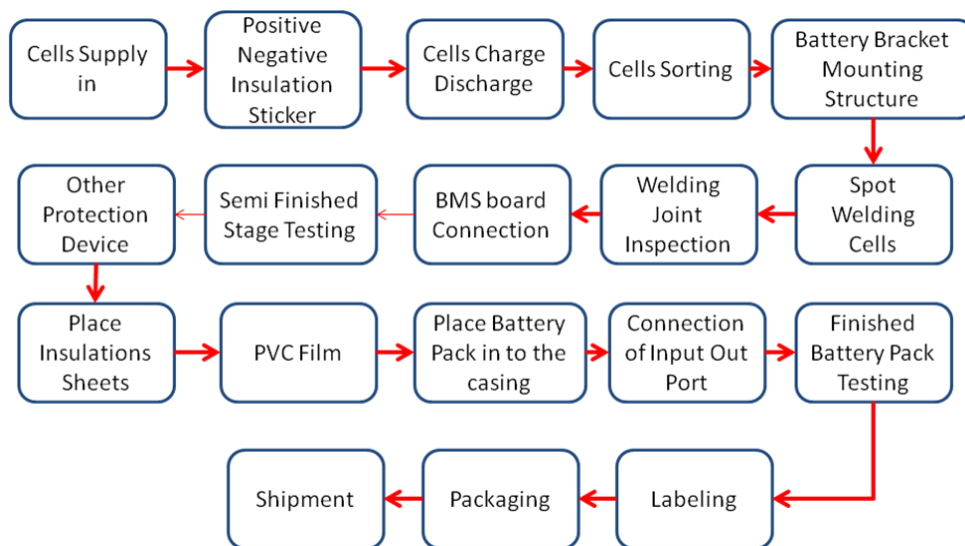


Figure 3: LIB manufacturing process flow [1]

### IV. Major Machinery Used in Process [1]

1. Cell Grading & Capacity Tester



2. Cell Insulation Sticker pasting machine



3. Cell internal resistance shorting machine



4. Polarity Checking



5. Auto Spot Welder



6. BMS tester



7. Batter Pack performance Testing Machine



8. Battery Aging Machine



## V. Indian Government Schemes for Start-Ups And MSMEs

Government of India has launched many schemes for start ups and MSMEs to be “ATMANIRBHAR BHARAT”

### 1. Pradhan Mantri Mudra Yojana [5]

This scheme was launched in 2015. The Mudra scheme covers MSMEs such as Small Manufacturing Units, Retailers, Wholesalers, Artisans, and more.

Categories of businesses are as follow,



### 2. Credit Guarantee Trust Fund for Micro & Small Enterprises (CGTSME) [5]

This was launched in 2000. Any collateral / third party guarantee free credit facility (both fund as well as non-fund based) extended by eligible institutions, to new as well as existing Micro and Small enterprise, including Service Enterprises, with a maximum credit cap of 200 lakh (Rupees Two Hundred lakh only) are eligible to be covered. Recently, guarantee coverage made us eligible to select NBFCs and Small Finance banks.

### 3. Financial Support to MSMEs in ZED Certification Scheme[5]

This was launched in 2016. It is to encourage all types of manufacturers which are registered under MSME to create better products. MSMEs will be given financial assistance/subsidies for obtaining ZED Certification Level.

An MSME unit will get subsidies as per the following structure, on the cost of certification:

Micro Enterprises: 80%

Small Enterprises: 60%

Medium Enterprises: 50%

An additional subsidy of 10% for the MSMEs owned by Women/SC/ST Entrepreneurs OR MSMEs in NER/Himalayan/Island territories/aspirational districts.

### 4. Credit Linked Capital Subsidy for Technology Up gradation (CLCSS) [5]

This was enforced with effect from 01.04.2017 till 31.03.2020 or till the time sanctions if the aggregate Capital Subsidy disbursed reach to Rs. 2360 crore, in which The Govt can give 15% subsidy on investment up to Rs 1 crore for upgrading technology.

Name of The Bank which is associated with this scheme.

1. Andhra Bank
2. Bank of Baroda
3. Bank of India
4. Canara Bank
5. Corporation Bank

6. Indian Bank
7. NABARD
8. Panjab National Bank
9. SIDBI
10. State Bank of India
11. Tamil Nadu Industrial Investment Corporation
12. Design Clinic for Design Expertise to MSMEs

#### 5. Design Clinic For Design Expertise To MSMEs. [5]

The goal of this scheme is to help to link up MSMEs and design experts to design economical solutions through efficient change in the design of existing products.

The scheme is divided into two major parts:

a. Design Awareness- Seminars & Workshop	Funding
One day seminar	Rs. 60,000/- per program
For each workshop if 3 - 5 days	Rs. 3.75 lakh per program
b. Design Projects	
Awareness program on new Design strategies	@ 75% for micro, 60% for SMEs for the project range Rs. 15 lakh to Rs. 40 lakh
Students of UG/PG programs from institutions	@ 75% for the project cost of Rs. 2 lakh

Moreover, some technical institutions and universities are also funding new start-ups under their Incubation centre. Gujarat Technical University has an Incubation Center where technical students get funds for their efficient innovative ideas and R K University have also one segment which works for the Start-ups and Innovation project prepared by any students who approach them and provide guidance.

#### VI. Funding And Investment Required For Li- Ion Battery Manufacturing Plant

Sr. No.	Particular	In Rs.
1.	Land or Factory shade	50,000/- on rent (Monthly) or for Own Land Investment 1.5 Cr
2.	Primary Company/ Firm legal Registration	50,000/-
3.	Machinery	40,00,000/-
4.	Tools	50,000/-
5.	Software	1,00,000/-
6.	Furniture	3,00,000/-
7.	Flooring for Lab. Area	3,00,000/-
8.	Initial Raw materials	10,00,000/-
Total Approx		Rs. 58 Lakh to Rs. 60 Lakh To Rs. 2.00 Cr.

**RUNNING COST INVESTMENTS (MONTHLY)**

Sr. No.	Particular	In Rs.
1.	Technical staff expenses	1,00,000/-
2.	Non technical Staff expenses	25,000/-
3.	Other expenses like Electricity bill ,Tax bill or any other Govt. Charges etc.	50,000/-
4.	Software renewal charges	5,000/-
	Total Approx	Rs. 1.80 Lakh to Rs. 2.00 Lakh

As per the commercial analysis and as per the schemes available for MSMEs and Start-ups the primary investment can be afforded and manageable. Out of the above listed, investment particulars may vary and depend upon the size of plant capacity; company associations like Partnership, LLP, Pvt. Ltd. Etc.

**VII. Payback And ROI Plan For Li- Ion Battery Manufacturing Plant (By Simple Method) [1]**

Sr. No.	Particular	Per Unit price in Rs.	Plant Unit capacity per month in Nos.	Total Turnover in month in Rs.
1	Approx 2 wheeler (low speed) battery pack price of 46.8 V/ 30 Ah	27,350	200	54,70,000/-
2	Approx 2 wheeler (high speed) battery pack price of 51.2 V/ 86 Ah	96,500	100	96,50,000/-
Total				1,51,20,000/-
Capital Investment				2,00,00,000/-
Payback in Months				1.3 or 2 Months
ROI (keep 2% Profit Margin )				3,02,400/-

**Conclusion**

The reform in the transport sector towards petrol vehicles to E mobility, which has most beneficial to boost employments in this new area, reduce emissions and also sustain the

beauty and peace of any country. In EV, nowadays Li-Ion batteries have the biggest market segment. Continuous decline of the cost price, advanced manufacturing technology, increased cycle life, low weight and high energy storage potential make Li-Ion batteries an optimal choice in this field. During the study here some financial schemes and investment segments were discussed which will benefit for anyone who ever wants to start business on EV segment. As discussed, EV market and particularly Li- Ion battery manufacturing is an emerging market which opens new opportunities for engineers. Recycle and reuse can be ways for batteries that come to the end of life (EoL). Recycle batteries also called as secondary batteries. This will give a big hand in reducing the impact on environment. Besides that, by comparing on increasing the lifespan. The use of batteries would be a better choice.

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## **Energy Conservation Testimony of RK University after Deploying Renewable, Efficient & Sustainable Technologies**

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### **Abstract**

The engineering education can play a significant role to promote and develop a clean, green, and sustainable environment around the world. Recently, COP26 (twenty-sixth session of the Conference of Parties) has showcased the global efforts to address climate change impacts on the Earth. In the same regard, this article is presenting the annual report of energy conservation in RK University through renewable, efficient, and sustainable technologies. This annual testimony concentrates on the energy saving efforts taken by the University through successful execution of roof-top solar power plant, biogas plants, rain-water harvesting system, solar water heater system, energy efficient sensor-based street lights and energy efficient fans. This article also includes various energy conservation computations to realize the important of clean and green energy. This annual report also fulfills the requirement of “Green Campus” as per the UGC and “Swachh Campus” as per the MHRD, Government of India.

**Keywords:** *Sustainable environment; Climate change; Energy conservation; Annual report; Green campus; Swachh campus.*

### **Introduction**

For the past two decades, the energy demand from fossil fuels has increased enormously due to massive industrial growth and a steep rise in population [1]. Renewable energy sources have attracted attention as potential sources of energy. They are clean and cost-effective than conventional energy sources. Green energy is one of the 20 sustainable development goals emphasized by the United Nations. As of September 2021, India has 101.53 GW of renewable energy capacity and represents ~38% of the overall installed power capacity. The country is targeting about 450 GW of installed renewable energy capacity by 2030.

By the end of COP26, 151 countries had submitted new climate plans (known as nationally determined contributions, or NDCs) to slash their emissions by 2030 [2]. In engineering education, several universities have developed short-term courses to provide certificates in education for clean, green & environmental sustainability available to all disciplines. The role of universities and colleges are to take climate action by promoting and executing clean, renewable, and sustainable energy-based systems. With this same regard, RK University has taken the initiative to develop “Swachh campus” & “Sustainable

environment” by implementing renewable, efficient & sustainable technologies.

As per the 2019-2020 annual report of energy audit and energy conservation for RK University, more than 50% of the electricity consumed by RK University is produced from roof-top solar photo-voltaic (SPV) plants installed in the university campus. Moreover, solar water heaters are also installed in the university campus to boil the water.

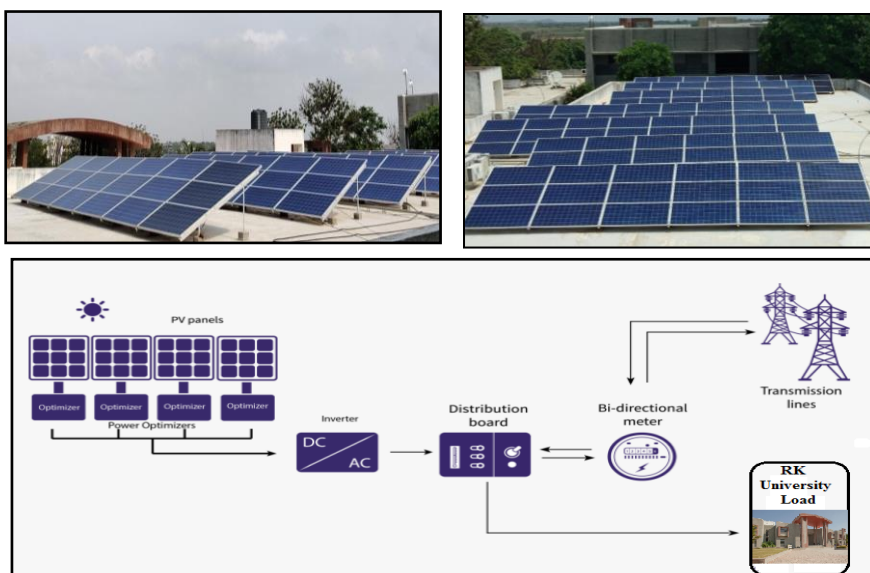
A bio-gas plant is also installed in the university area and the output gas is used in the hostel kitchen area of the university. The university campus has the provision of rainwater harvesting to make maximum use of rainwater. And the water demand is fulfilled by 2 numbers of open wells in the campus.

The university is also having energy efficient technology like energy efficient BLDC (Brushless Direct Current) fans which save ~60% of electricity compared to conventional fans. Furthermore, the university campus has installed the latest LED tube lights which save ~50% of electricity compared to conventional tube lights. In the university campus, outside streetlights are worked by day-light sensors which reduces the wastage of electricity.

### Energy Conservation by Renewable Resources: RK University

This article represents the energy conservation report of RK University, which includes renewable energy system-based implementation work as mentioned below.

#### (A) Roof-top SPV Plant



**Fig 1:** Photographs and layout of Roof-top Solar PV Plant

A Roof-top Solar PV Plant is installed in RK University since 2018. The total installed capacity of this plant is 157.5 kW. As per geographical location, the latitude and

longitude of this plant are 22.2406° N and 70.9017° E, respectively. In this plant SPV panels are installed at the angle of 26.5°. Moreover, the net area covered by SPV panels is 1,570 m<sup>2</sup>. Total capital cost of this roof top SPV plant is Rs. 88.91 lakh and after receiving 30% subsidy by state and central government, net amount Rs. 63.15 lakh was paid by the University. This SPV plant has 3 numbers of “on-grid” inverters with the capacity of 50 kVA each. SPV panels are mounted on an aluminum fixed structure for supporting purpose.

In this plant, poly-crystalline cells are used, and each module has 72 numbers of poly-crystalline cells. The module rating is 320 W<sub>P</sub> and total numbers of SPV modules are 492. This plant has total 48 numbers of panels with a total rating of 157.5 kW. Let’s see few historical analysis related to this plant as per below graphs.

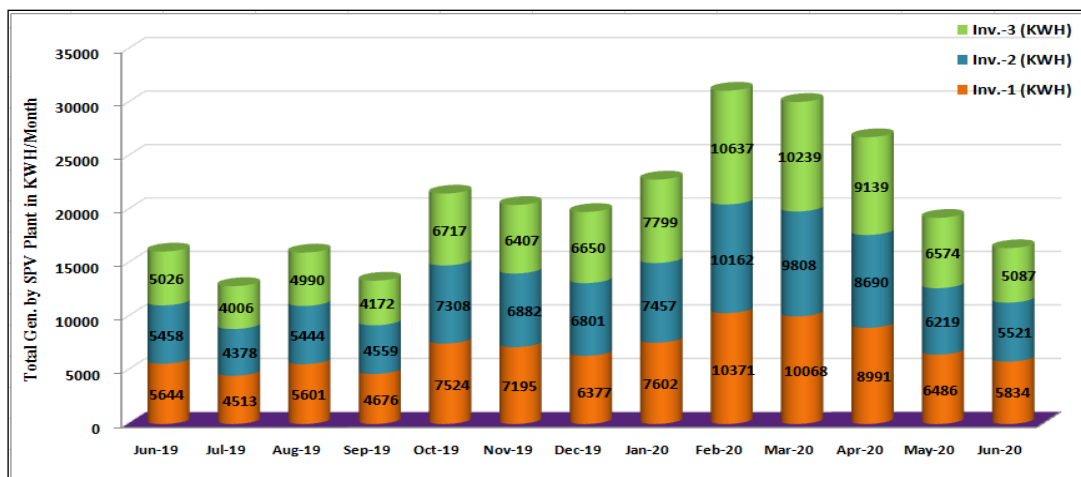


Fig 2: Month wise KWH generation of SPV plant

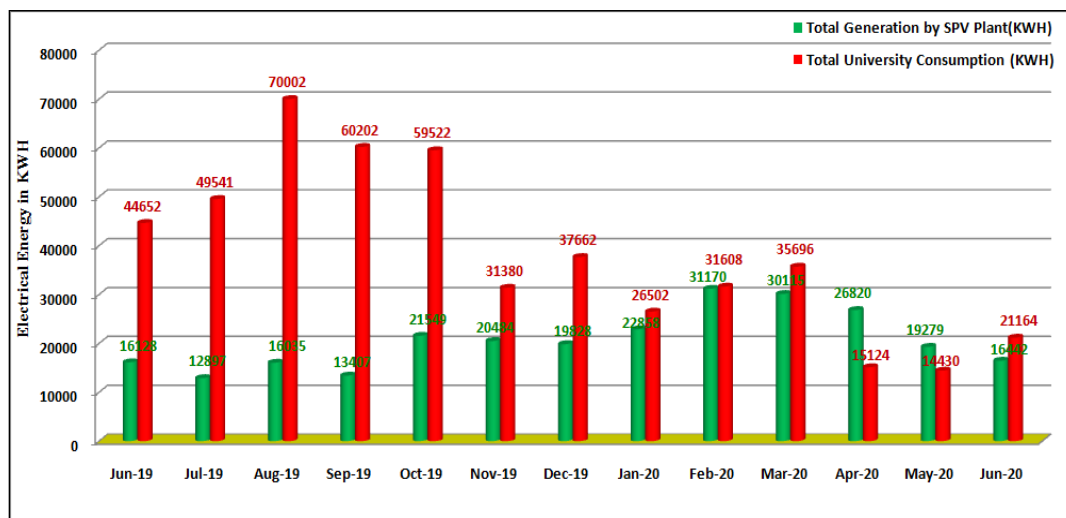
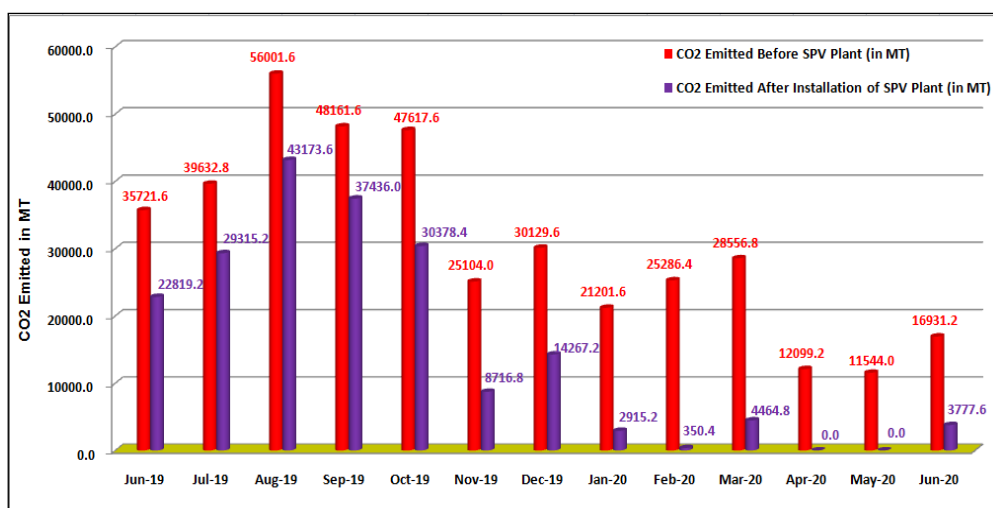


Fig 3: Month wise electricity generation by SPV plant Vs. month wise electricity consumption by the University





**Fig 4:** Month wise CO<sub>2</sub> emission by University with/without installation of SPV plant

As per the above graphs, it is understandable that, annually 53% of the electricity used in the University is drawn from Solar PV plant. Moreover, annually same percentage of CO<sub>2</sub> emitted from the University's electricity consumption is also reduced [3]. The overall the average efficiency of SPV plant is near to 15.32% and average utilization factor is around 44.5% [4]. If we estimate the payback period of this plant than ideally it should be around 3.5 years, but due to less per unit rate of SPV generation (~Rs.3 per unit) and higher per unit rate of grid electricity consumption (~Rs.8 per unit), the net payback period stands around 8.5 to 9 years includes maintenance cost. This SPV plant is installed by JJPV Pvt. Ltd., Rajkot.

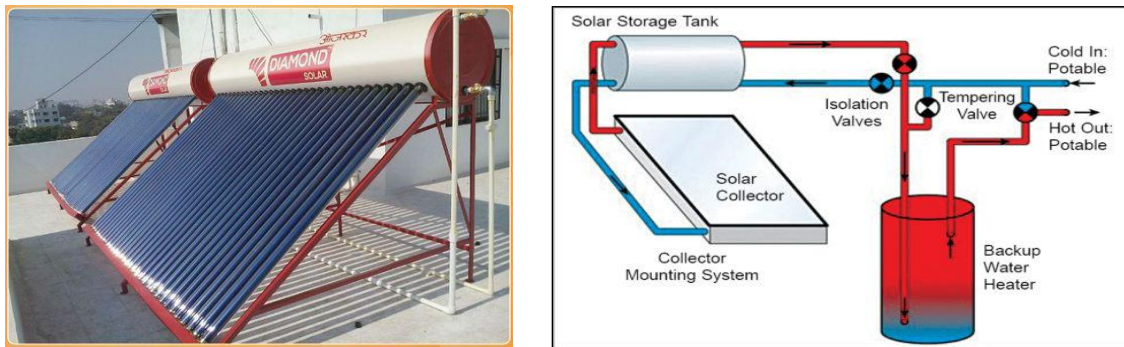
### (B) Solar Water Heaters

One more usage of the same renewable resource in RK University is solar water heaters. In the University's hostel area and staff quarters having excellent solar water heater facility & total 52 numbers of solar water heaters are successfully installed since 2011. And the net cost of solar water heater is Rs.38,000 each.

**Table 1:** Building/area wise solar water heater list in RK University

Sr. No.	RK University area	No. of Solar water heaters	Capacity of heating in Liter
1.	Hospital area	3 + 4 = 7	500 Liters each
2.	Boy's Hostel - A	4 + 4 + 4 = 12	500 Liters each
3.	Boy's Hostel - B	4 + 4 + 4 = 12	500 Liters each
4.	Girl's Hostel - A	2 + 1 = 3	500 Liters each
5.	Girl's Hostel - B	2 + 1 = 3	500 Liters each
6.	Girl's Hostel - C	2 + 2 = 4	500 Liters each
7.	2 BHK Staff Quarters	3 + 2 = 5	500 Liters each
8.	3 BHK Staff Quarters	1 + 1 = 2	500 Liters each
9.	North Star School	2 + 2 = 4	500 Liters each

If consider a conventional electric heater in the stand of solar water heater, then 3.5 KW power is required to boil 500 Liter water. Thus, the net power saving from solar water heater is  $52 \times 3.5 = 182$  KW. Let's see the photo/layout of the solar water heater as below.

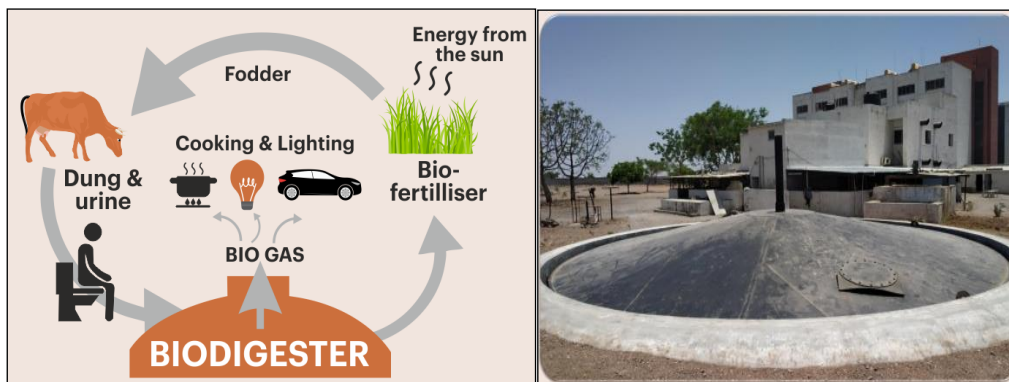


**Fig 5:** Photograph and layout of solar water heater

The solar collector tubes are mounted at 45°. And a backup water heater is also available [5] as a mention in the above figure. Moreover, the type of solar water heater is “Evacuated tube collector” which has good efficiency.

### (C) Bio-gas Plant

Biogas is a type of bio-fuel that is naturally produced from the decomposition of organic waste. Hence, it is a renewable or green source of energy. Bio-gas plant is a device for the conversion of fermentable organic matter in particular cattle dung/food waste into combustible gas [6]. Now, RK University has facilitated a bio-gas plant that is working by food waste of hostel mess & kitchen area. Moreover, the gas produced by the plant is used for the cooking purpose in same kitchen area.



**Fig 6:** Process layout & photograph of bio-gas plant of RK University

The capacity of RK University's bio-gas plant is 85 m<sup>3</sup> & daily feed is 2125 kg. Daily water requirement is ~2000 liter. The model of this bio-gas plant is KVIC floating dome type, and the plant commissioning date is 3<sup>rd</sup> August 2018. The cost of plant is Rs.13.5 lakh. The output gas connection of this plant is at hostel kitchen area.

#### (D) Rain-Water Harvesting System

Water is one of the most important elements in the daily routine life. The average annual rainfall of India is 119 cm and out of them India stores only 6% of rainfall [7]. The rain is only source of water & using the Rain-Water Harvesting System (RWHS), people can store the rainwater in the tank and recharging aquifer directly or indirectly [6]. The RK University is situated in Saurashtra agro-climatic zone. And the major part of the Saurashtra region falls under semi-arid type with varying climatic as well as soil.

RK University campus has the provision of RWHS & its plan is to make maximum use of rainwater. Let's see the figure of RWHS & few snap-shot of installed RWHS in the University.



**Fig 7:** Layout & Photographs of RWHS

In general, rooftop rain-water from the buildings is collected in the tank and excess water diverted into the well for recharge. In RK University, the capacity of underground tank is 2 lakh liters. The water demand is fulfilled by 2 open well & 3 bore wells in the campus; it is recharged by rooftop rainwater in rainy season. Moreover, harvested rainwater used in hostel & college building. The ground-water recharge is done from the surface runoff from the campus. Recharging water into the aquifers is assist in improving the quality of existing ground-water. The net cost of RWHS is Rs.2.5 lakh.

#### **Energy Conservation by Efficient & Sustainable Technologies: RK University**

Energy conservation report of RK University is also including few energy efficient & sustainable technological devices as mentioned below.

##### (1) Energy Efficient BLDC Ceiling Fans

RK University campus has successfully installed energy efficient BLDC ceiling fans with the power rating of only 32 W.



**Fig 8:** Photograph of BLDC ceiling fan

The air delivery and fan diameter are same as the conventional fan but due to in-built BLDC motor; the total power consumption of this fan is reduced up to 60%. And the payback period of this BLDC ceiling fan is around 2 to 2.5 years only.

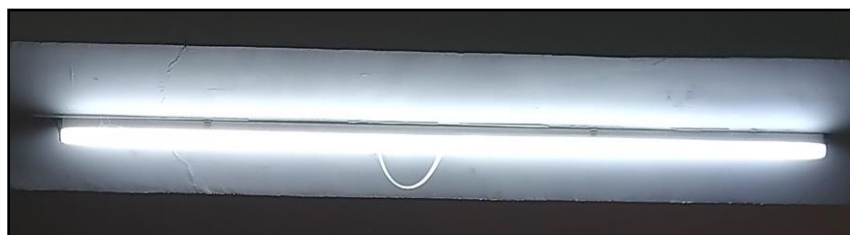
**Table 2:** Features of BLDC ceiling fan

Sr. No.	Features of BLDC Ceiling Fan	
1.	Power Consumption	32 Watt
2.	Voltage Range	90 to 270 V
3.	Air Delivery	220 m <sup>3</sup> / min.
4.	Net Weight	4.2 kg
5.	Color	White
6.	Material	Aluminum
7.	Mfg. Company	Sinox Power Pvt. Ltd., Rajkot.
8.	Dimension (L*W*H)	54 x 24 x 23 cm
9.	Max. Speed	375 RPM
10.	No. of Speeds	6
11.	Power Factor	0.95

In RK University, total 840 numbers of BLDC ceiling fans are installed and working efficiently (as per June 2022 data). Now, compared to a conventional ceiling fan of 80 W, the monthly electricity saving from this BLDC ceiling fan is [(80W\*30 days\*6 hrs.) – (32W\*30 days\*6 hrs.)] 8.64 kWh per fan [8].

## (2) Energy Efficient LED Tube lights

RK University campus has also effectively established LED tube lights with the power rating of 20 W. The light intensity & illuminance are the same as per conventional tube light but due to the used of LED; total power consumption of LED tube light is reduced up to 50 % [9]. And the payback period of this LED tube light is around 2.5 to 3 years only.



**Fig 9:** Photograph of LED tube light

In RK University, the total 450 numbers of LED tube lights are mounted and working successfully (as per July 2022 data). Now, compare to conventional tube light of 40 W, the monthly electricity saving from this LED tube light is [(40W\*30 days\*6 hrs.) – (20W\*30 days\*6 hrs.)] 3.6 kWh per tube light. The detailed features of LED tube light are mentioned below.

**Table 3:** Features of LED tube light

Sr. No.	Features of LED tube light	
1.	Power Consumption	20 Watt
2.	Voltage Range	110 to 280 V
3.	Model; Type	20 W LED; T5
4.	Color Temp.	6500 K
5.	Length	120 cm
6.	Luminous Flux	1800 Lumen
7.	Mfg. Company	Newbie Tech. Pvt. Ltd., Rajkot.
8.	Power Factor	0.85

### (3) Energy Efficient Day-light Sensor based LED Street Lights

RK University campus has also effectively installed energy efficient day-light sensor-based LED streetlights with the power rating of just 22 W.

**Fig 10:** Photograph of LED Street light

The light intensity & illuminance are same as per conventional streetlight but due to the used of LED; total power consumption of LED Street light is reduced and due to day-light sensor the wastage of electric power is also diminished [10].

**Table 4:** Features of LED Street light

Sr. No.	Features of day-light sensor based LED street light	
1.	Power Consumption	22 Watt
2.	Voltage Range	220 to 260 V
3.	Optics	Polycarbonate diffuser
4.	Height of the Pole	3.75 Mtr.
5.	Type of Sensor	Photocell or Day-light
6.	Luminous Flux	2100 Lumen
7.	Mfg. Company	Fornax LED Pvt. Ltd.
8.	Power Factor	0.90

In RK University, total 130 numbers of day-light sensor based LED Street lights are installed and working powerfully (as per July 2022 data). Now, compared to conventional streetlight of 80 W, the monthly electricity saving from this day-light sensor based LED Street light is  $[(80W*30 \text{ days}*6 \text{ hrs.}) - (22W*30 \text{ days}*6 \text{ hrs.})]$  10.44 kWh per street light. And the payback period of LED Street light is 1.5 to 2 years only.

### Conclusion

By using renewable, efficient, and reliable technologies, RK University has conserved a high amount of electricity (~65%). Capital or initial costs of these technologies are high (2 to 2.5 times) but running or working costs are very less (30% to 50%). Thus, payback periods of all technologies are around 1.5 years to 3.5 years only. Moreover, by using these technologies, the total CO<sub>2</sub> emission from the University's electricity consumption is also reduced (65%).

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## Relationship Between Sit to Stand Ability, Cognition, Freezing of Gait and Activities of Daily Living in Parkinson's Patients: A Cross Sectional Study

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### ABSTRACT

Background: "Sit to stand" being a prerequisite for walking, the inability of patients to perform it can result in institutionalization. Cognition and freezing of gait also impaired functioning and mobility in activities of daily living. There was a need to find out whether "sit to stand" ability correlates with cognition, and quality of life in Parkinson's patients.

Method: It was a cross sectional study in which thirty-three Hoehn & yhar stage 1,2, and 3 patients aged 50 to 70 years were included. Patients with musculoskeletal impairments of lower extremity which would affect walking were excluded from the study. Each patient performed five times sit to stand (5TSTS) from a chair and time taken was recorded. Mini mental scale was (MMS) taken for cognitive impairment. Freezing of gait questionnaire and Parkinson's disease activities of daily living scale (PDADLS) was also taken.

Result: Correlation between the outcomes of the variables was analysed using Pearson correlation co-efficient. The 5TSTS scores showed strong positive correlation to PDADLS and with MMS weak positive correlation. However, moderately positive relationship was found between freezing of gait and PDADLS.

Conclusion: The study concludes that change in the 5TSTS performance can affect motor functions and freezing gait like daily living activities of life but not any significant in cognitive functions. Exercise training focusing on sit-to-stand ability may also influence activities of daily living (ADLs) and freezing gait in Parkinson's patients.

**Keywords:** *Cognition, freezing gait, Parkinson's Disease, Sit to Stand Ability.*

### INTRODUCTION

Parkinson's disease (PD) is a disorder of the central nervous system (CNS) which is progressive and has both motor and nonmotor symptoms. The cardinal motor symptoms include features of rigidity, bradykinesia, tremor and in later stages, postural instability. Constipation, Rapid eye movement (REM), sense of smell, sleep behaviour disorder, mood disorder, orthostatic hypotension are the early features of Parkinson's disease. The nonmotor symptoms include altered bladder function, excessive saliva, integumentary changes, difficulty speaking and swallowing, and cognitive problems (slowed thinking, confusion, and in some cases dementia) are included in non-motor early symptoms.<sup>1</sup>



The term parkinsonism is a generic term used to describe a group of disorders with primary disturbances in the dopamine systems of basal ganglia (BG).<sup>1</sup> Parkinson's disease ( PD) is a common disease that affects an estimated 1 million Americans and an estimated 7 to 10 million people worldwide. More than 2% of people older than 65 years of age have Parkinson's disease (PD).<sup>1</sup> The prevalence of the disease is expected to increase substantially in the coming years due to the aging of the population.<sup>1</sup> Difficulties with gait and balance in Parkinson's disease (PD) increase the risk of falls, institutionalization, and mortality.<sup>2</sup>

Pal, G., O'Keefe et al. study revealed that there is a correlation between reduced processing speed and impaired turning in Parkinson's disease. Identification of processing speed deficits is particularly important since this construct has the potential to be modified with cognitive training <sup>3</sup>. Another Research of Brett W. Fling, Marian L. Dale et al. established that cortical input from areas involved with higher cognitive function is required for safe ambulation. The relationship of cognitive impairment, especially prefrontal lobe dysfunction, has been linked to motor disability in PD but the mechanism of relationship is still unclear.<sup>2</sup> With the Parkinson's disease (PD) progression other impairments occur, such as postural instability and gait dysfunctions . These impairments result in a greater propensity to falls, as well as a reduced capacity to walk , and lead to progressive functional restraints.<sup>4</sup>

These physical aspects contribute to worsen the quality of life in patients (QoL). QoL is a multidimensional concept that refers to an individual's subjective perception concerning their life and other aspects, such as familial relationships, the patient's own health, financial issues, housing, social life and leisure.<sup>5</sup> A frequently observed symptom in advanced stages of Parkinson's disease (PD) is Freezing of Gait (FOG).The prevalence of FOG lies between 20% to 60%.<sup>6</sup> This disabling clinical phenomenon is defined as follows: "brief, episodic absence or marked reduction of forward progression of the feet despite the intention to walk". Patients with PD generally describe FOG as "having the feeling as if their feet are glued to the ground."<sup>6,7</sup> Patients with PD often describe that FOG is triggered in stressful conditions like Walking in crowded places or walking through narrow spaces, like crossing the doorstep. Furthermore, FOG is often associated with falls and reduced quality of life (QoL).<sup>7,8</sup>

Patient-reported assessments of freezing of gait (FOG) in Parkinson's disease (PD), such as the FOG questionnaire (FOGQ), would be needed because FOG is difficult to assess objectively.<sup>8,9</sup> However, the measurement properties of the FOGQ have been sparsely assessed. The FOG-Q is one of the well-known and often used measurement tool in clinical settings. The FOG-Q is less time consuming and can be administered with ease.<sup>10</sup> The FOG-Q has already shown high reliability(0.94) and validity for detection of FOG-Q in PD patients in previous studies.<sup>11</sup>

The impact of disease on activities of daily living (ADL) as reported by patients themselves is an important measure of the disadvantage attributed to any disease state. The degree to which a disease interferes with the ability to carry on a normal life is likely to be

more important to the patient than formal measures of disease severity.<sup>12</sup> The PADLS is also found to be a valid and reliable(0.89) instrument to assess ADL in Parkinson's Disease(PD).<sup>13</sup> It is a self-reported questionnaire. The PADLS introduces a new disease-specific measure in PD, which provides health professionals with a reliable index of self-rated ADL. The Parkinson disease activities of daily living scale (PADLS) is acceptable to patients and takes very little time or effort to complete.<sup>13,14</sup>

The high number of falls and subsequent injuries, establishment of an outcome measure that reflects both lower extremity strength and balance deficiencies in individuals with PD. Sit-to-stand (STS) movement is considered a fundamentally required movement for mobility and functional independence, as the movement is part of many Activities of Daily Living (ADL).<sup>15</sup> The Five times sit to stand (FTSTS) would appear to be very useful for assessing fall risk in individuals with PD, as strength and balance deficiencies are prominent. Five times sit to stand (FTSTS) in PD is most related to balance and fall risk.<sup>15,16</sup> The FTSTS is reliable(0.95) and easy to administer, and may be useful as a quick means of assessing gross fall risk in individuals with Parkinson's Disease(PD).<sup>17</sup>

The full spectrum of cognitive impairment, from subjective cognitive decline to dementia, has been observed in Parkinson disease (PD).<sup>18</sup> The Mini-Mental State Examination (MMSE) is the most commonly used brief cognitive tool in the assessment of a variety of cognitive disorders.<sup>19,20</sup> It is reliable(0.90) and Relatively quick, easy to perform, Requires no additional equipment. It Can provide a method of monitoring deterioration over time.<sup>20</sup>

The aim of study is to find out the relationship between freezing of gait, cognition, sit to stand and activity of daily living in Parkinson's patient. Patient with Parkinson's typically progress with cognitive impairment during the later stage of life which leads to further complication so, the need for this study is to examine the relationship between functional mobility, freezing of gait, cognition and activity of daily living. This correlation gives the idea about the specific deficit of patient which help to establish the proper rehabilitation protocol. Study hypothesized that all these components may correlate to one another or may not correlate.

### **Methodology**

**Study setting:** Shree k k sheth physiotherapy college, Rajkot.

**Study population:** Parkinson's disease patients

**Sampling technique:** Purposive sampling

**Sample size:** 33 patients

**Study design:** Cross sectional observational study

Study design and Participants:

We had recruited 33 patients with the age group ranging from 50 to 70 years. All the patients were explained about the purpose of the study. Written consent was taken from the patients. Ethical clearance for the study was granted by institution committee. The patients were

purposely assigned for study. The sample size was calculated on the basis of Parkinson's symptoms reported previous study ( $\alpha = 0.05$ ,  $\beta = 0.20$ ,  $r = 0.50$ , power = 90, 95%CI). All the subjects were assessed fulfilling their inclusion and exclusion criteria. Patients were Included if they had 50 to 70 years age, male or female, Hoehn & yhar stage 1,2, and 3 and could follow instruction. Patients with any musculoskeletal injury or disease, neurological disease other than Parkinson's were excluded.

#### Procedure

After the enrolment of the patients 5 times sit to stand was performed and freezing of gait questionnaire (FOG-Q), Parkinson's disease activities of daily living (PADLS), Mini mental state examination (MMSE) was taken for every patient included in the study on the same day.

#### Freezing of gait questionnaire

The Freezing of gait is 6 questions questionnaire used to help assesses freezing of gait severity unrelated to falls in patients. It is sub divided in to 4 of the items assessing FOG severity and 2 of the items assessing gait. Questions included are during worst state you're walking like, your gait difficulties affect your activities, do your feet feel while turning or initiate gait, how longest this episode, how longest typical hesitation, how longest typical turning hesitation. Total score ranges from 0 to 24 and high score correspond to more severe FOG. FOG questionnaire which is highly reliable and valid tool has high test-retest reliability for score (ICC 0.94).<sup>11</sup>

#### Parkinson's disease activities of daily living scale

The Parkinson's disease ADL scale is self-rated questionnaire used to help assesses severity of affection of ADL due to disease. It has 13 items with daily living like dressing, speech, hygiene, salivation, swallowing, handwriting, cutting food, turning bed, falling, freezing when walking, waking, tremors, sensory compliant related to Parkinson's. Total score ranges from 0 to 52 high score indicate more affected ADL. We have used Parkinson's disease activities of daily living scale which is reliable and valid tool has test-retest reliability ICC 0 .89.<sup>13</sup>

#### Five times sit to stand test (5×SST)

The 5xSST scoring is based on the amount of time (to the nearest decimal in seconds) a patient takes to transfer from a seated to a standing position and back to sitting for five times. The equipment needs in performing 5xSST test includes: Stopwatch and standard height chair with straight back (43-45 cm, 17-18 inches high). The patients were given a practice trial for this test and a minute of rest was given before the actual performance. Patients sat comfortably with leg well supported on the standard chair with a backrest. It was ensured the patient stood up completely and sat down in the procedure. Also, patients were instructed to fold their arms across their chest. (fig.1) Then the patients were instructed to do sit-to-stand five times, as quickly as possible, at the count of go and without their back or leg resting on the chair between the interval of repetition and time was taken. The results were interpreted as the lesser the time taken by the patient to complete the test the better was

the outcome of the test. The normal score is 11.4 seconds for elderly age groups. The 5xSST test has excellent intra-rater reliability (ICC) range: 0.914–0.933) and excellent test-retest reliability (ICC range: 0.988–0.995).



Fig. 1 five times sit to stand test

#### Mini-mental state examination

The Mini-mental state examination is used to measure cognitive impairment in older adults. it can be used for screening of cognitive impairment, to estimate the severity of cognitive impairment at a given point in time, to follow the course of cognitive changes in an individual over time, and to document an individual's response to treatment. It is used to assess different subset of cognitive status including attention, language, memory, orientation, visuospatial proficiency. Orientation to time has 5 questions and 5 points, orientation to place has 5 questions and 5 points, Registration like repeating the name prompt has 3 points, attention and calculation subset have 5 points, recall subset has 3 points, language subset has 2 points, repetition subset has 1 point and complex commands subset like drawing an object has 6 points. The total scored on a scale of 0-30 with scores > 25 interpreted as normal cognitive status. The MMSE has higher specificity (95%) with ICC .90.<sup>20</sup>

#### Statistical analysis

The data was analysed using statistical package for social science (SPSS), version 26. The Kolmogorov Smirnov test was used to verify normality of the distribution of variables.

The values for variables showed a normal distribution, so parametric tests, Pearson correlation co-efficient was used to analyse the data.

### Results

The mean age of the patients was  $62.03 \pm 4.45$  years. The characteristics of the patients are shown in Table 1. After analysis, as shown in Table 2, the 5TSTS score showed strong positive correlated with ADL ( $r = 0.838$ ,  $P < .001$ ) and moderately strong positive relationship between 5TSTS and freezing of gait ( $r = 0.246$ ,  $P = .168$ ). However, there was a low negative relationship.

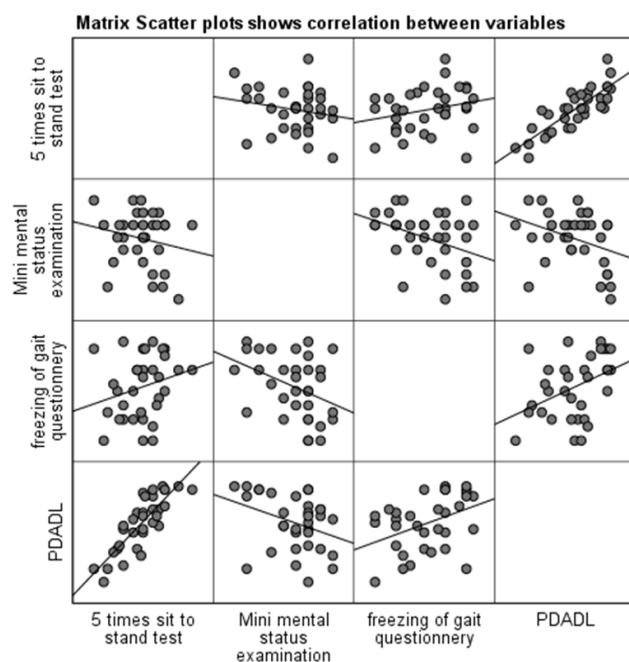
Variables	Mean $\pm$ SD
Age	$62.03 \pm 4.45$
5 times seat to stand	$13.4 \pm 1.108$
MMSE	$24.91 \pm 2.199$
Freezing of gait	$13.58 \pm 4.395$
ADL	$37.94 \pm 8.303$
Male female ratio	17: 16

Table 1. Patient characteristics Values are expressed in mean  $\pm$  SD mention between 5TSTS and MMSE ( $r = -0.197$ ,  $P = .271$ ). Also, MMSE was moderately negatively correlated with freezing of gait ( $r = -0.382$ ,  $P = .028$ ) and negative correlated with ADL ( $r = -.344$ ,  $P = .050$ ) whereas freezing of gait and ADL were moderately positive correlated with each other ( $r = 0.410$ ,  $P = .018$ ).

		Sit to stand	MMS	Freezing of gait	ADL
Sit to stand	Pearson correlation	-	-.197	.246	.838**
	P value	-	.271	.168	.000
MMS	Pearson correlation	-.197	-	-.382*	-.344**
	P value	.271	-	.028	.050
Freezing of gait	Pearson correlation	.246	-.382*	-	-.410*
	P value	.168	.028	-	.018
ADL	Pearson correlation	.838**	-.344*	.410*	-
	P value	.000	.050	.018	-

Table 2 shows correlation between variables

\*\*Correlation is significant at the 0.01 level. \* Correlation is significant at the 0.05 level



graph 1. Matrix Scatter plots shows correlation between variables

## Discussion

The STS transition is one of the most important activities of daily living because people frequently use it as they move from sitting to standing and then often to walking. There are very few literatures available on relationship between sit-to-stand ability and other measures of functional independence. Therefore, the purpose of this study was to investigate relationship of 5TSTS, freezing of gait, cognition and activity of daily living in Parkinson's patients. For a successful performance of the 5TSTS test, lower limb strength and balance reactions of either or both lower extremities are required although contributions from individual legs cannot be differentiated. The results of this study revealed a strong positive relationship between 5TSTS test and activity of daily living ( $r = .838$ ). Susanna Mezzarobba at all found out that PD + FoG show postural control differences in STW, compared with PD-FoG and healthy. Different spatial distribution of COP trajectories, between two PD groups are probably due to a deficit to plan postural control during a more demanding motor pattern, such as STW.<sup>21</sup> Dawn M tan at all found Freezing of Gait and Activity Limitations in People With Parkinson's Disease in that FOG severity and gait hypokinesia were associated with reduced levels of activity after adjusting for disease severity.<sup>22</sup> Mon S. Bryant, at all found that Many persons living with Parkinson's disease (PD) have difficulty rising from a chair. Low physical activity levels and reduced ability to perform activities of daily living (ADL) may be associated with Impaired ability to perform the chair rise in persons with PD. The patients with PD may have difficulty

in living independently and engaging in physical activities of daily living due to impaired ability to rise from chair.<sup>23</sup> Altered anticipatory postural control and consequently a failure to bring the COM adequately forward over the feet prior to the lift-off of the buttocks from the chair may be a result of inability to rise from a chair in persons with PD. Ryan p duncan et al. suggested that sit-to-stand performance is also correlated with balance confidence (ABC) and mobility-related quality of life (PDQ-Mobility) in PD, with those who take longer to perform the FTSTS having lower balance confidence and poorer quality of life.<sup>25</sup> Ashley Harrie et al. found that the link between dual tasking and fall risk in PD may be caused by cognitive features other than executive dysfunction and may vary based on the ambulatory task in question. These findings refer to on the cognitive contributions to falls in PD.<sup>24</sup>

Sarah Vercruyssen et al. suggested that One of the cognitive hypotheses of FOG states that freezing is a consequence of frontal executive dysfunction based on evidence that freezers demonstrated reduced cognitive flexibility and verbal fluency, compared to non-freezer. Cognitive decline in freezers was unrelated to freezing severity. This suggest that freezing of gait have a minimal influence on cognition and vice versa. The cognitive and motor contributions to ADLs are different which suggests that interventions targeted at motor control may result in selective improvements in independent functioning. Deborah A. Cahn and Edith V. Sullivan et al. suggested that specific components of simple motor functioning and executive functioning mediate performance on ADLs. He found that some cardinal signs of PD influence ADL suggesting a selective relationship with fine motor control and speed, rather than with severity of rigidity. The current results support the findings that cognitive screening measures are predictive of ADL functioning or cognition is correlated with ADL functioning.<sup>26</sup>

Orna Moore, et al. suggested that FOG has an independent and significant impact on QoL in PD patients, beyond its effect on gait and mobility. Our results also suggest the positive correlation of freezing of gait and activities of daily living. The possible explanation can be as such, the patient cannot be prepared for the event, which frequently catches him/her in the most uncomfortable and sometimes very unpleasant situation. Such an event is a clear demonstration of the loss of control the PD patient has on his/her own body with regard to a very basic function, mobility. Loss of control, even if transient, is one of the most important fears PD patients express at any stage of the disease. Another aspect of FOG is its social consequences. FOG episodes are frequent in crowded situations like at the theatre or social events, as well as in time restricted situations like crossing the street at a green light or entering an elevator. Getting stuck to the ground or performing ineffective shuffling steps in those situations leads to much embarrassment and frustration, with emotional consequences that can be reflected in QoL assessment.<sup>27</sup>

From the result of our study, we found that sit to stand is important factor associated with motor function and daily living activities in Parkinson's disease. Also freezing of gait has its impact on activities of daily living and therefore needs to be considered. Altered Cognition may not

be associated with the sit to stand ability but may have impact on activities of daily living and thus quality of life in Parkinson's disease.

### **Conclusion**

It was concluded that the activity of daily living is affected by alteration in any of the above parameters but motor activity like sit to stand is not affected by alteration in cognition in Parkinson's disease. The changes in STS ability can affect balance and walking. Also freezing of gait has its effect on activities of daily living and thus quality of life in Parkinson's disease. Due to strong correlation between these variables, the 5TSTS performance can be used as an indicator of the independence in Parkinson's patients. Therapeutic interventions that focused on the "sit-to-stand" ability might give benefits in dynamic balance and quality of life.

### **Clinical implication**

The sit to stand activities in Parkinson's disease has a correlation with freezing of gait and activity of daily living, the physiotherapy rehabilitation should include exercises improving the sit to stand ability. Also exercises to improve freezing of gait would help to improve ADL and thus QOL in PD. Sit to stand used as a test can also be used as for treatment purpose like standing up from high chair, low chair, swiss ball and in later stages if patient is bed ridden this exercise can help making transfer activities more easier for patients and care taker. So, physiotherapy rehabilitation should include sit to stand exercises, gait training and dual task training to improve ADL in PD.

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### **Authors' contributions**

Authors have contributed in literature search, data analysis, and review. authors have contributed in data collection, manuscript preparation, and editing. The authors have read and approved the final manuscript.

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The data collected and/or analysed related to the study are available from the corresponding author on reasonable request and after institutional approval.

### **Consent for publication**

Yes, all the authors provide consent for the publication of this study in this journal. Authors declare that the abovementioned manuscript has not been published or considered for publication elsewhere.



### Competing interests

The authors declare that they have no competing interests.

### Abbreviation

PD = Parkinson's disease

BG = Basal ganglion

5STS = Five times sit to stand test

PDADL = Parkinson's disease activities of daily living scale

ADL = activities of daily living

MMSE = mini mental status examination scale

FOGQ = freezing of gait questionnaire

STW = Sit to walk

COP = control of posture

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## A STUDY TO CORRELATE BETWEEN BMI AND CARDIORESPIRATORY FITNESS AMONG COLLEGIATE STUDENTS: A CORRELATIONAL STUDY

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### Abstract

**BACKGROUND:** Cardiorespiratory fitness is the most important part of healthy lifestyle. Body fat can be measured by BMI. CRF and body composition are related to health have been the focus of researchers in the field of health and physical education. Over the past four decades, there has been an increase in prevalence of overweight and physical fitness declination in adult across all genders. Physical inactivity and sedentary lifestyle lead to accumulation of adipose tissue.

**AIM:** The effect of body mass index on cardiorespiratory fitness among collegiate students.

**METHOD:** The present study was carried out in the students of age group 18 to 25 years with collegiate students. 132 students were selected based on inclusion and exclusion criteria. They were assessing with McArdle step test.

**RESULT AND DISCUSSION:** Normal distribution of data was assessed. BMI and  $VO_{2max}$  were analyzed with Pearson's correlation test using SPSS version 21. It is shown statistically significant negative correlation between BMI and  $VO_{2max}$ .

**CONCLUSION:** This was reported that  $VO_{2max}$  increased as the value of BMI decreased and  $VO_{2max}$  decreased as the value of BMI increased. So, the appropriate planning should be made to maintain normal BMI and Cardiorespiratory fitness.

**KEY WORDS:** *Body Mass Index, Cardiorespiratory Fitness,  $VO_{2max}$ , Collegiate Students*

### INTRODUCTION

Cardiorespiratory fitness is one of the most important components of physical fitness. It is also known as aerobic capacity. Which is the ability of the body to perform dynamic, large –muscle exercise, for prolonged periods, at moderate – to high intensity [1]. CRF is an important marker of physical and mental health in youth. Low or unhealthy CRF is a strong predictor of CRF. Over the past 6 decades, CRF is declined internationally [2]. Maximum oxygen consumption ( $VO_2$  max) is considered to be the most widely accepted measure of CRF. Which gives a baseline estimation of one's heart and lung capacity. It can be used to follow the progress of daily physical exercise [1].

The cardiovascular system consists of the heart, blood vessels and blood. It provides several essential functions necessary for life, such as transporting oxygen and nutrients, removing carbon dioxide and wastes, fighting disease and maintaining body temperature. Cardiovascular disease (CVD), the number one cause of death worldwide, which refers to any disease that affects the cardiovascular system. Many risk factors have been found to be associated with CVD, such as hypertension, diabetes, unhealthy diets, smoking, alcohol, obesity and low CRF. Among these risk factors obesity has received particular attention [3]. High levels of CRF in young adults is associated with a lower risk of having calcification in the coronary arteries. Which prevents the development of early atherosclerotic vascular disease. [1]

CRF and body composition are related to health have been the focus of researchers in the field of health and physical education. Given the fact that CRF and obesity are to important risk factors for CVD, it is of interest to examine the relationship between CRF and obesity.[3] Over the past four decades, there has been an increase in prevalence of overweight and physical fitness declination in adult across all genders.[4] physical inactivity and sedentary lifestyle leads to accumulation of adipose tissue.[5] Regular physical exercise increases CRF level and suppresses the chronic inflammatory state of obesity.[1] Compared with obesity, the impact of CRF on human health has often ignored, even though it appears to be one of the most important determinants of overall health status and a powerful predictor of CVD mortality and morbidity. [3]

Body fat can be measured by BMI. It is based on height and weight that applies to both adult men and women. [6] Obesity is a major global public health challenge of our time.[9] BMI does not measure body fat directly but BMI is moderately correlated with more direct measure of body fat. BMI is strongly correlated with various metabolic and disease outcome as these are more direct measures of body fatness. [7]

With increasing prevalence of severe obesity, more information is needed about health expectancy at the extreme of BMI distribution. That is obesity and severe obesity which typically associate with excess morbidity and mortality. [9]

The calculation of BMI is based on the following formulation.

$$\text{BMI} = \text{Weight(kg)}/\text{Height(m)}^2$$

BMI is interpreted using standard weight status categories. These categories are the same for men and women of all body types.

Measurement of VO<sub>2</sub>max is considered an important part in the evaluation of CRF and aerobic fitness. [2]

Aerobic fitness is a very good indicator of CRF and exercise tolerance for everyday activities which are largely aerobic for general population. It is considered that VO<sub>2</sub> max or maximal aerobic capacity is only a single measure of the functional capacity of the oxygen system or cardiorespiratory system or oxygen transport system. [4]

Sophisticated laboratory equipment is required to measure aerobic capacity directly. However, it can reliably be estimated indirectly by performance submaximal exercise protocol such as the McArdle step test. [2] McArdle step test is used to measure oxygen consumption ( $VO_2$ max) and used to measure CRF. It is a submaximal test  $VO_2$  max is an internationally accepted reference standard for assessing CRF. A lower maximal oxygen capacity is a strong predictor of CVD. Variables measured in McArdle step test are heart rate (HR), rate of perceived exertion (RPE), and  $VO_2$  max. McArdle step test is useful for improving mental performance of young adult population. [8]

The evolution from hunting and gathering to agriculture, followed by industrialization, has had a profound effect on human physical activity patterns (PA). Current PA patterns are undoubtedly the lowest they have been in human history. The modern statistic and epidemiology methods have made it possible to quantify the independent effects of Cardiorespiratory fitness (CRF) and PA on health outcome. Cardiorespiratory fitness is an important health indicator. Any physical activity will have an effect on lungs. Decrease in cardiorespiratory fitness may cause diseases like heart disease, cancer, diabetes, hypertension, stroke, osteoarthritis, respiratory problems etc. Lower level of Cardiorespiratory fitness is associated with the highest risk of this type of diseases.

So, the need of this study is to find out the effect of BMI on Cardiorespiratory fitness among Collegiate students.

### **METHODOLOGY**

- **STUDY DESIGN:** A Correlational study
- **STUDY SETTING:** RK University, Kasturbadham, Bhavnagar highway  
District- Rajkot
- **STUDY SAMPLE:** 132 Subjects
- **STUDY DURATION:** 4 Months
- **STUDY POPULATION:** Male & Female Collegiate Student
- **STUDY TECHNIQUE:** Purposive sampling

### **INCLUSION CRITERIA**

- Male and Female
- Collegiate students
- Age between 18 to 25 years
- Underweight, Normal, Overweight BMI Category

### **EXCLUSION CRITERIA**

- Subjects below 18 years and above 25 years
- History of Cardiac disease

- History of Lung disease
- History of Neuromuscular disease
- History of any Acute or Chronic illness
- Obese Category
- Smokers
- Uncooperative subject
- History of any Acute or Chronic illness

### **MATERIALS USE IN STUDY**

- Pen, Paper, Chair & Table
- Consent Form & Assessment Form
- Stop Watch
- Weighing Machine
- Stedimeter
- Measure Tap
- Stool

### **METHOD**

- In this study 132 samples were selected according to the inclusion criteria, the data was obtained from RK University and measured in 18 to 25 years old collegiate students.
- The procedure was explained to all the subjects and written consent form was taken from them, Weight was measured by weighing machine and height was measured by stediometer.
- Then BMI was calculated which is based on weight and height.  
$$\text{BMI} = \text{weight}(\text{kg}) / \text{height}^2 (\text{m}^2)$$
- Then the McArdle step test was performed.
- In this the following instructions were given to them:
- Do warm up first, then do step up and down on a 41.7 cm step for 3 minutes in time with metronome, after 3 minutes heart rate was measured.

### **OUTCOME MEASURES:**

#### **1. BMI:**

- The BMI was introduced in the early 19<sup>th</sup> century by the Belgian named Lamert Adolphe Jacques Quetelet.<sup>[10]</sup>
- He was mathematician, not a physician. The body mass index (BMI) is the metric currently in use for defining anthropometric height/weight characteristics in adults and for classifying (categorizing) them into groups. The common interpretation is that it represents an index of an individual's fatness.<sup>[11]</sup>

- Body Mass Index is a simple calculation using a person’s height and weight. The formula is  $BMI = \frac{kg}{m^2}$  where kg is a person’s weight in kilograms and  $m^2$  is their height in meters squared.<sup>[12]</sup>

**Table:5.1 BMI CATEGORY**

<b>BMI</b>	<b>Weight status</b>
Below 18.5	Underweight
18.5-24.9	Normal weight
25.0-29.9	Overweight
30.0-34.9	Obesity class I
35.0-39.9	Obesity class II
Above 40	Obesity class III

**2. McArdle STEP TEST:**

- The McArdle step test developed by McArdle, Katch, Pechar, Jacobson, and Ruck (1972).<sup>[13]</sup>
- The step test requires that the individuals step up and down on a standardized step height of 16.25i in (41.25cm) for 3 minutes.<sup>[14]</sup>
- Men step at a rate(cadence) of 24 per minute, whereas women step at a rate of 25 per minute. This cadence should be closely monitored and set with the use of an electronic metronome. A 24 step per minute cadence means that the complete cycle of step up with one leg, step up with the other, step down with the first leg, and finally step down with the lastly leg is performed 24 times in a minute. commonly the metronome is set at a cadence of 4 times the state rate, in this case 96 bpm for men, to coordinate each leg’s movement with a beat of the metronome. The women’s step cadence would be 88 bpm. Although it may possible to test more than one client at a time, the group would need to be of the same gender.<sup>[14]</sup>
- At the conclusion of 3 min. the client stops and palpates the pulse (typically at the radial site) while standing within the first 5 seconds. A 15 second pulse count is then taken and multiplied by four to determine heart rate in bpm. This recovery HR should occur within the first 30 sec. immediate recovery from the end of the step test. The subject’s  $VO_{2max}$  is determined from the recovery HR by following formulas.<sup>[14]</sup>

**FORMULA AND CALCULATIONS:**

For men,  $VO_{2max} = 111.3 - (0.42 \times HR)$

For women,  $VO_{2max} = 65.81 - (0.1847 \times HR)$ <sup>[14]</sup>

**NORMATIVE / COMPARATIVE DATA:**



Table:5.2 Normative data of VO<sub>2</sub>MAX

	Males (mls/kg/min)						Females (mls/kg/min)					
	18-25	26-35	36-45	46-55	56-65	66+	18-25	26-35	36-45	46-55	56-65	66+
<b>Excellent</b>	80-63	70-58	77-53	60-47	58-43	50-38	71-58	69-54	66-46	64-42	57-38	51-33
<b>Good</b>	59-53	54-50	49-44	43-40	39-37	36-33	54-48	51-46	44-39	39-35	36-32	31-28
<b>Above Average</b>	51-47	47-44	42-40	38-35	35-33	32-29	46-42	43-40	37-34	33-31	31-28	27-25
<b>Average</b>	46-43	42-40	38-35	35-32	31-30	28-25	41-39	38-35	33-31	30-28	27-25	24-22
<b>Below Average</b>	41-38	39-35	34-32	31-29	29-26	25-22	37-34	34-31	30-28	27-25	24-22	22-20
<b>Poor</b>	35-31	34-31	30-27	28-26	25-22	21-20	32-29	30-26	26-23	24-21	21-19	18-17
<b>Very Poor</b>	29-20	28-20	25-19	23-18	21-16	18-15	26-18	25-20	21-18	19-16	17-14	16-14

## STATISTICAL ANALYSIS

Data was coded in Microsoft excel and word were used to generate graphs and tables.

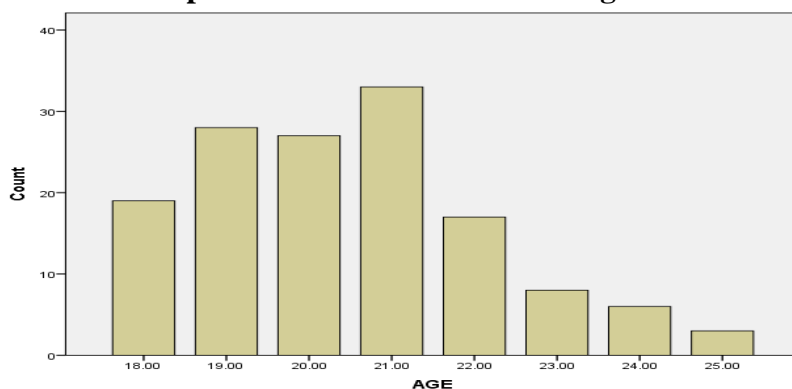
All the statistical analysis was done by the **STASTICAL PACKAGE FOR THE SOCIAL SCIENCE (SPSS)** software version **21** for windows. Normality of data was checked by using a Kolmogorov – smirnov test, Shapiro wilk test, Skewness, Kurtosis and Q-Q Plot.

**A PEARSON'S CORRELATION** is carried out in order to measure correlations between the variables such as BMI & VO<sub>2</sub>Max. An Independent samples t-test is carried out to assess the Age and Gender. **Level of significance** (p-value) was set to **0.05** levels. And **Confidence interval (CL)** was considered to be **95%**.

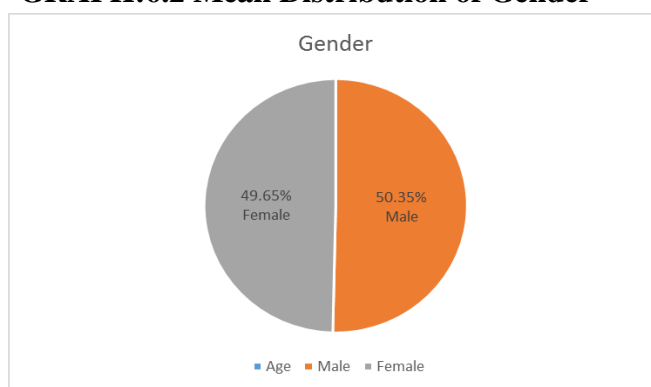
Table: 6.1 Mean Distribution of Age

Mean	N	Std. Deviation
20.4539	141	1.72989

**Graph:6.1 Mean Distribution of Age**

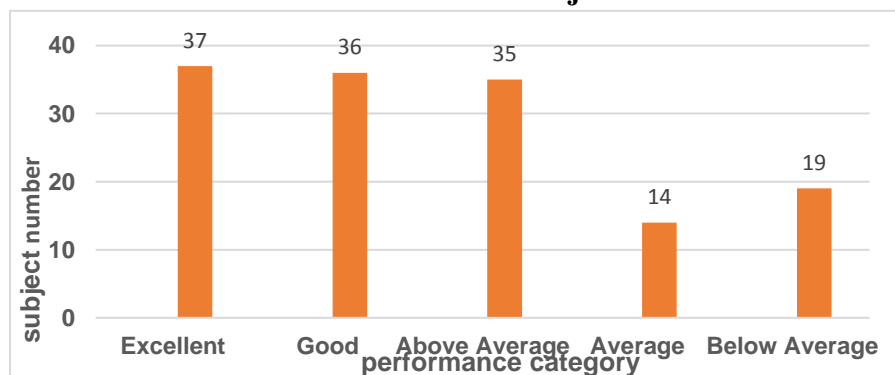


**GRAPH:6.2 Mean Distribution of Gender**



**Interpretation:** the above graph shows the number of participant and percentage according to gender. There is male has more participated compare to male.

**GRAPH:6.3 Mean Distribution of subject Performance**

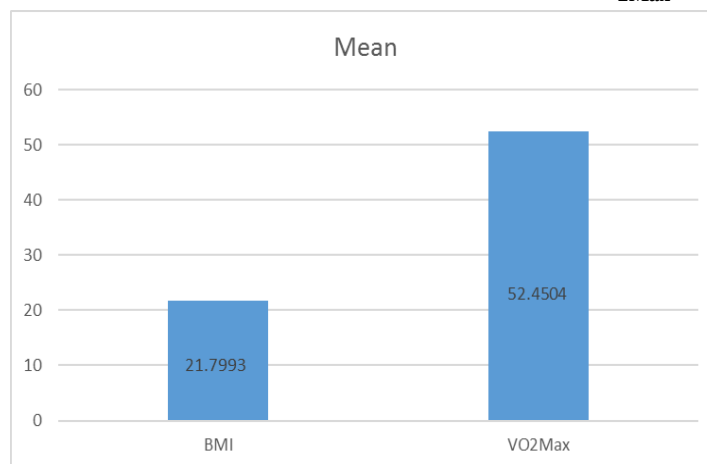


**Interpretation:** The above graph shows the number of participant and their performance category of McArdle step test. Most of subjects have excellent performance and very less subjects have average performance.

**Table:6.2 Mean distribution of BMI and VO<sub>2</sub>Max**

	Mean	Std. Deviation
BMI	21.7993	4.81051
VO2Max	52.4504	11.74613

**GRAPH:6.4 Mean distribution of BMI and VO<sub>2</sub>Max**

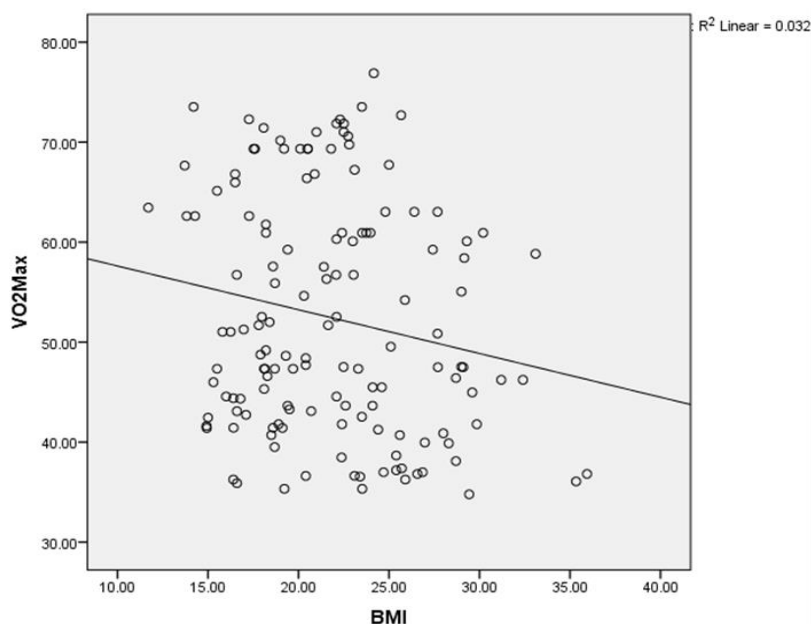


**Interpretation:** The above graph shows the mean Distribution of BMI and VO<sub>2</sub> Max.

**Table:6.3 Pearson's correlation of BMI and VO<sub>2</sub>Max**

		BMI	VO2Max
BMI	Pearson Correlation	1	-.179*
	Sig. (2-tailed)		.034
	N	141	141
VO2Max	Pearson Correlation	-.179*	1
	Sig. (2-tailed)	.034	
	N	141	141

**Interpretation:** The above table is shown Pearson's Correlation of BMI and VO<sub>2</sub>Max sig. P value is 0.034 it means data is statistically significant that shows correlation between BMI and VO<sub>2</sub>Max.

**Graph: 6.5 Scatter Diagram**

**Interpretation:** Above graph is scatter diagram of BMI and VO2Max. That shows a statistically significant negative correlation between BMI and VO2Max.

## DISCUSSION

The aim of the present study was correlate BMI and cardiorespiratory fitness among collegiate students.

A correlational study was carried out in 141 students between the age group of 18 to 25 (male and female) in college. The BMI of the subjects was measured and the McArdle step test was performed by the subjects.

Outcomes of BMI and McArdle step test were done using by statistical test Pearson's correction.

The result of the present study was accepted Alternative hypothesis ( $H_1$ ) and rejected Null hypothesis ( $H_0$ ). According to the result, there is a negative correlation between BMI and CRF which means when BMI increases, CRF will decrease and if BMI decreases, CRF will increase. There are many different theories about the BMI and cardiorespiratory fitness. According to Jiun-Hao Wang, Tai-husing Hung, the most important theory includes Overweight and obese male and female adults had substantially reduced CRF. increased body mass is associated with decreased exercise tolerance and aerobic capacity.<sup>[15]</sup>

According to Emmanuel Bonney, Gillian Ferguson and Bouwien Smits-Engelsan, the relationship between body mass index, cardiorespiratory and musculoskeletal fitness in a cohort of South African female adolescents, BMI was negatively associated with cardiorespiratory fitness.<sup>[16]</sup>

According to T.Takken, H.J.Hulzebos, Marcel Schmitz and Pieter-Jan van oi, they revealed that the underweight and obese groups scored lower than the normal weight and overweight group. CRF was lower in obese females compared to females with a BMI between 18.5 and 29.9kg/m<sup>2</sup>.<sup>[17]</sup>

According to Pei An Liao, Hung -Hao chang they revealed that overweight and obese adults had much lower levels of cardiorespiratory fitness as compared to their normal weight counterparts.<sup>[18]</sup>

According to Laxmi Cc, IB Udaya, S Vinutha Shankar, they showed that There was a significant negative correlation between body mass index (BMI) and VO<sub>2</sub>max.<sup>[19]</sup>

According to Bibek Koju, Shaligram Chaudhary, Lok Raj Joshi, Anupama Shrestha, they showed that the reason for reduced VO<sub>2</sub>max in female subjects participated in their study may be due to sedentary lifestyle, decreased physical activity, unhealthy lifestyle behaviors, etc. Increase in regular physical activity or exercise may help in increasing muscle mass as well as VO<sub>2</sub>max.<sup>[20]</sup>

According to Candi D. Ashley, Joe F. Smith, Paul D. Reneau the study showed that non-obese participants have better cardio-respiratory fitness than obese. Thus, increased BMI was associated with decreased level of VO<sub>2</sub>max in young adults.<sup>[21]</sup>

## CONCLUSION

The study concludes that the statistically significant Negative Correlation between BMI and VO<sub>2</sub>max. This study was reported that VO<sub>2</sub>max increased as the value of BMI decreased and VO<sub>2</sub>max decreased as the value of BMI increased. So, the study suggested lower level of Cardiorespiratory Fitness in subjects with high BMI value and good level of Cardiorespiratory fitness in subjects with lower BMI value. It is important to help overweight subjects to become more fit and reach their healthy weight in order to improve Cardiorespiratory Fitness and reduce risk of Cardiovascular disease. Subjects with normal BMI value should maintain their weight. Exercise program like aerobics and healthy diet useful to achieve normal weight and good Cardiorespiratory Fitness.

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## To analyze the ergonomic advantage in performing Cardiopulmonary Resuscitation (CPR): observational study

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### Abstract

This study was aimed to analyze the ergonomic advantage in performing cardiopulmonary resuscitation (CPR). The subjects were selected from various city of Gujrat. 32 purposive subjects were taken according to selection criteria. Subject's written consent was taken. **Day: 1** Pre vital was taken like HR, BP, RR after that Half Subjects (n=16) were perform 1 man CPR for 2 min by assuming Position – A ( Traditional position – kneeling ) and another Half subjects (n=16) perform 1 man CPR for 2 min by assuming Position - B ( Modified position - spine should be straight and HIP-KNEE 90-90\* ) in **Day : 2** Reverse the Position and Perform 1 man CPR for 2 min. Pre and Post changes in vitals after performance of CPR were measure and energy expenditure were measured by HR based energy expenditure formula, Apple Watch series: 1. : Data was analysis by SPSS version 21 Normal Distribution of data was assessed by Shapiro Wilk Test, which saw the data was normally distributed. Therefore, Analysis of position wise pre and post changes in vitals was done by Paired sample t-Test and analysis of changes in mean of vitals and calories expenditure between Position - A and Position - B was done by Independent Sample t-Test. In position -B there is less vital changes and less number of calories burned as compared to position – A So, Present study concluded that there is a significant ergonomic advantage in performing cardiopulmonary resuscitation.

**Keywords:** *High Quality CPR, Posture, Energy Expenditure, Ergonomic Advantage*

### Introduction

Ergonomic word is derived from Greek words: Ergo means work and Nomoi means natural laws Meaning of these is “The science of work and person’s relationship to that work” [1] Ergonomics give information about human behavior and their abilities and limitations. Ergonomics is the study of people at work scientifically. [3] Ergonomics works on to reduce stress and eliminate injuries and disorders related to overuse of muscle due to bad posture and repeated task. This is done by proper designing of work area and utilization of proper biomechanics of the body. Any physical activity needs energy to perform it. [4] Energy expenditure is the total number of energies that a person wants to do any physical activity like walking, running, bathing even our body’s physiological system also required energy to



perform their work. <sup>[5]</sup>

The amount of energy expenditure is associated with the exertional level of activity and biomechanics of posture. Use of science to evaluate the biomechanics of posture is known as ergonomics. Energy is measured in calories or kilocalories. The number of calories we utilize every day is known as Total daily energy expenditure (TDEE). TDEE is varied for all peoples. It depends on BMI, Height, Weight, Nutritional level, Gender etc. <sup>[6]</sup>. The energy on our body is produced in the form of heat. There are various methods to calculate energy expenditure in the form of calories like Accelerometer is a device which calculates active calories burned. There is one formula-based calculator given by American Council which measure energy expenditure directly by Heart Rate. Now a day's various devices are also available which calculate energy expenditure like Fitness Band, Digital Watches of a various company etc. <sup>[7]</sup>

CPR (Cardiopulmonary resuscitation) is an exertional activity its required lots of energy to perform. the total number of energies required to perform any physical activity depends on the physical health of a person and use of biomechanics of body. <sup>[8]</sup> The performance of high quality and adequate chest compression is one of the essential elements of the "chain of survival" of cardiac arrest patient. High quality CPR (Cardiopulmonary Resuscitation) creates blood flow which delivers oxygen to brain. <sup>[9, 10]</sup> CPR is a series of events. It consists of 2 phases of Compression and Breathing. The ratio between these two is 30:2 and Rate of compression is 100-120/min and Depth of compression is 5 cm for adult and for children and 4 cm for infants. <sup>[11, 12]</sup> It is an early model of treatment in a patient with cardiac arrest either patient is inside or outside a hospital. <sup>[6, 7]</sup> Survival of patient is depending on Time within CPR is given and Quality of CPR maintain thought CPR cycle. <sup>[13, 14, 15]</sup>

As CPR is a high exertional activity and it is required lots of energy so there is a need to find does change in position of CPR provider has any impact in energy expenditure which may lead to a reduction in exertion level of provider and may save the energy and maintain the quality of CPR

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#### **Material and Methods:**

- Mannequin (3 bscientific.com), Measure Tap (SMI)
- Mask, Stethoscope (Diamond), Stop Watch (Racer)
- Apple Mac book pro Core I9 9<sup>th</sup> Gen, Sphygmomanometer (Diamond)
- Apple watch series -1, Consent Form and Assessment form
- Pen, Paper

#### **Methodology:**

- **Study Design:** Observational study
- **Study Setting:** Gujrat
- **Study Population:** BLS certified provider
- **Sampling Technique:** Purposive Sampling Technique

- **Sample Size:** 32
- **Study duration:** 6 Months

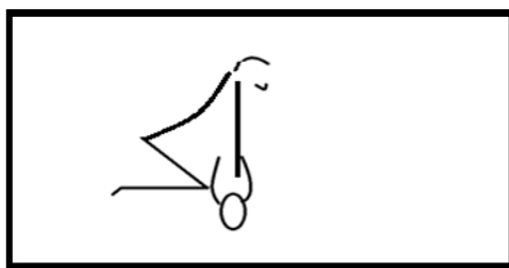
**Criteria for selection of samples:**

**Inclusion criteria:**

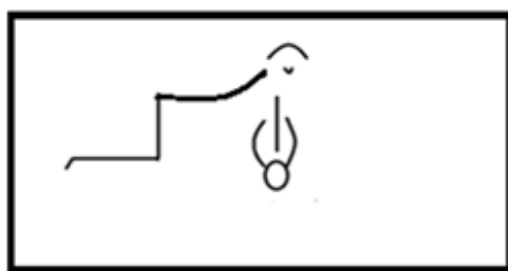
- People with certified as a BLS provider
- Both male and female

**Procedure:**

First Ethical approval was from Institutional Ethical Committee (IEC) , SPT, RKU and CTRI registration was done once after approval arrives from IEC,SPT,RKU After that Total of 32 purposive participants was taken According To selection The subjects in the study were prior informed about the risks and the written consent forms were taken. After that in Day:1 all subject's pre vitals ( Heart rate, Respiratory rate, and Blood pressure as taken) then First Half subjects ( n=16) were perform 1 man CPR for 2 min by assuming Position – A ( Traditional Position – Kneeling) and Second Half subjects (n=16) were perform 1man CPR for 2 min by assuming Position – B ( Modified position – spine should be straight and Hip-Knee at 90-90\*) after that post vitals was taken and energy expenditure in form of calories as measure by Heart rate based formula and Apple watch series-1 on Day-2 Reverse the position First Half subjects (n=16) were perform 1 man CPR for 2 min by assuming Position – B ( Modified position – spine should be straight and Hip-Knee at 90-90\*) and Second half subjects (n=16) were perform 1 man CPR for 2 min by assuming Position – A ( Traditional Position – Kneeling) pre and post changes in vitals and energy expenditure in form of calories were measure.



**Figure 1.1 Position - A ( Traditional position- Kneeling)**



**Figure 1.2 Position - B (Modified position - spine straight, HIP-KNEE at 90-90\*)**

**Outcome measures:**

➤ **Vitals**

- Blood pressure, Heart Rate, Respiratory Rate
- Average Range for above mentioned vitals for an adult is Blood pressure is 100-120/80-90mm/hg, Heart Rate is 60-100 bpm and Respiratory rate is 12-20 rpm<sup>17</sup>

➤ **Energy expenditure**

There are various methods to calculate energy expenditure among them; these two are the most reliable method.

- Apple Watch series-1<sup>25, 26</sup>

- Heart Rate based energy expenditure formula<sup>27,28</sup>

▪ **Formula For males:**

•  $C = ((-55.0969 + (0.6309 * HR) + (0.1988 * W) + (0.2017 * A)) / 4.184) * 60 * T$

▪ **Formula For females:**

•  $C = ((-20.4022 + (0.4472 * HR) - (0.1263 * W) + (0.074 * A)) / 4.184) * 60 * T$

C = Calories, HR = Heart Rate, W = Weight (kg), A = Age, T = Time

➤ **Results and statistical analysis**

The present study was carried out to find out the effect ergonomic advantage in performing Cardiopulmonary Resuscitation. Data was analyzed using SPSS software version 20 and Microsoft Excel 2019. Level of significance was kept at  $\leq 0.05$  and confidence interval **95%** before applying statistical tests, data was screened for normal distribution.

**Table: 1.1 Demographic distributions of Subjects**

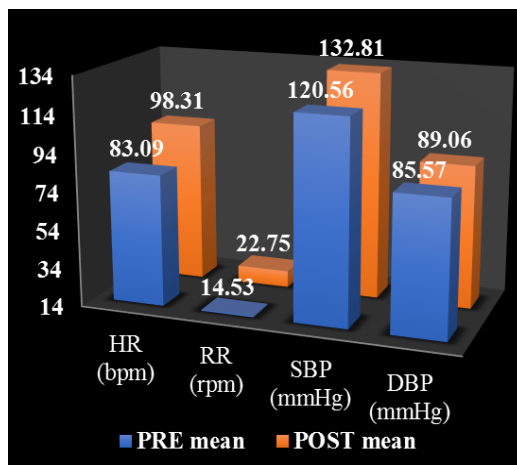
<b>Total Subjects</b>	<b>32</b>
<b>Males</b>	<b>15</b>
<b>Females</b>	<b>17</b>
<b>Mean Age (years)</b>	<b>24.41</b>

**Table: 2.1** Analysis of pre and post changes in vitals by paired t-test for Position: A Traditional position assume by CPR provider)

Parameters	PRE		POST		t- Value	'p' Value
	Mean	±SD	Mean	±SD		
<b>HR (bpm)</b>	<b>83.09</b>	<b>6.49</b>	<b>98.31</b>	<b>10.93</b>	<b>-11.22</b>	<b>0.000</b>
<b>RR (rpm)</b>	<b>14.53</b>	<b>3.28</b>	<b>22.75</b>	<b>3.80</b>	<b>-21.76</b>	<b>0.000</b>

<b>SBP (mmHg)</b>	<b>120.6</b>	<b>9.33</b>	<b>132.8</b>	<b>9.85</b>	<b>-14.32</b>	<b>0.000</b>
<b>DBP (mmHg)</b>	<b>85.57</b>	<b>8.68</b>	<b>89.06</b>	<b>9.34</b>	<b>-4.847</b>	<b>0.000</b>

**Interpretation:** In position – A all Vitals are significant changes with p-value < (0.05) after CPR performance

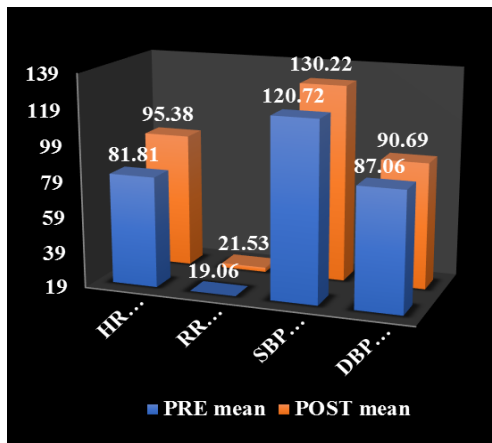


**Graph: 1.1** Comparison of Pre and Post changes in mean of vitals for Position: A (Routine position assume by CPR provider)

**Table: 2.2** Analysis of Pre and Post changes in vitals by paired t-test for Position: B (Modified Position -Spine should be straight& Hip-Knee 90-90\*)

Parameters	PRE		POST		t- Value	'p' Value
	Mean	±SD	Mean	±SD		
<b>HR (bpm)</b>	<b>81.81</b>	<b>4.25</b>	<b>95.38</b>	<b>9.99</b>	<b>-9.002</b>	<b>0.001</b>
<b>RR (rpm)</b>	<b>19.06</b>	<b>3.22</b>	<b>21.53</b>	<b>3.99</b>	<b>-18.91</b>	<b>0.000</b>
<b>SBP (mmHg)</b>	<b>120.72</b>	<b>6.93</b>	<b>130.2</b>	<b>6.83</b>	<b>-12.67</b>	<b>0.001</b>
<b>DBP (mmHg)</b>	<b>87.06</b>	<b>7.57</b>	<b>90.69</b>	<b>6.59</b>	<b>-8.004</b>	<b>0.000</b>

**Interpretation:** In position – B all Vitals are significantly changing with p-value < (0.05) after CPR performance

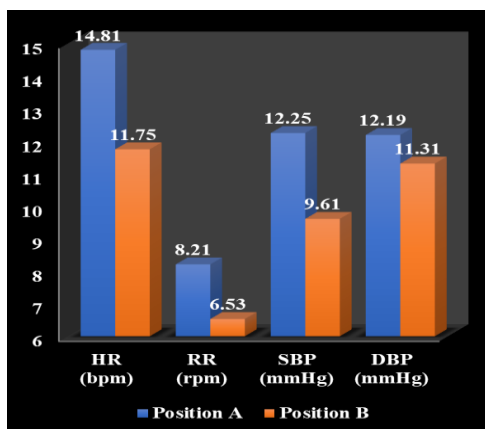


**Graph: 1.2** Comparison of Pre and Post changes in mean of vitals for Position: B (Traditional position - Spine should be straight& Hip-Knee 90-90\*)

**Table 2.3** Analysis of changes in vitals by Independent sample t-test (Between Position – A and Position - B)

Parameters	Position – A		Position - B		t -Value	‘p’ Value
	Mean	±SD	Mean	±SD		
HR (bpm)	14.81	6.26	11.75	4.46	2.254	0.02
RR (rpm)	8.21	2.14	6.53	1.88	3.352	0.001
SBP (mmHg)	12.25	4.84	9.61	4.26	2.292	0.002
DBP (mmHg)	12.19	2.86	11.31	2.29	1.352	0.1

**Interpretation:** In position – B all vitals saws significantly less changes in vitals with p-value < (0.05) except DBP which is > (0.05) after CPR performance

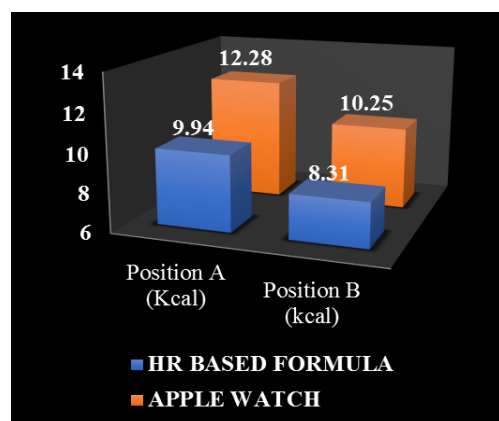


**Graph: 1.3** Comparison of changes in mean of vitals (Between Position – A and Position - B)

**Table: 2.4** Analysis of calories expenditure by Independent sample t-test (Between Position – A and Position - B)

Parameters (Kcal)	Position - A		Position - B		‘t’ Value	‘p’ Value
	Mean	±SD	Mean	±SD		
HR based Formula	9.94	2.77	8.31	2.03	2.67	0.01
Apple watch	12.28	2.69	10.25	1.57	3.69	0.001

Interpretation: In Position -B there is a less calories expenditure as compare to Position- A with p-value (<0.05) after CPR performance



**Graph: 1.4** Comparison of mean calories expenditure in CPR performance (Between Position – A and Position - B)

**Discussion**

The primary aim of the present study was to analyses the ergonomic advantage in performing cardiopulmonary resuscitation (CPR). Total 32 Subjects was included in this study and they have to perform 1-man CPR for 2 min in 2 Different positions. The result of the present study demonstrated that there is a significant effect of ergonomic advantage in performing cardiopulmonary resuscitation. That is why the alternative hypothesis of the present study is accepted.

The reason behind these can be expected that in any physical work first 30 seconds, there is an anaerobic energy expenditure which does not require oxygen. After 30 seconds in any work, there is an aerobic energy expenditure which required utilization of oxygen to release energy. [29] Amount of oxygen required to perform any physical activity is dependent upon the following factors.

Level of physical activity, type of activity, exertion level, utilization of biomechanics of joint,

number of muscle activation etc.

Now we will see Biomechanics of **Position A (Traditional Position)**

- Less Base of support (BOS) and Line of gravity (LOG) falls outside the BOS
- Trunk and Hip-knee is in continuous flexion position
- Antigravity muscles like Trunk flexors, Gluteus Maximus, and Quadriceps are in continuously eccentrically contracted state
- Due to large oxidative muscle fibers continuously in eccentric contraction it early goes into fatigue
- Due to this there is more calories expenditure required to maintain this position.

Biomechanics of **Position – B (Modified position - Spine straight & Hip-Knee at 90-90\*)**

- More Base of support (BOS) and Line of gravity (LOG) falls inside the BOS
- Spine is in neutral position and Hip-knee is also in 90-90\* position
- Antigravity muscles like Trunk flexors, Gluteus maximus, and Quadriceps are in co-contracted
- Compression force is generated directly from the shoulder
- Provides gravity assisted movement for Compression and Allowed chest to recoil completely

- Calorie expenditure depends on heart rate so here it is considered that in position A there is more Heart rate so calories expenditure is also higher and in position B there is less heart rate, so calories expenditure is also less.<sup>[30]</sup>

M. P. DE LOOZE also conducted a study on Relationship between energy expenditure and positive and negative mechanical work in repetitive lifting and lowering was concluded that change in position in lifting and lowering has a significant impact on the reduction in energy expenditure. Which support the mechanism of the present study.

### **Conclusions**

- This study concluded that change in position has an ergonomic advantage in performing cardiopulmonary resuscitation (CPR).
- Life-saving skills always matter while performing CPR. However, change in the position and taking ergonomic advantage to add value in the performance of CPR as well as longevity of execution.

### **Acknowledgements**

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## **A study to find out the effect of Pilates exercise on low back pain due to primary dysmenorrhea: A Randomised controlled trial**

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### **Abstract**

**Background:** Primary dysmenorrhea is a common problem among the young females. It affects daily routine activities and quality of life. It is characterized by lower abdominal pain which may irradiate to thighs and lower back. Pain appears the day before or during the first menstrual cycle day. Low back pain is the most common symptom among females with primary dysmenorrhea. Pilates is a series of exercises based on progressive movement the body is able to perform. It helps in prevent injuries and provide pain relief. This is why the study is planned to know the effect of Pilates on low back pain due to primary dysmenorrhea.

**Aim:** To know the effect of Pilates exercise on low back pain in female with primary dysmenorrhea.

**Methodology:** This is an experimental study on young females with age group of 18-25 years studying in school of physiotherapy, RKU. 40 subjects were selected conveniently as per criteria include co-operative individual and having low back pain during menstruation. Females having child and having any pelvic or gynecological diseases and being treated with any physical therapy or under drug were excluded. All subjects were submitted to a protocol of 7 Pilates ground exercise aimed at the lower back region. Pain intensity was evaluated by numerical pain rating scale.

**Result:** The result of paired t test and unpaired t test suggests that Pilates have significant effect on low back pain during menstruation. The pain is decrease due to the phenomenon called exercise- induced analgesia that is during treatment with Pilates, these patients may have increased their pain threshold due to the adjustment of endogenous pain control mechanisms. The body would start to secrete more neurotransmitters, such as norepinephrine, serotonin, enkephalin and dopamine, which would act to inhibit and control pain.

**Conclusion:** Result of this study indicates that Pilates as physical activity has significant effect on low back pain due to primary dysmenorrhea. Thus, Pilates reduce low back pain during menstruation in females with primary dysmenorrhea.

**Keywords:** *Pilates exercises, primary dysmenorrhea, low back pain*

## **Introduction**

Primary dysmenorrhea is the more common type of dysmenorrhea which is due to the production of prostaglandins. These are natural substances made by cells in the inner lining of the uterus and other parts of the body. <sup>(1)</sup> The prostaglandins made in the uterus make the uterine muscles contract and help the uterus to shed the lining that has built up during the menstrual cycle. If excessive prostaglandins are produced, the girl may have excessive uterine contraction accompanied with pain or dysmenorrhea with her menstrual cycle. Prostaglandins can also cause headache, nausea, vomiting and diarrhea. Hormonal and endocrine theory, uterine contractions, uterine bleeding, cervical obstruction and psychological factors are also involved in the pathophysiology of primary dysmenorrhea. <sup>(2)</sup>

In a study done on dysmenorrhea in different settings the prevalence of dysmenorrhea in adolescent girls was 54% which was also same as reported by other Indian and Western Countries. A dysmenorrhea incidence of 33.5% among adolescent girls in India was reported by Nag George and Bhaduri found dysmenorrhea to be a common problem in India with prevalence of 87.87%.

The dysmenorrhea can be treated medically, surgically or by conservative methods. Medical treatment for dysmenorrhea includes Non-steroidal anti-inflammatory (NSAIDs) or Oral contraceptive pills (OCPs) both reduces the symptoms by reducing myometrium activity. <sup>(3-5)</sup>

Pilates exercises belong to a group of Body-Mind Exercises, where the focus is on controlled movement, posture, and breathing pattern. Pilates improves mental and physical well-being, increase flexibility, and strengthens muscles through controlled movements done as mat exercises to tone and strengthen the body. The method combines principles of exercises from the Eastern cultures and the Western cultures. <sup>4</sup> Pilates developed comprehensive method of stretching and strengthening exercises both of them together aim to create a strong and limber body as well as a strong will of mind that can control the body. This is true for the Pilates Method, which may be said to have key principles. These principles are centering, concentration, control, precision and breathing. <sup>(6-7)</sup>

Pilates is the fastest growing exercise regimen in the U.S. and Canada. Pilates is also beneficial to the post-natal women. Rudolf .H Moos (1968) developed the Menstrual Distress Questionnaire (MDQ). This questionnaire is composed of seven factors that Moos found to be stable and recurrent (pain, concentration, behavioral change, autonomic imbalance, water retention, negative effect, arousal), as well as a control factor composed of menopausal symptomatology. <sup>(8-10)</sup>

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## **METHODOLOGY**

- **Study design:** Interventional study
- **Study setting:** School of physiotherapy, RKU
- **Sampling technique:** Convenient
- **Study population:** Females with primary dysmenorrhea
- **Study sample:** 40 females (6 months) (some subject were included in the study but as they continue with other physiotherapy treatment. so, that's why they are excluded in this study)

## **INCLUSION CRITERIA**

- Co-operative individual
- Females with age of 18-25 years
- Females having with low back pain due to primary dysmenorrhea.

## **EXCLUSION CRITERIA**

- Married women having child, gynecological disease and pelvic disease
- Smoking
- Being under drug or physical therapy treatment

## **MATERIAL USED**

- Pen
- Paper
- Assessment form
- NPRS

**PROCEDURE**

The subjects for the study were selected as per inclusive and exclusive criteria. were informed about the purpose of the study and also explained about the procedure of the study and we took the consent form from the subjects. Then, they quified their low back pain during menstruation through the numerical pain rating scale (NPRS). There are two groups, the one is experimental group which is having a 20 female students, and the other one is control group which is also having a 20 female students. Frequency was thrice in week, there is a session of 30 minutes contain 5 repetitions of each exercises. Participants were oriented to wear comfortable clothes to prevent compressing and/or impairing circulation, in addition to avoid watches or bracelets to prevent skin injuries. Participants were re-evaluated at treatment completion by the same initial evaluation criteria, to compare pre and post-treatment data.

Treatment group:

In treatment group we give 7 Pilates exercises. Exercises given are as below (this protocol is taken from reference no. 15)

**Table 1: Pilates exercises Program**

Exercise	progression
Hip mobility exercise	Thrice in A Week, session OF 30 Minutes contains 5 repetition
Chest lifts	
Pelvic curl	
Leg floats	
Single leg stretch	
Double leg stretch	
Plank	



Bridging



Pelvic



Double leg stretch



Singly leg stretch

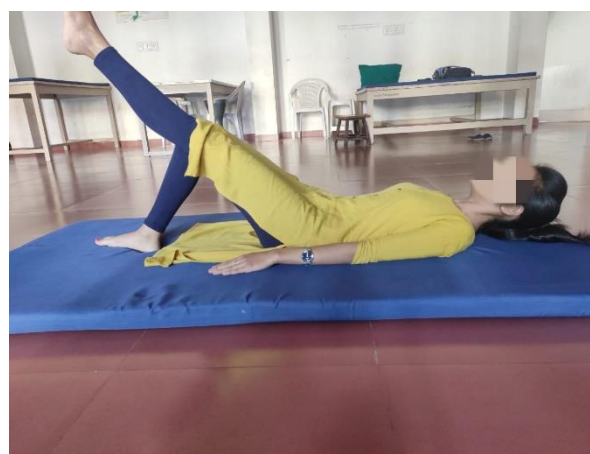




Chest lifts



Plank



Leg Floats

**RESULT**

In this study total 40 females were assessed. They were further divided into two groups. One experimental group in that Pilates exercise given and second group is control group.

Statistical Software: IBM SPSS Statistics 21

Statistical Test: Paired Sample T Test and unpaired sample T Test

**PAIRED SAMPLE T TEST:**

Paired sample t test between pre data and post data of experimental group suggest that data is significant. Paired sample t test between pre and post data of control group suggest that data is significant.

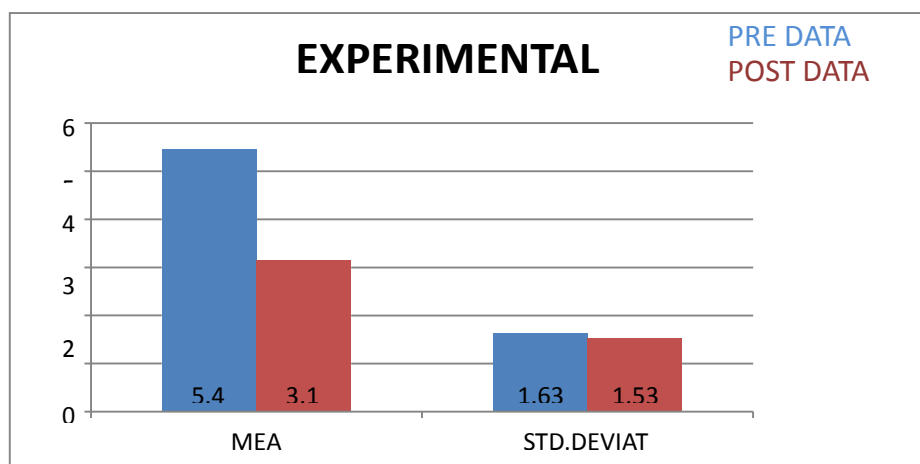
**UNPAIRED SAMPLE T TEST:**

Unpaired sample t test of post data of experimental group and post data of control group has showed t value=2.846, which suggest that data is significant.

**PAIRED SAMPLE T TEST:**

Table no 5.1 Paired sample t test between pre data and post data of experimental group suggest that data is significant.

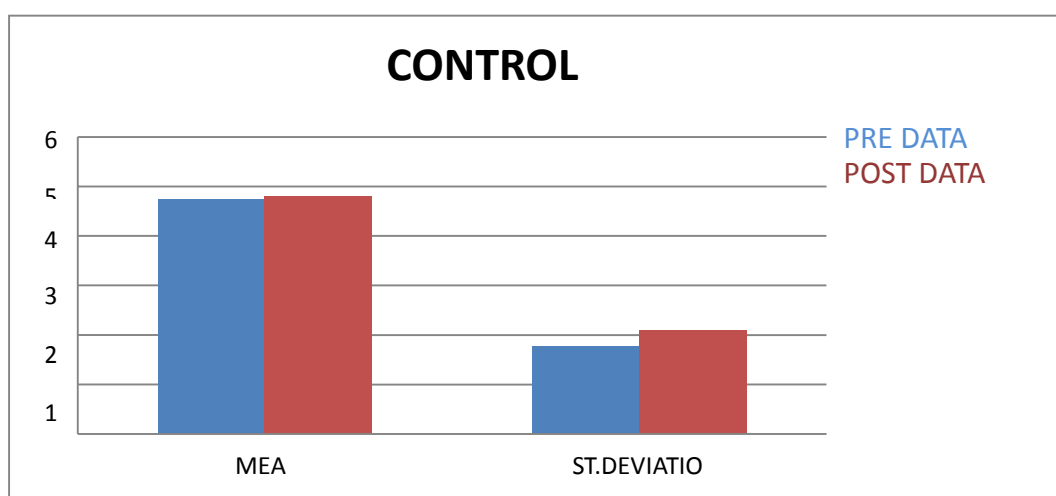
	NO	MEAN	STD.DEVIATION	T VALUE
PRE DATA	20	5.45	1.635	9.516
POST DATA	20	3.15	1.531	9.516



**Graph No:5.1** Paired sample t test between pre data and post data of experimental group

Table no 5.2 Paired sample T test between pre and post data of control group suggest that data is significant.

	NO	MEAN	STD.DEVIATION	T VALUE
<b>PRE DATA</b>	20	4.75	1.773	-0.328
<b>POST DATA</b>	20	4.8	2.093	-0.328



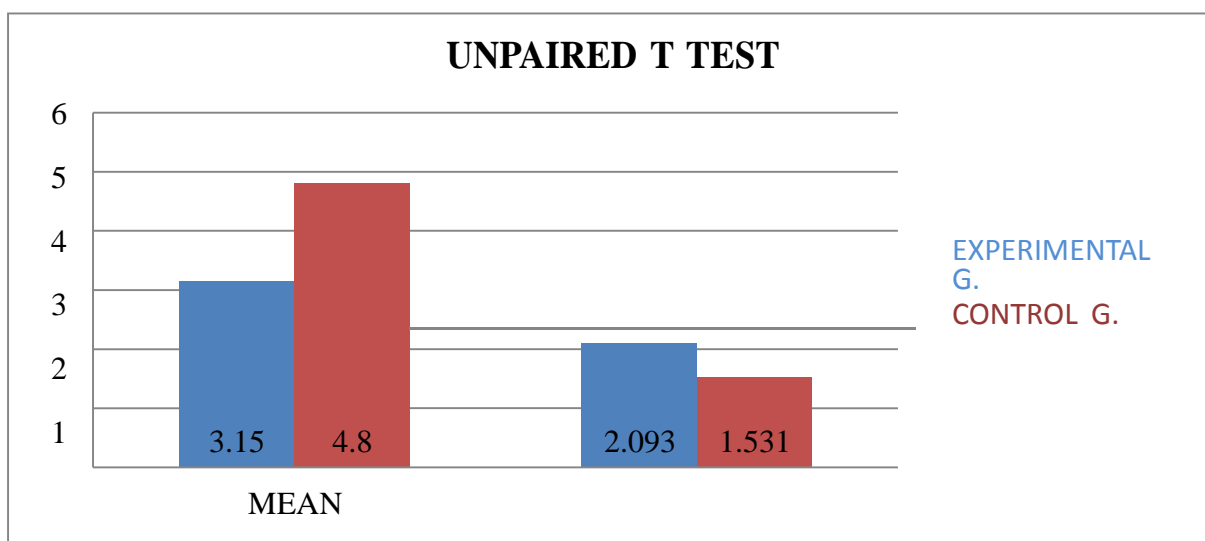
**Graph No:5.2** Paired sample t test between pre data and post data of control group

### UNPAIRED SAMPLE T TEST

Table no 5.3 Unpaired sample t test of post data of experimental group and post data of control group has showed t value=2.846, which suggest that data is significant.

	NO	MEAN	STD.DEVIATION	T TEST
<b>EXPERIMENTAL GROUP</b>	20	3.15	2.093	2.486
<b>CONTROL GROUP</b>	20	4.8	1.531	2.486

Graph No:5.3 shows Unpaired sample t test of post data of experimental group and post data of control group



## DISCUSSION

The purpose of the study was to find out of the effectiveness of Pilates exercise for the primary dysmenorrhea in female students to improve in pain intensity. The study was carried out with two groups. Group A(n=20) was Pilates exercise and group B(n=20) was the control group total 40 subjects were taken in this study, there was one outcome measure taken in this study. (i)numerical pain rating scale.

The present study showed that the intragroup comparison of all the outcome was done using the statistic test paired t-test. which has shown statistical significance difference. However, the control group did not show any improvement after four weeks of study.

So, here the present study showed that group A is more effective compared to the group on the base of that shows decrease pain intensity.

So, here the null hypothesis was rejected and the experimental hypothesis was accepted.

A different study with Pilates has shown that during six months there has been considerable of low back pain patients' improvement; most part of this analgesia was obtained with just one month of program

The use of pain evaluation tool in this study (NPRS) helped determining the similarity of data obtained in each phase, increasing the reliability of results. The pain evaluation tool of this research has shown significant pain intensity decrease reported by participants of Pilates. There has been decrease because exercises increase blood flow, correct muscle and postural unbalances and recover body and mind vitality, thus contributing to pain decrease<sup>13</sup>.

Most study results are similar to those obtained in our study with Pilates, which would improve pelvic blood flow, decreasing muscle stresses, providing the stretching of all involved structures with consequent pain relief<sup>14,15</sup>.

This phenomenon is called exercise-induced analgesia, that is, during the treatment with Pilates, these patients may have increased their pain threshold due to the adjustment of endogenous pain control mechanisms. The body would start to secrete more neurotransmitters, such as norepinephrine, serotonin, enkephalin and dopamine, which would act to inhibit and control pain<sup>16</sup>.

Results of this study confirm other findings already reported by the literature which state that Pilates physical exercises may be used as a treatment to decrease low back pain.

## CONCLUSION

This study concluded that Pilates as physical activity has significant effect on low back pain due to primary dysmenorrhea. Thus, Pilates improve low back pain during menstruation in females with primary dysmenorrhea.

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## Parsonage – Turner Syndrome – A Case Study

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### Abstract

**Background:** Parsonage-Turner Syndrome is a rare condition, involving shoulder & scapular muscles. The role of physiotherapy is unexplored.

**Objective:** To throw light on the clinical picture & course of recovery in a case of Parsonage-Turner Syndrome.

**Discussion:** Case study here discusses about physiotherapy assessment & role of physiotherapy in Parsonage- Turner Syndrome.

**Conclusion:** Patient suffering with Parsonage- Turner Syndrome can be benefitted with a holistic approach of medicines & physiotherapy.

**Keywords:** *Brachial Neuritis, Parsonage Turner Syndrome, Brachial Plexopathy, Rare Shoulder Diseases*

### Introduction

Parsonage Turner Syndrome (PTS) is a term used to describe a neuritis involving the brachial plexus, PTS is a rare syndrome that may occur in otherwise normal healthy individuals with symptoms of a sudden onset, constant, severe throbbing, non-positional shoulder girdle pain, self-limiting in nature. [1]

It is also referred to as Acute Brachial Neuritis,  
Idiopathic Brachial Plexopathy,  
Brachial Neuritis,  
Brachial Plexus Neuritis,  
Brachial Plexus Neuropathy,  
Neuralgic Amyotrophy [1,2]

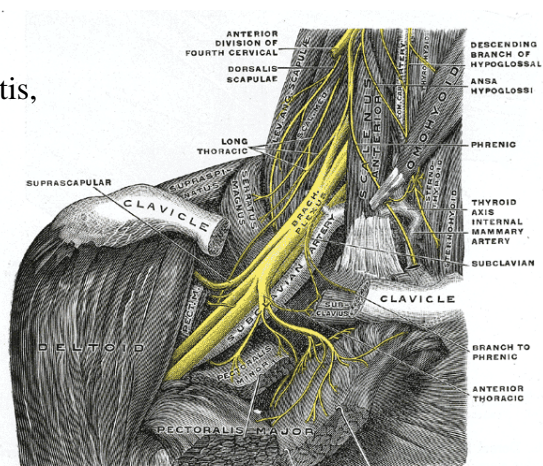


Fig. 1 Brachial Plexus

This acute phase may last for few hours to a few weeks and is followed by sensory deficits (not in all patients) wasting & atrophy of the muscles in the affected areas. Although the

etiology is unclear, it is reported in various clinical situations, including postoperatively, post infectious (25%), posttraumatic & post vaccination (15%). [4] There could be several causes of development of PTS, multiple theories exist including genetic or hereditary neuralgic amyotrophy, however experts do not know exact cause.[2]

PTS may present with symptoms of an isolated peripheral nerve lesion, although the pathology is thought to lie more proximally. It generally involves one upper limb; mostly the axillary nerve, the upper trunk of brachial plexus, the suprascapular nerve & the long thoracic nerve are affected. It is an uncommon neurological disorder characterized by rapid onset of severe pain in the shoulder and arm [4].

3 per 100,000 get PTS each year. More males than females are affected with more common in young adults, but young children & the elderly have reportedly had it, too. [2]

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### **Case Report**

Reported case here is of a 9 year old boy who presented at physiotherapy center with sudden onset severe left shoulder pain without any obvious cause. He consulted orthopedician who took X-Ray which was normal, they prescribed NSAIDS, though pain subsided but he was unable to raise shoulder at all. There was no eccentric control of shoulder. He was then referred to Neurologist, He was prescribed tapering dose of steroids. Patient showed no improvement after a week so then was advised for physiotherapy.

Physiotherapy assessment demonstrated neither pain or tenderness nor any sensory deficit. Patient was unable to raise shoulder for any movement actively while passive ROM was complete. After he was disrobed, he had substantial atrophy of scapular & deltoid muscles. Muscle power assessed by MODIFIED MEDICAL RESEARCH COUNCIL GRADING was reduced for Supraspinatus, Infraspinatus, Serratus Anterior, Anterior & Middle Deltoid. There was complete lack of eccentric control in shoulder.

FG test for scapular & upper limb muscles was negative for faradic currents & feeble contractions seen for interrupted galavanic.

He underwent MRI on next day for left shoulder. MRI showed subacute denervation of supraspinatus, infraspinatus and deltoid muscles without definite injury/edema of left brachial plexus. Minimal dilated central canal involving cervical spinal cord from C5 to C7 vertebral levels. Clinical pathological correlation is suggested to rule out Brachial Neuritis/Parsonage Turner Syndrome.

Physiotherapy treatment was planned

- Scapular isometric/stabilization exercises
- Isometric – active control exercise for scapula & shoulder at multiple angles
- Electrical stimulation with interrupted galavanic current & progressively Surged Faradic for Supraspinatus, Infraspinatus & Deltoid group.
- Scapular strengthening exercises
- Theraband training





Fig. 2 Shoulder & Scapular Muscles Wasting

### Results and Discussion

This patient represents a rare case of Parsonage-Turner Syndrome, a condition that is categorised under RARE DISEASE DATABASE by NORD who is showing significant improvement with appropriate physiotherapy.

The report here is to highlight clinical thinking & rational combined for diagnosis as well as progression & results of physical therapy treatment for a 9 year old with PTS.

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### Conclusions

Present case study is showing gradual improvement with holistic approach of neural multivitamins & physiotherapy. Consistent religious physiotherapy with standardized protocol needs to be followed by therapist and patient. Thus appropriate well planned physical therapy would help to get faster and normal recovery in patients suffering with Parsonage-Turner Syndrome.

### Relevance & Implications of the Study

Parsonage-Turner Syndrome being a rare condition with many times idiopathic or unknown cause might consult to physiotherapist directly without any radiological examinations, but thorough assessment with keen observation and examination skills would lead therapist to appropriate diagnosis and plan treatment accordingly. This case clearly emphasizes the importance of critical thinking that starts from the very first visit when an examination & evaluation happens which would have great impact on patient's recovery. This case study throws light on the evident inevitable role of physiotherapist in rehabilitation of a rare condition like Parsonage-Turner Syndrome.

### **Acknowledgements**

Our heartfelt gratitude to our patient for his consent & cooperation during the conduct of the study. Our sincere thanks to our dear parents for their blessings and support through our work.

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## Herbal Product- A Survey to Know the Impact on Daily Life

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### Abstract

Herbal products, herbal cosmeceuticals, nutraceutical, phytopharmaceuticals and Ayurveda medicines are being used around the world increasingly. 25% prescription contains herbal/medicinal plant ingredients & 80% relies on herbal products for health care. It is very important for students of pharmacy to be aware about importance of herbal products and its prevalence in their daily life. Our aim is to made student aware about importance and prevalence of herbal products and to measure impact of herbal products in our daily life. A google form was prepared with questionnaire having both open and close ended questions on herbal products. 100 students of 5<sup>th</sup> semester B. pharmacy were given one-month time and asked to search and enter details about herbal products present at their home used by them and their family. Then all data were expressed as counts and percentages. A total of 86 students have filled out form. We have found that total of 534 herbal products /formulations are being used by students and their family with maximum of 20 & with average of 6.44 in each house. Maximum used category of was herbal cosmeceuticals 33.9%, followed by house hold herbs 20.2%, followed by AYUSH products 16.5% followed by herbal products containing phytochemicals. Most used nutraceutical herb was Fenugreek 82.6% followed by ginger and garlic with 77.9%. Maximum used herbal cosmetics category product is herbal shampoo 83.7% followed by herbal oil with 66.3%. Maximum used Ayurveda product category was churna with 45.3%. Maximum used house hold herbal herbs were ginger. So, current survey revealed that herbal products impact in each corner of our daily life.

**Keywords:** *Herbal products, survey on herbal, nutraceutical, herbal shampoo*

### Introduction

Total of 80% of the world's population relies on traditional medicine for their health care needs. total of 170 WHO member countries out of 194. [1] Herbal products are need and topic of interest in developing and developed countries, respectively. [2] The use of herbal medicine as an alternative remedy for COVID-19 in combination with modern medicine, and has released several recommendations on herbal therapy during pandemic. Several herbal immune booster's formulations, and house hold herbs gives symptomatic relief were used during COVID -19 lockdown. People believes that herbal products are safe, effect and there are no side effects. [2-3] The projection made by World Health Organization (WHO) states that the global herbal market would grow to \$5 trillion by 2050. India stands as the 2nd

largest exporter of herbal medicines only after China. Both the countries are producing over 70 percent of the herbal medicines demand across the globe. India exported raw herbs worth USD330.18 million during 2017–18 with a growth rate of 14.22% over the previous year. As per a published report of NMPB, 2017, out of 6500 medicinal plant species traditionally used by Indian communities. [4] According to the ‘All India Trade Survey of Prioritized Medicinal Plants, 2019’, demand for high-value medicinal plants increased by 50%. [5] Overall people trust on herbal products and thus, herbal products are high in demand for quality herbal products be it herbal medicinal products or phytopharmaceuticals or traditional medicines or nutraceutical claims immune boosters or cosmeceuticals which contains medicinal plants. Thus herbal products are not only as herbal medicines but botanicals are present in categories like nutraceuticals and cosmeceuticals. Thus, it is very for pharmacy students to understand the importance and difference between different types of herbal products and its impact on their daily life. We used 6<sup>th</sup> semester B pharm syllabus for survey questionnaire preparation and used survey form also as one of the active learning technique “background knowledge probe”. So, we have decided to perform one survey on different herbal products used by pharma students and their families.

## **Experimental**

Materials and methods:

Survey form was prepared by using google form.

General procedure:

A Google form was prepared with questionnaire having both open and close ended questions on herbal products. Google form contains total of eight questions contains both check box and paragraph options along with email of students on herbal products. Selection of questions were based on syllabus of 6<sup>th</sup> sem b pharmacy by Pharmacy Council of India. [6] Emails were then sent to students of 6<sup>th</sup> semester B. Pharmacy before at initial stage of their study. Form was sent for total 100 number of students. Participating students were from diverse regions of India and contains both male and female students. Ratio of girl students to boy students were 25:75. All students were then orally informed to fill out form within 8 days’ time period. Students were informed to check for not only herb or herbal based products used by them but also to check at their home. So actual survey size can be considered as 400 (considering 4 individuals per home). Survey was performed in month of December, 2021. Survey form contains open ended question on how many herbs or herbal based products are being used at their home? followed by multiple checkbox question, which category of herbal products they are using? with options like herbal cosmetics, AYUSH (Ayurveda, unani, siddha or homeopathy) products, phytopharmaceuticals or herbal medicinal products, house hold crude drugs or any other herbal products. Followed by a question about name of products with its use. Followed by a multiple checkbox option question was asked about nutraceutical.

Whether they have any nutraceutical products at their home? (with options of fenugreek, alfalfa, ginger, garlic, honey, amla, ginseng, ashwagandha, spirulina, chicory or none of the above). Next question was about category of herbal cosmetics. Which herbal cosmetic is there at your home? (with options like herbal shampoo, herbal bath, herbal cream, herbal oil, herbal pack, herbal face wash, herbal perfume, herbal serum, herbal soap, herbal oral hygiene products) followed by a question about which ayurvedic formulation is present at your home? (with options like Asava, arista, Gutika, churna, lehya, Bhasma or any other or none of above) one more open ended question was asked about house hold remedies that Any house hold herbal remedies you are using to cure minor ailment at home?

Statistical analysis:

Statistical analysis was done using the statistical package of MS Excel 2016, then converted into representable graphical format. Simple descriptive statistics were used together with Chi-square test. The chosen level of significance was set at  $P < 0.05$ .

### Results and Discussion

Total 86 students have responded in google form out of 100 students and completed questionnaire. Survey revealed that all 86 students have been using herbal products at their home. Total number of herbal products found at 86 students home are 534. Maximum number of herbal products used by any students is 20. Minimum number of herbal products used by students is 1. Average number of herbal products present at student’s home is 6.44. Our survey reconfirms the WHO (World health organization) survey that 80% people still depend on traditional medicine and similar type of other survey done in Jordan. [1,7] Moreover, present survey also revealed that herbal products are prevalent at each home at least one.

Category of herbal products:

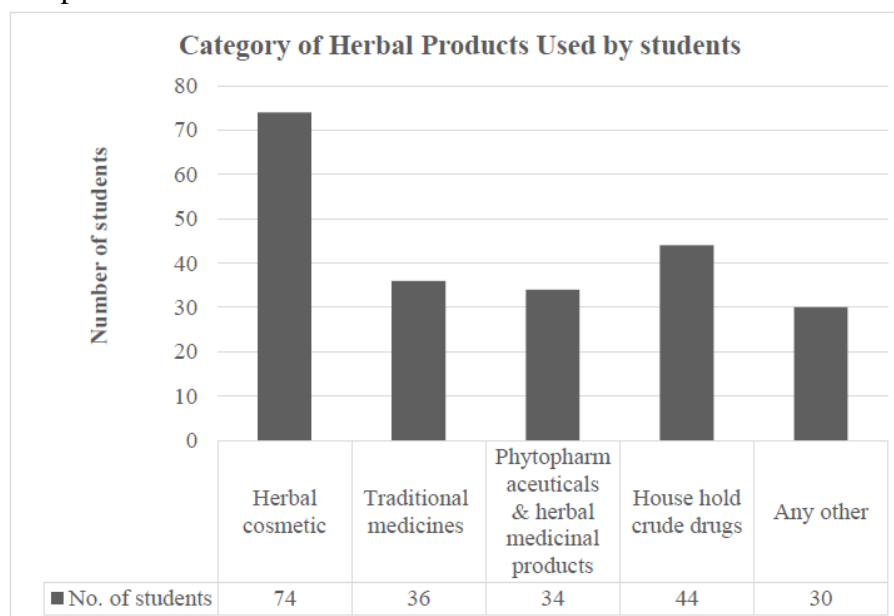


Fig. 1 Category of herbal products used by students.

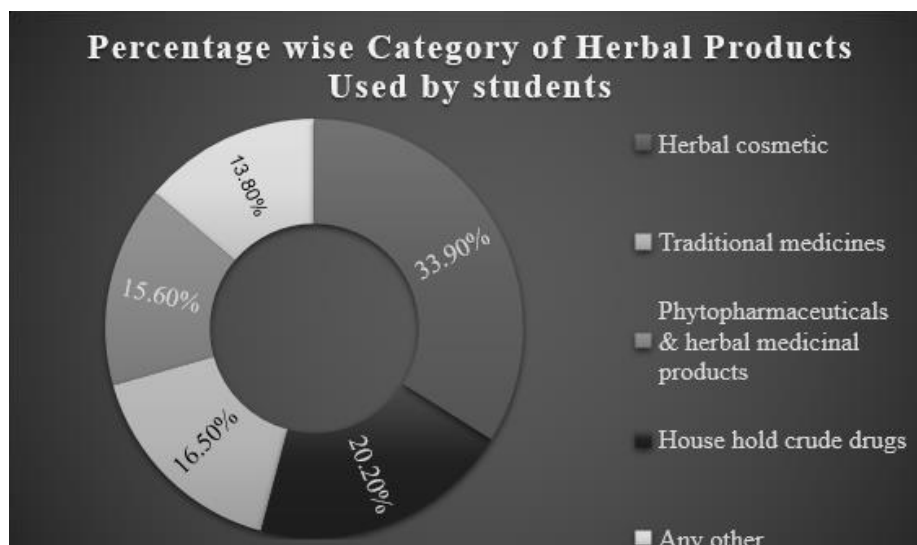


Fig. 2 Percentage wise category of herbal products used by students.

Fig. 1 & 2 indicates response presented in graphical format of the question that which category of herbal product is used by students or at their home? There were total five categories: Herbal cosmetics, Traditional medicines, phytopharmaceuticals and house hold crude drugs and any other than above mentioned category. Out of 86 total 74 students and their home are found with herbal cosmetics products. Maximum used category was herbal cosmetics, with 33.9%. After herbal cosmetic 2<sup>nd</sup> maximum used category was house hold crude drugs with 44 number of students and with 20.2%. 3<sup>rd</sup> maximum used category was Traditional medicinal formulation of AYUSH (Ayurveda, Siddha, Unani, Siddha and Homeopathy) with 36 number of students and with 16.5%, Which is followed by phytopharmaceuticals and herbal medicinal products with 34 number of students and with 15.6%. Least used category was other herbal products with 30 number of students and with 13.8%. Herbal cosmetics are defined as the products which prepared by or included plants and/or herbal components which are combination of many natural molecules or compounds. [8] Traditional medicinal products are those which are prepared as mentioned in scriptures of that particular system of medicines. Traditional medicine is the sum total of the knowledge, skills and practices based on the theories, beliefs and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health and in the prevention, diagnosis, improvement or treatment of physical and mental illness. While house hold crude drugs are those which are used and prepared as per ethnobotanical knowledge passed to us by our own ancestor to us and generally available at our home. Phytopharmaceuticals purified and standardized fraction with defined minimum four bio-active or phytochemical compounds (qualitatively and quantitatively assessed) of an extract of a medicinal plant or its part, for internal or external use of human beings or animals for diagnosis, treatment, mitigation, or prevention of any disease or disorder but does not

include administration by parenteral route. [9] Herbal Medicinal products containing as active substances exclusively herbal drugs or herbal drug preparations. They may consist of herbal preparations made from one or more herbs. If more than one herb is used, the term mixed herbal product can also be used. They may contain excipients in addition to the active ingredients. [10] Thus, it is evident from current survey that maximum used of category from herbal products was herbal cosmetic. The reason behind it might be increased desire for looking good. Synthetic cosmetics quite frequently cause adverse reactions, and are commonest single reason for hospital referrals with allergic contact dermatitis. [11] 2<sup>nd</sup> position of House hold crude drug might be due to ethno medicinal knowledge transferred from ancestors to current generation in India. [12]

Nutraceutical product:

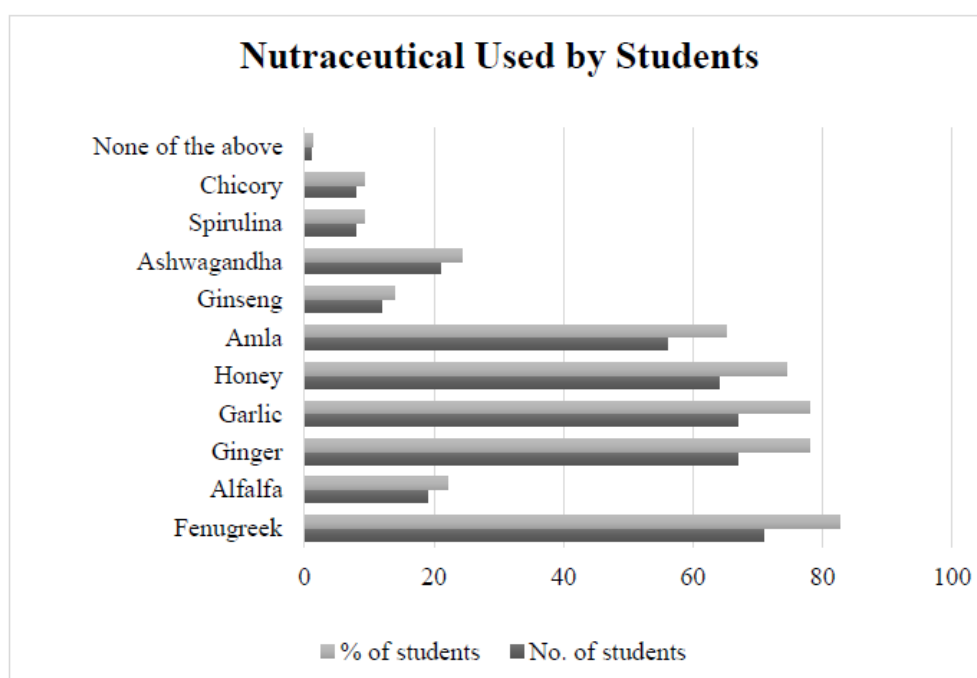


Fig.3 Nutraceutical products used by students.

Fig. 3 indicates answer of chart describing which of the nutraceutical was available at students' home? with options like Fenugreek, alfalfa, ginger, garlic, honey, Amla, ginseng, ashwagandha, spirulina, chicory or none of the above. From current survey it was found that maximum used herbal nutraceutical was fenugreek with 82.6%, followed by ginger and garlic with 77.9%. 3<sup>rd</sup> highest used herbal nutraceutical was honey with 74.4%, followed by Amla with 65.1%, followed by ashwagandha with 24.4%, followed by Alfalfa with 22.1%, followed by Ginseng with 14%, followed by spirulina and chicory each with 9.3%. Present survey found that out of 86 only 1 student home was not found with any nutraceutical product. Nutraceutical – a term coined by n 1989 by Stephen De Felice, is made up of two words 'nutrition' and 'pharmaceutical'. Nutraceutical is defined as food (or part of a food) that

provides medical or health benefits, including the prevention and/or treatment of a disease. [13] Nutraceuticals are classified as dietary fiber, probiotics, prebiotics, poly unsaturated fatty acids, antioxidant, polyphenols and spices. [14] Reason of picking up this special category of herbal product is it's growing market throughout the globe. For example, Global market which was approximately 400 billion USD (United States of America Dollar) in 2019 is expected to cross 700 billion USD with a CAGR (compound annual growth rate) of 8.3% by 2027. [15] Fenugreek being more popularity is due to scientific fact behind it's use as a nutraceutical. Fenugreek (*Trigonella foenum graecum*) is an annual plant belongs to the family Leguminosae. Fenugreek, seed and green leaves are popular as food and in as a medicine from ancient time in India. It contains phytochemical steroidal sapogenin-diosgenin, alkaloid-trigocoumarin, trigonelline, mucilage, volatile oil, bitter fixed oil, protein and carbohydrates- dietary fibers. Fenugreek is also rich source of iron total 33mg/100g dry weight. Fenugreek is used to enhance sensory quality of foods. Fenugreek possess medicinal properties such as anti-diabetic, anti-carcinogenic, hypo-cholesterolemic, antioxidant, and immune-modulatory effect. It is also used as a part of various food product developments as food stabilizer, adhesive, and emulsifying agent. [16]

Herbal cosmetic category:

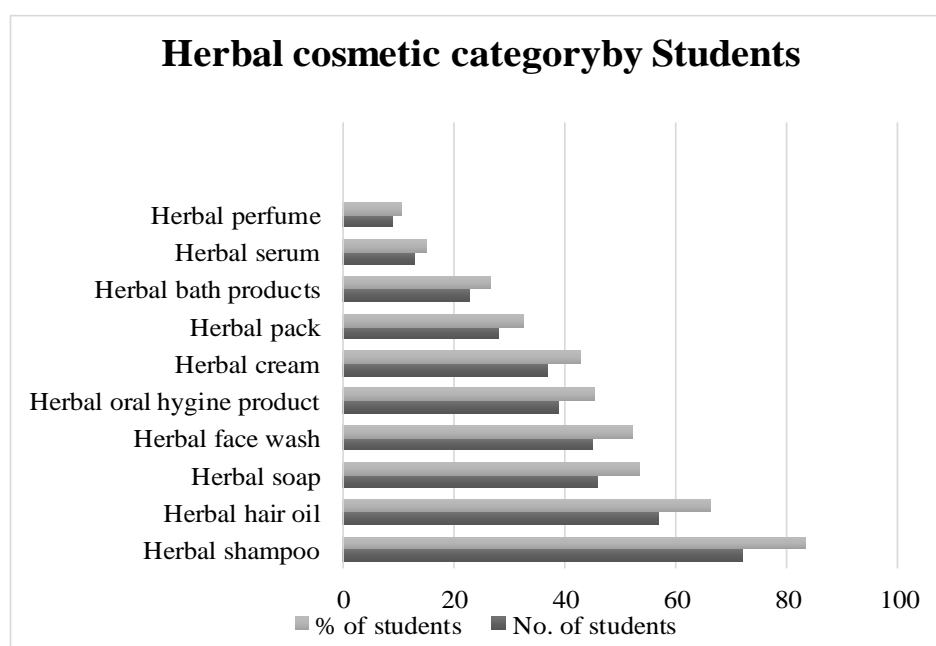


Fig. 4 Herbal cosmetic category used by students.

We have selected a question related to herbal cosmetic because The global herbal cosmetic products market size was estimated at US\$ 83.52 billion in 2021 and is expected to hit US\$ 130.2 billion by 2030, with CAGR of 5.06% during 2022 to 2030. [17] A question was asked to select herbal cosmetic category present at their home. Options were- herbal shampoo, herbal bath products (powder), herbal cream, herbal hair oil, herbal pack, herbal face wash,



herbal soap, herbal perfume, herbal serum, and herbal oral hygiene products. Fig. 4 indicates result of survey on category of herbal cosmetic products. The highest used herbal cosmetic was herbal shampoo with 83.7%, followed by herbal hair oil with 66.3%, followed by herbal soap with 53.5%, followed by herbal face wash with 52.3%, followed by herbal oral hygiene product with 45.3%, followed by herbal cream with 43%, followed by herbal pack with 32.6% followed by herbal bath product with 26.7% followed by herbal serum with 15.1% and herbal perfume at last with 10.5%. Present, survey revealed that most used category of herbal cosmetic product is herbal shampoo of different company. The Indian herbal shampoo market was valued at USD 318.1 million in 2021 and is projected to record a CAGR of 10.19% during the forecast period, 2022-2027. [18] Reason behind increased use of herbal shampoo is not only faith of people regarding safety aspect of herbals. But due to availability wide range of different herbal shampoo which is due to ease of introducing herbal extracts and phytochemicals in herbal shampoo.

Traditional medicine (specially ayurvedic formulation) category:

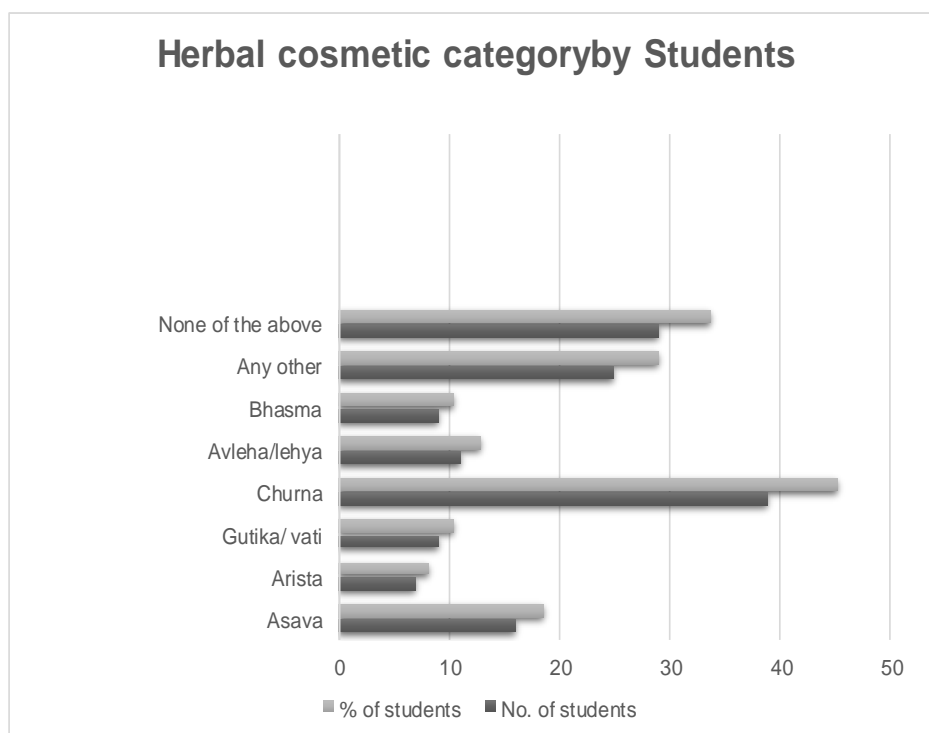


Fig. 5 Ayurvedic medicine category used by students.

Fig. 5 indicates the result of survey about a question asked that which ayurvedic formulation category used at their home? Options were: Asava, Arista, Gtika/vati, Churna, Avleha/lehya, Bhasma, any other, none of the above. Churna is defined as

Aristas and Asava is defined as are ayurvedic medicinal preparation made by soaking of drugs either in powder form or in form of decoction in solution of sugar or jiggery for specified period of time during which undergoes fermentation generating alcohol, thus

facilitating extraction of phytochemicals from drugs. Gutika/vati is defined as medicines prepared in the form of tablet or pills are known as vati and Gutika. These tablets are made of one or more crude drugs of plant, animal or mineral origin. Avleha/lehya is defined is a semi-solid preparation of drugs, prepared with addition of jaggery, sugar or sugar-candy and boiled with prescribed drug juice or decoction. Also known as Modaka, Guda, Khanda, Rasayana, Leha etc.

Table 1 House hold herbal remedies used by students and their relatives as primary treatment

Sr. no.	Name of herbal remedies	Ailments/ minor health problem
1	Ginger	Cough & abdominal pain
2	Holy basil & Vasaka	Cough
3	Turmeric	Cough, inflammation, wound healing, as face pack and injury
4	Ajwain & Asafoetida	Carminative and in stomachache
5	Clove	Dental analgesic
6	Neem bark and leaf	Dental, fever and skin problems
7	Prickly pear fruit juice	To increase Hemoglobin level
8	Aloe	Antidandruff, for hair shine and skin soothing, pimple
9	Honey	Throat infection, cold, cough, and minor burns
10	Black pepper	Cough and cold
11	Chirayeta and picrorrhiza	Fever
12	Vicks Tulsi	Throat infection
13	Calotropis leaf	Knee and back pain
14	Cinnamon decoction	Cough

Bhasma is defined as powder of a substance obtained by calcination. [19] In present survey analysis it was revealed that maximum used ayurvedic product was churna with 45.3%. 2<sup>nd</sup> highest category selected by students was none of above with 33.7%, followed by any other with 29.1%, followed by Asava with 18.6%, followed by Avaleha/Lehya with 12.8%, followed by Bhasma & Gutika both with 10.5%, and last arista with 8.1%. Only 36 students out of 86 students are using Ayurvedic formulation and only 77 formulations are of Ayurvedic traditional medicines out of total 534 formulations. Ayurvedic traditional formulation category was less than in earlier section even here also only few students have Ayurvedic formulation at their home. The reason behind it is Rule 170 of the Drugs and Cosmetics Act

1945, which was inserted through a gazette notification in 2018, under which advertisement of (AYUSH) Ayurveda, siddha, unani and homeopathic medicines are prohibited. [20] Many Ayurveda formulations are available as over the counter (OTC) products like churna, but certain formulation need valid medical prescriptions to purchase. Popularity of churna among all other category is its easy availability as OTC. Churna formulation contain fine powder of several herbal, minerals and plant origin crude drugs. Smaller the particle size greater is the absorption rate from g.i.t and hence the greater is bioavailability. [21]

House hold herbal remedies:

An open ended question asked was about house hold remedies. Any house hold herbal remedies you are using to cure minor ailment at home? In present survey we have found that each home is using house hold remedies to treat some minor ailments. Only one student has not mentioned about how and which house hold remedies they are using. We have compiled list of house hold remedies and ailments or problems by students and their relatives at home in table 1. Most used herb as house hold remedies are turmeric, clove and ginger, these three are also widely used food items as spices throughout Indian kitchen. Turmeric is dried rhizome of *Curcuma longa*, Family Zingiberaceae. Main phytochemical class present in turmeric is oleo resin. The resin present is known as curcuminoids the mixture of resin. Main phytochemical present is known as curcumin. It is proven that curcumin prevents release of inflammatory mediators, also antioxidant. It also depletes nerve endings of substance P, the neurotransmitter of pain receptors. Indian herbal pharmacopoeia has suggested key application as anti-inflammatory and as stomachic, which also supports use of turmeric lepa for treatment of inflammation. [22] Clove is dried flower bud of *Syzygium aromaticum*, family Myrtaceae. Main class of phytochemical present is volatile oil and main phytochemical present is phenolic ether Eugenol. Eugenol is proven antibacterial. German commission E. describes it key application in inflammatory changes of oral and pharyngeal mucosa, in dentistry and for topical anesthesia which supports use of clove oil by student as dental analgesic. [23] Ginger is rhizome of *Zingiber officinale*, family Zingiberaceae. Both form of ginger fresh as well as dried both are popularly used in India. The ayurvedic pharmacopoeia of India recommends dried rhizomes in dyspepsia, loss of appetite, anaemia, rheumatism, cough and dyspnoea, while fresh rhizome in constipation, colic, oedema and throat infection. According to Indian medicinal plants by C P Khare ginger contains gingerol and shaogaol which suppress gastric contraction, gastric secretion and reduce vomiting. Thus, both modern as well as traditional knowledge supports use of ginger as carminative, in stomach problem and in cough. [24] Minor health problems in which these house hold remedies used by students mostly are flatulence, stomach ache, cough, dental problem, dandruff in hair and injury. Thus, we have list of house hold remedies stating that “I am using xyz herb for xyz ailments” or “My mother is using xyz herb for xyz ailments” or “My father is using xyz herb for xyz ailments or “My sister is using xyz herb for xyz ailments” or

“My brother is using xyz herb for xyz ailments” or simply mentioned about use of crude drug in specific problems. Not only that, they have also mentioned about dosage and method of preparation of their house hold remedies. These shows success of current survey with our objective to use survey as background knowledge probe, so that whenever they study nutraceutical, or dosage form development they can connect scientific reason behind using it and get more interest in study and research of herbal drugs. These also prove that students have filled up the form genuinely with interest. These part of survey also proves that herbal drugs, formulations are not only present in our house but, we are utilizing to solve our daily life minor ailments, stomach ache, cough and hair or skin disorders.

From present survey it is very evident that most people use herbal or medicinal plant in either or form to solve their health, or cosmetic related problems with average ratio of 6.44. Most popular category of herbal products are herbal cosmetics followed by nutraceuticals among students. Most house hold herbal remedies used by students are turmeric, clove and ginger. Most minor problem they are facing and dealt with house hold remedies are flatulence, cough, dental, skin and hair problems or diseases.

### **Conclusions**

Present survey suggest that herbal products are presently being used at different level with different category at most of home. Thus, it is very evident from present survey that whether we know or not herbal products have very deep impact in daily life not only due to their presence but also due to knowledge we have about herbals from our ancestor and its easy availability. Present survey can be used to resolve issue with current formulation present at their home. Students and researcher can also use present survey for direction of future research in herbal product development field of different category mainly novel drug delivery formulation in nutraceutical and cosmeceuticals. Researcher can also concentrate more investigation on house hold herbs like fenugreek, aloe, neem, ginger, garlic, turmeric, clove and ginger convert in to new drug delivery formulation for treatment of gastrointestinal and respiratory tract minor ailments due to wider acceptability.

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## Synthesis, Characterization and Antimicrobial Activity of Novel Chalcone series and its Isoxazole Derivatives

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### ABSTRACT

A new series of chalcones have been prepared by the Claisen-Schmidt condensation. A novel series of isoxazole derivatives have been synthesized by the reaction of respective chalcones with hydroxylamine hydrochloride. The compounds were characterized by elemental analysis and mass, where spectral study of compound **1f**, **1g**, **2a** and **2h** also carried out by FTIR, <sup>1</sup>H NMR, <sup>13</sup>C NMR, and MS techniques. All synthesized compounds assayed for their antibacterial activity against *S. Aureus* MTCC-96, *B. Subtilis* MTCC-441, *E. Coli* MTCC-443, *S. Typhi* MTCC-98 and antifungal activity against *A. Niger* MTCC-282 and *A. Clavatus* MTCC-1323 at different concentrations and compared with standard drugs. The minimum inhibition concentration (MIC) of the compounds were studied by the micro broth dilution method. **1b**, **1c**, **1d**, **1h** and **2e** showed moderate to comparable antibacterial activity against *E. Coli*, *S.Typhi*, *B. Subtillis* and *S. Aureus*. All of these substituted chalcone compounds did not show antifungal activity but its isoxazole derivatives **2e** and **2h** showed comparable anti fungal activity.

**Keywords:** Isoxazole, Chalcone, Pyrazole carbaldehyde, Microbial activity

### INTRODUCTION

Chalcones have attracted researchers since last many decades due to their broad spectrum of biological activity like antibacterial<sup>[1]</sup>, acetylcholinesterase inhibitor<sup>[2]</sup>, Antitubercular<sup>[3]</sup>, Anticancer<sup>[4]</sup>, antidiabetic, anti-infective, anti-inflammatory, anti-oxidant, antiaging<sup>[5]</sup>. Chalcones have applications as mediator in synthesis of various organic compounds<sup>[6]</sup>. The  $\alpha$ ,  $\beta$  unsaturated propenone linkage may responsible for their broad spectrum of biological activity and their applications in various organic synthesis. A literature survey shows that heteroaromatic ring containing chalcones exhibits excellent biological activities<sup>[7,8]</sup>. Pyrazolic chalcones were reported for their potential as antimicrobial and antioxidant agents. Pyrazol derivatives exhibits antibacterial, antifungal, herbicidal, insecticidal and many other biological activities<sup>[9]</sup>. Isoxazoline compounds shows various pharmacological activities like antibacterial, antibiotic, antitumour, antifungal, analgesic, antituberculosis and anti-inflammatory<sup>[10-12]</sup>.

## MATERIALS AND METHODS

Thin-layer chromatography was accomplished on 0.2-mm pre coated plates of silica gel G60 F254 (Merck). Visualization was made with UV light (254 and 365nm). IR spectra were recorded on a SHIMADZU-FTIR-8400 spectrophotometer using DRS probe over frequencies ranging from 4000-400  $\text{cm}^{-1}$ .  $^1\text{H}$  (400 MHz) and  $^{13}\text{C}$  (100 MHz) NMR spectra were recorded on a BRUKER AVANCE II spectrometer in  $\text{DMSO-d}_6$  as solvent and TMS as an internal standard.  $^{13}\text{C}$  (100 MHz) NMR were recorded on 100 MHz spectrometer using  $\text{DMSO-d}_6$  as solvent. Chemical shifts are expressed in  $\delta$  ppm downfield from TMS as an internal standard. Mass spectra were determined using direct inlet probe on a SHIMADZU GCMS-QP 2010 mass spectrometer. Solvents were evaporated with a BUCHI rotary evaporator. Melting points were measured in open capillaries and are uncorrected. The chemicals used in this work were purchased from Merck and Spectrochem Chemical Companies. All chemicals were reagent grade and used without further purification, and all solvents were freshly distilled before use.

## EXPERIMENTAL SECTION

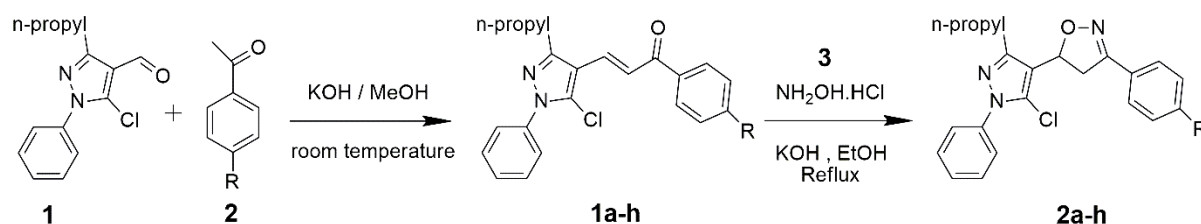
### General process for the synthesis of Chalcones (1a-h)

A series of chalcone (**1a-h**) were prepared by using 100 mL RBF containing a mixture solution of 5-chloro-1-phenyl-3-propyl-1*H*-pyrazole-4-carbaldehyde (**1**) (1 mmol) and respective para substituted acetophenone (**2**) (1 mmol) in 30 mL methanol. Followed by addition of 10 mL 10% KOH solution. Then reaction mixture was stirred for 5-10 h and kept overnight at room temperature. Then reaction mixture was quenched on to ice cold water and acidified with aqueous 10% HCl solution. Crude product was extracted using Ethyl acetate (25 mL), and organic layer was washed with water and organic solvent was evaporated using rotary evaporator to obtain solid compound. The product was purified by recrystallization in methanol. The compound was characterized by various techniques as mentioned in Table 1.

### General process for the synthesis of 5-(5-chloro-1-phenyl-3-propyl-1*H*-pyrazol-4-yl)-3-aryl-4,5-dihydroisoxazole (2a-h).

The compounds substituted 4,5-dihydroisoxazole (**2a-h**) obtained in a 100 mL round bottomed flask containing (1 mmol) respective chalcone compound (**1a-h**) and (1.1 mmol) hydroxylamine hydrochloride (**3**) in 20 mL ethanol was placed in a water bath and 10 % ethanolic potassium hydroxide solution (2 mL) was added drop wise at room temperature with stirring. Then reaction mixture temperature was raised to reflux with stirring for 6-14 h. The progress of reaction was monitored by TLC. After completion of reaction, reaction mixture was quenched on to ice cold water. Crude product was extracted using Ethyl acetate (25 mL) and organic layer was washed with water and organic solvent was evaporated using

rotary evaporator to obtain solid compound. The product was purified by recrystallization in methanol. The compound was characterized by various techniques as mentioned in Table 1.



**Figure 1:** Synthesis of substituted chalcones (**1a-h**) and its 4,5-dihydroisoxazole derivatives (**2a-h**)

**Table 1:** Substrate scope

Code	R	M.F.	M.W.	M.P.	% yield	*R <sub>f</sub>
<b>1a</b>	H	C <sub>21</sub> H <sub>19</sub> ClN <sub>2</sub> O	350	168-170	87	0.69
<b>1b</b>	OH	C <sub>21</sub> H <sub>19</sub> ClN <sub>2</sub> O <sub>2</sub>	366	202-204	85	0.78
<b>1c</b>	OCH <sub>3</sub>	C <sub>22</sub> H <sub>21</sub> ClN <sub>2</sub> O <sub>2</sub>	380	189-191	82	0.74
<b>1d</b>	F	C <sub>21</sub> H <sub>18</sub> ClFN <sub>2</sub> O	368	161-163	71	0.79
<b>1e</b>	Cl	C <sub>21</sub> H <sub>18</sub> Cl <sub>2</sub> N <sub>2</sub> O	384	172-174	75	0.84
<b>1f</b>	Br	C <sub>21</sub> H <sub>18</sub> BrClN <sub>2</sub> O	430	154-156	78	0.76
<b>1g</b>	NO <sub>2</sub>	C <sub>21</sub> H <sub>18</sub> ClN <sub>3</sub> O <sub>3</sub>	395	181-183	88	0.64
<b>1h</b>	NH <sub>2</sub>	C <sub>21</sub> H <sub>20</sub> ClN <sub>3</sub> O	365	192-194	79	0.70
<b>2a</b>	H	C <sub>21</sub> H <sub>20</sub> ClN <sub>3</sub> O	365	184-186	76	0.72
<b>2b</b>	OH	C <sub>21</sub> H <sub>20</sub> ClN <sub>3</sub> O <sub>2</sub>	381	166-168	68	0.79
<b>2c</b>	OCH <sub>3</sub>	C <sub>22</sub> H <sub>22</sub> ClN <sub>3</sub> O <sub>2</sub>	395	196-198	71	0.76
<b>2d</b>	F	C <sub>21</sub> H <sub>19</sub> ClFN <sub>3</sub> O	383	174-176	69	0.81
<b>2e</b>	Cl	C <sub>21</sub> H <sub>19</sub> Cl <sub>2</sub> N <sub>3</sub> O	399	185-186	64	0.85
<b>2f</b>	Br	C <sub>21</sub> H <sub>19</sub> BrClN <sub>3</sub> O	445	136-139	70	0.78
<b>2g</b>	NO <sub>2</sub>	C <sub>21</sub> H <sub>19</sub> ClN <sub>4</sub> O <sub>3</sub>	410	161-164	73	0.69
<b>2h</b>	NH <sub>2</sub>	C <sub>21</sub> H <sub>21</sub> ClN <sub>4</sub> O	380	149-151	57	0.74

\*Hexane : Ethyl acetate (80:20)



**Table 2:** Antimicrobial activity of synthesised compounds:

Compound	Minimum inhibition concentration ( $\mu\text{g/mL}$ )					
	Gram-positive		Gram-negative		Fungal species	
	<i>B. subtilis</i>	<i>S. aureus</i>	<i>E. coli</i>	<i>S. typhi</i>	<i>A. niger</i>	<i>A. clavatus</i>
<b>1a</b>	250	500	500	1000	250	500
<b>1b</b>	200	250	100	200	500	500
<b>1c</b>	25	50	50	100	250	250
<b>1d</b>	200	100	100	200	500	250
<b>1e</b>	500	250	500	500	1000	500
<b>1f</b>	1000	1000	500	1000	>1000	1000
<b>1g</b>	>1000	1000	500	500	1000	1000
<b>1h</b>	100	100	100	250	500	1000
<b>2a</b>	1000	>1000	>1000	1000	500	500
<b>2b</b>	500	1000	250	500	250	200
<b>2c</b>	250	250	500	1000	250	500
<b>2d</b>	250	200	100	200	200	200
<b>2e</b>	100	200	200	100	100	100
<b>2f</b>	1000	500	250	500	250	500
<b>2g</b>	500	1000	500	>1000	500	500
<b>2h</b>	250	200	100	250	100	100
<b>Ciprofloxacin</b>	25	25	50	50	-	-
<b>Norfloxacin</b>	12.5	12.5	100	100	-	-
<b>Nystatin</b>	-	-	-	-	100	100
<b>Griseofulvin</b>	-	-	-	-	100	100

### Biological Testing

A series of chalcone (**1a-h**) and its 4,5-dihydroisoxazole (**2a-h**) derivatives were screened for their *invitro* antibacterial and antifungal activities following micro broth dilution method [13-15]. Antibacterial activity was screened against gram-negative (*Escherichia coli*, *Salmonella typhi*) and gram-positive (*Bacillus subtilis*, *Staphylococcus aureus*) microorganisms where antifungal activity was screened against *Aspergillus niger*, and *Aspergillus clavatus* microorganisms. The standard drugs used for this study were Ciprofloxacin and Norfloxacin for antibacterial screening, Nystatin and Griseofulvin for antifungal screening. Mueller Hinton Broth was used as a nutrient medium for bacteria and for fungal growth Sabouraud Dextrose Broth was used. By comparing the turbidity, inoculum size 10<sup>8</sup> CFU/mL was adjusted for test strain. The test performed in the form of primary and secondary screening. Each synthesized compounds under investigation and

standard drugs solution were diluted to obtain 2000 µg/mL concentration, as a stock solution. In primary screening 1000, 500 and 250 µg/mL concentrations of the compounds were used by successive dilution. The compounds found to be active in this primary screening were further screened in secondary screening where 200, 100, 50, 25, 12.5 and 6.25 µg/mL concentrations were used. The inoculated wells were incubated at 37°C for 24 h in a humid atmosphere. The minimal inhibitory concentration (MIC) values for all the newly synthesized compounds, defined as the lowest concentration of the compound preventing the visible growth, were determined by using micro dilution broth method according to NCCLS standards.

## RESULTS AND DISCUSSION

Claisen-Schmidt condensation of 5-chloro-1-phenyl-3-propyl-1H-pyrazole-4-carbaldehyde (**1**) with substituted acetophenone (**2**) in polar solvent like methanol gave substituted chalcones (**1a-h**) by using KOH as base catalyst. These substituted chalcones (**1a-h**) were refluxed with hydroxylamine hydrochloride in presence of alkali in ethanol to afford the corresponding isoxazole derivatives (**2a-h**). These compounds were characterized by elemental analysis and mass, where spectral study of compound **1f**, **1g**, **2a** and **2h** also carried out by FTIR, <sup>1</sup>H NMR, <sup>13</sup>C NMR, and MS techniques to elucidate the synthesized compounds structure.

### Compound Characterizations

#### **1-(4-bromophenyl)-3-(5-chloro-1-phenyl-3-propyl-1H-pyrazol-4-yl)prop-2-en-1-one (1f):**

Yield, 78%, m.p. 154-156°C; IR (cm<sup>-1</sup>): 3076 (C-H stretching of aromatic ring), 2969 (C-H stretching of aliphatic), 1751 (C=O stretching), 1656 (C=C stretching of enone), 1590 (C=C stretching of aromatic ring), 1495 (C=C stretching of aromatic ring); <sup>1</sup>H NMR (DMSO-*d*<sub>6</sub>) δ ppm: 0.995-1.032 (t, 3H, n-propyl-CH<sub>3</sub>, *J* = 7.2 Hz), 1.693-1.785 (m, 2H, n-propyl-CH<sub>2</sub>CH<sub>3</sub>), 2.858-2.896 (t, 2H, n-propyl-CH<sub>2</sub>CH<sub>2</sub>, *J* = 7.6 Hz), 7.544-7.680 (m, 7H, aromatic H, CH=CH), 7.798-7.819, 7.982-8.004 (dd, 4H, aromatic H). <sup>13</sup>C NMR (DMSO-*d*<sub>6</sub>) δ ppm: 13.743, 20.793, 29.160, 113.051, 120.168, 125.073, 127.184, 128.345, 128.940, 129.341, 130.235, 131.964, 132.732, 136.568, 137.197, 153.444, 188.017; *m/z* : 428; *Anal. Calcd. For* C<sub>21</sub>H<sub>18</sub>BrClN<sub>2</sub>O: C, 58.69; H, 4.22; N, 6.52; Found: C, 58.95; H, 4.25; N, 6.78.

#### **3-(5-chloro-1-phenyl-3-propyl-1H-pyrazol-4-yl)-1-(4-nitrophenyl)prop-2-en-1-one (1g):**

Yield, 88%, m.p. 181-183°C; IR (cm<sup>-1</sup>): 3069 (C-H stretching of aromatic ring), 2970 (C-H stretching of aliphatic), 1745 (C=O stretching), 1638 (C=C stretching of enone), 1576 (C=C stretching of aromatic ring), 1486 (C=C stretching of aromatic ring); <sup>1</sup>H NMR (DMSO-*d*<sub>6</sub>) δ ppm: 0.999-1.035 (t, 3H, n-propyl-CH<sub>3</sub>, *J* = 7.2 Hz), 1.717-1.772 (m, 2H, n-propyl-CH<sub>2</sub>CH<sub>3</sub>), 2.870-2.907 (t, 2H, n-propyl-CH<sub>2</sub>CH<sub>2</sub>, *J* = 7.6 Hz), 7.551-7.713 (m, 7H, aromatic H, CH=CH), 8.260-8.281, 8.393-8.414 (dd, 4H, aromatic H). <sup>13</sup>C NMR (DMSO-*d*<sub>6</sub>) δ ppm: 13.743, 20.769, 29.148, 112.981, 120.168, 123.972, 125.065, 128.666, 128.994, 129.356,

129.607, 133.697, 137.136, 142.429, 149.776, 153.599, 188.084;  $m/z$  : 395; *Anal. Calcd. For*  $C_{21}H_{18}ClN_3O_3$ : C, 63.72; H, 4.58; N, 10.62; Found: C, 63.58; H, 4.52; N, 10.67.

**5-(5-chloro-1-phenyl-3-propyl-1H-pyrazol-4-yl)-3-phenyl-4,5-dihydroisoxazole (2a):**

Yield 76%; m.p. 184-186<sup>0</sup>C; IR ( $cm^{-1}$ ): 3063 (C-H stretching of aromatic ring), 2962 (C-H stretching of aliphatic), 1612 (C=C stretching of aromatic ring), 1496 (C=C stretching of aromatic ring), 1303 (C-O stretching of heterocyclic ring); <sup>1</sup>H NMR (DMSO-*d*<sub>6</sub>)  $\delta$  ppm: 0.936 (t, 3H, n-propyl-CH<sub>3</sub>), 1.664 (m, 2H, n-propyl-CH<sub>2</sub>CH<sub>3</sub>), 5.655 (bs, 1H, heterocy. H), 7.261-7.716 (m, 10H, aromatic H); <sup>13</sup>C NMR (DMSO-*d*<sub>6</sub>)  $\delta$  ppm: 13.736, 21.737, 29.148, 74.359, 119.087, 119.844, 125.070, 126.430, 128.764, 128.863, 129.259, 129.815, 137.434, 138.957, 156.636;  $m/z$  = 362.9; *Anal. Calcd. For*  $C_{21}H_{20}ClN_3O$ : C, 68.94; H, 5.51; N, 11.49; Found: C, 68.85; H, 5.52; N, 11.56.

**4-(5-(5-chloro-1-phenyl-3-propyl-1H-pyrazol-4-yl)-4,5-dihydroisoxazol-3-yl)aniline (2h):**

Yield 57%; m.p. 149-151<sup>0</sup>C; IR ( $cm^{-1}$ ): 3348-3225 (N-H stretching of primary amine), 3063 (C-H stretching of aromatic ring), 2955 (C-H stretching of aliphatic), 1612 (C=C stretching of aromatic ring), 1504 (C=C stretching of aromatic ring), 1296 (C-O stretching of heterocyclic ring); <sup>1</sup>H NMR (DMSO-*d*<sub>6</sub>)  $\delta$  ppm: 0.995 (t, 3H, n-propyl-CH<sub>3</sub>), 1.715 (m, 2H, n-propyl-CH<sub>2</sub>CH<sub>3</sub>), 2.902 (t, 2H, n-propyl-CH<sub>2</sub>CH<sub>2</sub>), 5.341 (bs, 1H, heterocy. H), 6.556-6.705 (m, 2H, aromatic H), 6.979-7.162 (m, 2H, aromatic H), 7.465-7.650 (m, 4H, aromatic H), 8.023(1H, aromatic H); <sup>13</sup>C NMR (DMSO-*d*<sub>6</sub>)  $\delta$  ppm: 13.728, 21.078, 29.610, 99.177, 111.431, 114.369, 115.820, 124.982, 125.302, 125.921, 129.034, 129.244, 129.351, 129.548, 137.219, 148.937, 151.435, 162.542;  $m/z$  = 379.9; *Anal. Calcd. For*  $C_{21}H_{21}ClN_4O$ : C, 66.22; H, 5.56; N, 14.71; Found: C, 65.89; H, 5.51; N, 14.65.

**Antimicrobial Activity**

Antimicrobial activity performed by micro broth dilution method. The MIC value obtained for synthesized compounds **1a-h**, **2a-h** and for Ciprofloxacin, Norfloxacin, Nystatin and Griseofulvin as standard drug. In which compound **1b** showed moderate activity against *E. coli*. and *S. typhi*. Compound **1h** showed good activity against *B. subtilis* and *S. aureus*. Compound **1d** and **2e** found moderate active and compound **1c** found comparable active against all four bacterial strains *E. coli*, *S. typhi*, *S. aureus* and *B. subtilis*. Substituted chalcone compounds did not show anti fungal activity where its isoxazole derivatives **2e** and **2h** found comparable active against fungal species *A. niger* and *A.clavatus*.

**CONCLUSION**

Substituted chalcones and its isoxazole derivatives were synthesized and characterized by spectral techniques. They also screened for antibacterial activity and anti fungal activity against selected microbes and compared with standard drug Ciprofloxacin, Norfloxacin, Nystatin and Griseofulvin. In which some of the substituted chalcones and its isoxazole

derivatives found moderate to comparable active against selected bacterial strains where isoxazole derivatives **2e** and **2h** showed comparable anti fungal activity.

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## A Review on 1+ and 4+ cations doping in cobalt ferrites for their potential applications

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### ABSTRACT

In recent years, researchers are working on enhancing various properties of ferrite materials because of their versatile field of technological applications such as electronics, communications, automation, sensors, energy etc. Ferrites can be categorized structurally as spinel, garnet, magneto plumbites, and orthoferrites. Which, a spinel ferrite is one of the most important polycrystalline oxides which has more industrially viable applications. The cations doping in the spinel ferrites play a vital role to control electrical and magnetic properties. Hence, these properties can be modified for the ferrite system with suitable dopants. In this collective review, the projection of different properties of cobalt ferrite ( $\text{CaFe}_2\text{O}_4$ ) such as magnetic and electric properties are discussed. As well as the possible impact of simultaneous doping of materials such as lithium ( $\text{Li}^+$ ) and titanium ( $\text{Ti}^{4+}$ ) are covered. It is found that by doping the lithium and titanium in a cobalt ferrite system, an entirely new set of properties can be obtained. As lithium is the lightest cation and titanium is the high-corrosion-resistance cation, they can enhance various physical properties in the doped spinel oxides.

**Keywords:** Cobalt Ferrite, Cations Distribution, Magnetic Properties, Dielectric Properties.

### Introduction

Ferrites are made up of many small crystals, which are rigid, fragile, iron-containing and mostly magnetic at room temperature. They are low cost and have good corrosion resistance also. Ferrites can be classified into three types: spinel, hexagonal and garnet ferrites [1]. Amongst these spinel ferrites can be used as switches, transducers, actuators, etc. [2]. Cobalt is a ferromagnetic metal with a specific curie temperature. By the transition temperature its structure transits between HCP and FCC structure. Hence, the combination of cobalt and iron, specifically ferrites, has been known as a chemically stable and strong magnetic material for a long time. When suitable compounds are added to a cobalt ferrite, its structural properties can be changed. By doping Ti and Li in the spinel ferrite, electrical and magnetic properties can be modified [3, 4]. Ti-doped Cobalt ferrite is having very less conductivity, while with the doping of Li and the thermal treatment, the said spinel ferrite electric conductive might be enhanced [5, 6].

**Electric and Magnetic Properties of Cobalt Ferrite Nanoparticles:**

Muzquiz – Ramos et. al. has observed that for  $\text{CoFe}_2\text{O}_4$  the  $M_s$ ,  $M_r$  and  $H_c$  increase up to certain temperatures. After the critical point of temperature  $M_s$  exponentially increased while  $M_r$  and  $H_c$  substantially decreased [7]. Torres et. al. observed that for  $\text{CoFe}_2\text{O}_4$ , in the temperature range, of 5 K to 280 K the value of  $H_c$  and  $M_s$  decreased drastically, and superparamagnetic behaviour is exhibited [8]. Kanagesan et. al. and Mauricio A. Medina et. al. also find that  $\text{CoFe}_2\text{O}_4$  behaves as superparamagnetic materials at room temperature with low  $H_c$  value [9, 10]. Maaz et. al. has seen similar results for  $H_c$  at different temperatures in that the value of  $H_c$  decreases from 15000 Oe to 750-980 Oe when the temperature is increased from 77 K to 300 K [11]. Ajroudi et. al. has observed that the  $\text{CoFe}_2\text{O}_4$  behaves as an N-type semiconductor and its conductivity increase at high temperature but by increasing the amount of Co in the ferrite system it becomes stable [12]. Khandekar et. al. observed the n-type semiconducting behaviour of  $\text{CoFe}_2\text{O}_4$  at room temperature and resistivity decreases and dielectric constant increases with the increase in calcination temperature [13]. Hossain et. al. obtained  $\text{CoFe}_2\text{O}_4$  using the sol-gel method and observed soft ferrimagnetic behaviour as well as a dielectric constant that has higher values at low frequencies and decreases at high frequencies [14]. Razia Nongjai et. al. displayed similar results that at high temperatures  $\text{CoFe}_2\text{O}_4$  shows high conductivity which decreases at high frequencies [15]. Veena Gopalan et. al. measured the dielectric permittivity of  $\text{CoFe}_2\text{O}_4$  which is inversely proportional to the frequency but remains constant at very high frequencies [16]. Krutika L. Routray et. al. synthesized  $\text{CoFe}_2\text{O}_4$  using three different methods namely solid-state reaction, co-precipitation and auto-combustion method and observed that  $\text{CoFe}_2\text{O}_4$  shows ferrimagnetic nature and dielectric parameters have similar behaviour [17]. A few of the results related to the magnetic properties of doped  $\text{CoFe}_2\text{O}_4$  systems are tabulated as follows:

Table 1 Comparison of magnetic properties of  $\text{CoFe}_2\text{O}_4$  at different temperatures

Temperature	$M_s$ (emu/g)	$M_r$ (emu/g)	$H_c$ (Oe)	Reference
5 K	77 - 80	-	14000 - 17100	[8]
77 K	40.8	34.4	11000 - 15000	[11]
280 K	62 -71	-	8.3 - 264	[8]
300 K	68	31.7	750 - 1205	[11]
573 K	41	12	643	[7]
873 K	47	16	891	[7]
1173 K	68	5	103	[7]
1573 K	85	4	99	[7]

### Effect of Ti Doping in CoFe<sub>2</sub>O<sub>4</sub>

Patil and Kotake (2018) synthesized  $\text{Co}_{1+x}\text{Ti}_x\text{Fe}_{2-2x}\text{O}_4$  and the magnetic measurements showed that by increasing the amount of Ti in the Co site, the values of  $M_s$ ,  $M_r$  and  $H_c$  decreases rapidly [18]. Similarly, Vaithyanathan et. al. (2015) show that the magnetic parameters decreased due to a smaller fraction of Ti in  $\text{CoFe}_2\text{O}_4$  spinel ferrites [19]. In the contradictory, Amaliya et. al. (2018) synthesized  $\text{Co}_{1-x}\text{Ti}_x\text{Fe}_2\text{O}_4$  by the sol-gel method and observed from magnetic measurement results that by increasing the amount of Ti in A – site rather than B the values of  $M_s$ ,  $M_r$  and  $H_c$  increase rapidly [20]. Pal et. al. (2018) showed different results from what is discussed above i.e.  $M_r$  decreases with increases in Ti while  $M_s$  increases up to  $x=0.2$  and then it decreases while  $H_c$  remains constant this may be incorporated with the calcination temperature [21]. Chae in 2001 and 2003 showed that by increasing the calcination temperature the  $M_s$  and  $H_c$  values can be increased in  $\text{Co}_{1.2}\text{Ti}_{0.2}\text{Fe}_{1.6}\text{O}_4$  which confirms the direct relation of magnetic behaviour with calcination temperature [22, 23]. Patil and Kounsalye et. al. (2020) studied the effect of Ti on the electric properties of  $\text{CoFe}_2\text{O}_4$  and showed a similar nature in that the resistivity decreases with an increase in temperature, and the dielectric parameter decreases with an increase in frequency [24]. Nlebedim, Jiles (2015) investigated  $\text{Co}_{1+x}\text{Ti}_x\text{Fe}_{2-2x}\text{O}_4$  and observed that up to  $x=0.3$  content at 50 K temperature the coercivity decreases but after that for  $x=0.4$  &  $x=0.5$  specimens, the coercivity increases. It has also been recorded that by increasing temperature from 50 K to 300 K the coercivity of the material is decreased with an increase in the concentration of Ti [25]. The effect of Ti doping in either of the interstitial sites and resultant magnetic properties can be understood by the following diagram (Figure 1).

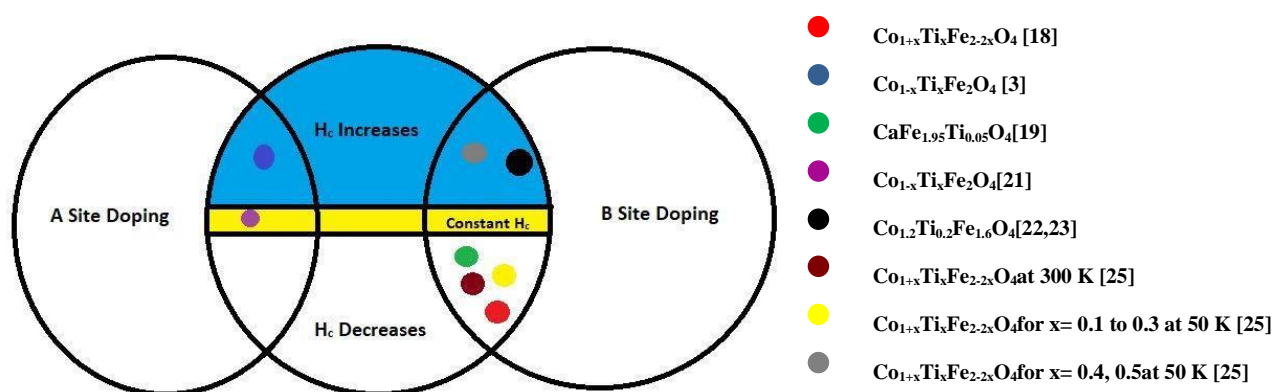


Fig 1: Diagram of Ti Doping in different sites and  $H_c$ (Coercivity) Value

### Effect of Li Doping in CoFe<sub>2</sub>O<sub>4</sub>

Shobhna (2012) observed that as the concentration of lithium is increased in the  $\text{CoFe}_{2-x}\text{Li}_x\text{O}_4$  system, the conductivity decreases [6]. While Rashid et. al. (2015) synthesized  $\text{CoCu}_x\text{Li}_x\text{Fe}_{2-2x}\text{O}_4$  to record the electrical properties which are found entirely different i.e conductivity

increased with an increase in the concentration of Cu and Li in the present system [26]. Anjum et. al. (2017) doped Li in the A site and the results were quite opposite to that of doping in the B site as conductivity was increased when the concentration of Li was increased [27]. Junaid et al. (2020) prepared a  $\text{LiCo}_{0.5}\text{Fe}_2\text{O}_4$  system and found that the specimen ( poses soft ferrimagnetism after doping Bismuth the values of  $M_s$  &  $M_r$  were enhanced. The value of  $H_c$  was decreased when the amount of Bi was increased in B-site. The dielectric constant was also decreased when the concentration of Bi was increased [28]. Shobana, Park and Choe (2019) synthesized  $\text{CoLi}_x\text{Fe}_{1-x}\text{O}_4$  and analyzed its electrical properties. It was found that by increasing the amount of Li the conductivity of the substance was also increased. It was quite opposite of  $\text{CoLi}_x\text{Fe}_{2-x}\text{O}_4$  which was discussed earlier [29]. Arvind et. al. (2016) synthesized  $(\text{Li}_{0.5}\text{Fe}_{0.5})_{1-x}\text{Co}_x\text{Fe}_2\text{O}_4$ . From magnetic measurement, it was observed that the  $H_c$  decreases when the concentration of Li is increased. Also, from the dielectric analysis, it was observed that Li-doped systems have more dielectric constant values than that pure Co samples [30]. The variation in the electric conductivity due to Li-ion doping in the A-site or B-site can be seen in Figure 2.

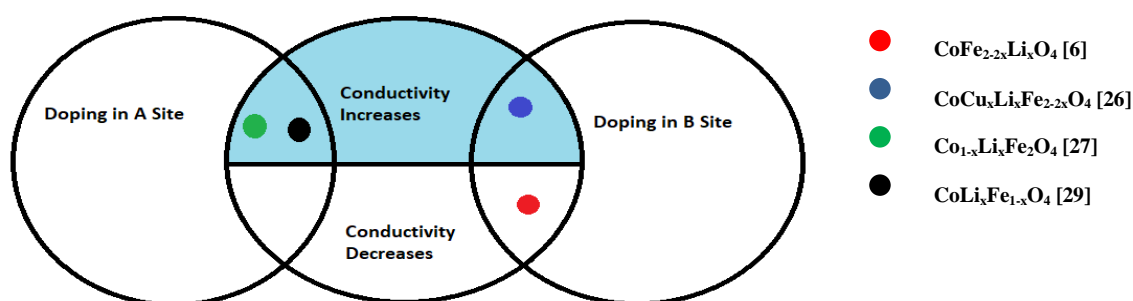


Fig 2: Diagram of Li Doping in different sites and Conductivity

## Conclusion

From the collective review studies, we have concluded that by doping the  $\text{Li}^{1+}$  and  $\text{Ti}^{4+}$  in spinel ferrite materials an entirely new set of properties is found. Both magnetic and electrical properties of  $\text{Li}^{1+}$  and/or  $\text{Ti}^{4+}$  doped  $\text{CoFe}_2\text{O}_4$  systems are dependent on doping concentration, synthesis processes and sintering temperature. As well as the properties of these types of specimens can be modulated by the interstitial sites' preferences for cations substitution.

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## Advantages Of Internationalisation for Higher Education Institutes

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### ABSTRACT

There are several benefits for Higher Education Institutes in terms of continuing the globalisation of higher education. Taking Indian higher education in broad prospective some of the benefits are covered in further detail below:

India has a big and diversified higher education system, like that of the United States. As per the reports of National Assessment and Accreditation Council (NAAC), Indian education system is the second biggest in the world after the United States. This extensive higher education infrastructure with more than 40000 colleges and 1000+ universities, meets country's educational requirements completely with the growing time. In practically all industries where development is required, formal programmes or training are offered, ranging from ancient philosophy to the most recent developments in computer technology. The type of courses that are provided in these institutions are in par with all other educational institutes of the world.

Many institutions in India those which fall in the group of 'Institutes of National Importance (INIs)', such as the Indian Institutes of Technology (IITs) and the Indian Institutes of Management (IIMs), as well as a few other universities with a strong international reputation and alumni in several parts of the globe, have premium status. The rising number of students from the families of Non-resident Indians (NRIs) who seek admission in the premier Indian colleges is a symptom of the comparability of the level of education offered in the country's top educational institutions. In addition, the cost of schooling in India is quite affordable. India has the benefit of having a variety of instructional mediums via which education may be transmitted. According to the data published by Indian Parliament (Rajya Sabha):

- (a) In the academic year 2020-21, a total of 5484 seats remained unfilled in IITs. The course-wise breakup of these seats are as follows:
- 476 seats were vacant in undergraduate courses (BTech)
  - 3,229 seats in postgraduate courses
  - 1,779 in PhD courses
- (b) In the academic year 2021-22, a total of vacant seats in IITs was 5296, slightly lower than the previous year. The course-wise breakup of these seats are as follows:
- 361 seats remained vacant in BTech courses
  - 3083 in postgraduate courses
  - 1852 in PhD courses

- (c) In NITs, as per the data 3741 seats across various courses were vacant in 2020-21, the number of vacant seats further increased to 5012 in 2021-22. Of these vacancies, most of the seats remained unfilled in postgraduate courses i.e., 2487 in 2020-21 and 3413 in 2021-22.

For most of the higher education institutions in India, English is being followed as the primary language of instruction, this is also due to the fact that most of the Indian HEIs have diverse group of students from all the parts of India with each part having a distinct local language and dialect. Some Indian universities, such as the Centre for English and Foreign Languages in Hyderabad, have established overseas campuses to work towards internationalisation of their outreach and expanding the sources of revenue. Learning English throughout their scholastic career helps Indian citizens to accept teaching and research positions across the globe at all levels, regardless of their country of origin. Indian postsecondary schools that are not affiliated with universities offer specialised training for the country's varying educational and training demands. Higher education places are also readily available in India, which is a positive development. Although there is tremendous competition for admission to the best universities, this does not imply that there is a limit to the number of students who may be admitted. With the entry of national commercial providers into the education system, India has more 'seats' available than there are students who want to enroll in them. Every year, as a result of the expansion of private providers in Engineering and Technology-related fields, there are many "vacancies" in the available capacity due to a lack of qualified applicants. According to the most recent report by AISHE (All India Survey on Higher Education), the number of colleges has climbed by roughly 8.4% from 39,071 in 2015-16 to 42343 in 2019-20, while the number of universities has increased by 30.5%, from 799 in 2015-16 to 1043 in 2019-20.

Within liberal arts and scientific universities, the severity of the issue is significantly greater. In addition, the low yearly growth rate in demand for higher education from the public in India is a source of concern. The primary challenge is how to maintain this increase if there are not enough qualifying students to meet demand. The best American institutions have a variety of reasons for wanting to expand into the Indian market. Numerous of them have a real desire to expand their businesses internationally and consider India as a significant source of economic development in the twenty-first century. They would want to grow it in one of the world's most important higher education marketplaces, and they may utilise their Indian outposts to attract talented Indian students and academic personnel to study in them.

**Keywords:** *Internationalisation, Higher Education, Public Institutes*

### **Strategies for Internationalisation in India**

Varghese and Mathews (2021) conducted research on internationalisation as well as India's New Education Policy in India. According to the authors, initiatives to expand India's soft power and strengthen its global influence seem to be driving the internationalisation of higher education in India, rather than market mediation for the purpose of generating cash. The New Education Policy 2020 (NEP 2020) promotes international educational institutions to develop a presence in India and suggests that Indian educational institutions be established in other countries as well. Also, it has been emphasized by multiple educational stakeholders that India's efforts towards the internationalisation of higher education is not in competition with other countries of the world towards the growth in educational perspective, but rather it towards the wish to strengthen the country's soft power and its global influence.

The Governmental Economic Plan 2020 (NEP 2020) is the first national strategy to place a high premium on internationalisation. International students are being drawn to India by the country's ambition to become a worldwide study destination and an education centre for them. The construction of branch campuses by top-ranking international institutions is recommended by NEP 2020, signaling a significant change in policy approach (from among the top 100 in world university rankings).

As part of its efforts to promote cultural understanding, India awards approximately 3,940 scholarships per year through the Indian Council for Cultural Relations (ICCR) to foreign students from approximately 140 countries. The country has also signed cooperation agreements in the field of education with 54 countries. Despite this, it has taken decades for the government to have a well stated strategy on internationalisation. Two previous national education plans (the NEP of 1968 and the NEP of 1986) were notably deafeningly mute on this matter.

The first time an internationalisation strategy had been presented in India was in 2002, when the University Grants Commission (UGC) unveiled the "Promotion of Indian Higher Education Abroad" (PIHEAD) programme. The Task Force on Higher Education in 2004 agreed to delay this proposal because they did not want the General Agreement on Trade in Services (GATS) framework to expose India's higher education system to international competition. In 2010, a measure was introduced in the Indian parliament that sought approval for international education providers to build campuses in the country. This measure was also defeated in the Senate.

When it comes to playing a worldwide role, India is trying to do so, and education may be a supporting area in that endeavour. In view of the internationalisation of Indian Higher Education, and to improve the flow of incoming foreign students by extending scholarships, "Study in India" initiative under Ministry of Education (Government of India) was incepted in 2018. As many as 500,000 overseas students are expected to enroll in Indian universities by 2024, with 10 percent of them receiving lucrative government scholarships. The awarding

of scholarships demonstrates India's desire to take a leading role in the international community.

### Current Indian Higher Education Landscape

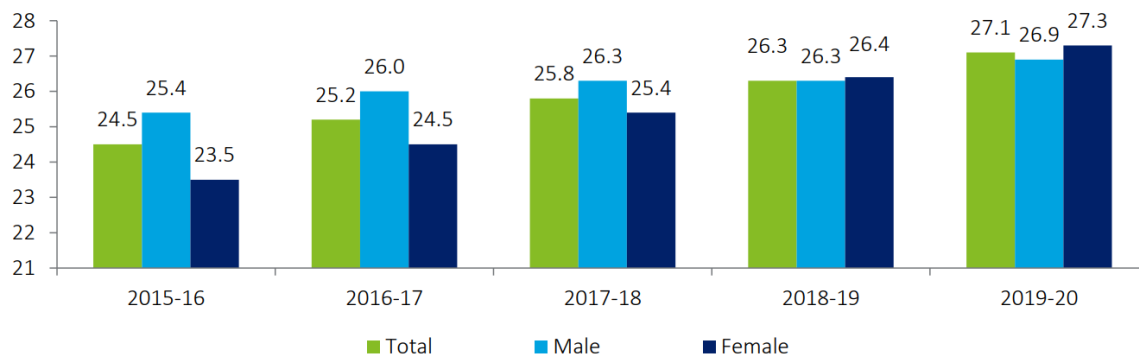
India is now home to around 48,000 overseas students, with plans to increase this number to 200,000 over the course of many years. Nepal had the highest proportion of international students, with 26.9 percent, followed by Afghanistan (9.8 percent), Bangladesh (4.4 percent), Sudan (4.0 percent), Bhutan (3.8 percent), Nigeria (3.4 percent), and the United States (3.2 percent). The administration thinks that a concentrated effort, as well as the changes proposed in the NEP, would aid in the improvement of the situation. The government, on the other hand, wants to increase the number of pupils to 200,000 from the existing 48,000 students (Nanda, 2020).

According to the Global Governance Initiative (2021), despite having the world's second biggest higher education system, none of the country's 990 universities and 40,000 colleges are ranked among the world's top 100 institutions in World University Rankings. Even though India has one of the world's biggest pools of labour, the quality of that workforce is a cause for worry. Substandard educational institutions produce degree-oriented graduates who are not professional in the traditional meaning of the word. According to the most recent Global Talent Competitive Index (2020), which measures a nation's existing capacity to develop and recruit talents, the country ranks 72 out of 132 countries. Only six colleges in the globe, all of which are home to some of the world's most distinguished intellectuals, are ranked among the top 500 institutions in the world.

Institution Indicator	Universities	Colleges	Standalone
Total number of institutions	1,043	42,343	11,779
Average enrolment per institution	7,803	641	216
Total estimated enrolment (in lakh)	81.38	271.54	20.74

Source: All India Survey of Higher Education, MoE 2019-20

Furthermore, the Gross Enrolment Ratio (GER), a statistic that compares the number of people in that age range who are enrolled in higher education to the overall population, is at 26%. According to the World Bank, only 25% of Indians enroll in higher education, compared to 99% in Italy, 90% in Australia, and 85% in the United States. From the current level of 35%, the NEP 2020 (National Education Policy 2020) wants to almost double it to 50% by 2035. Before we enlarge the current educational institutions, let's first analyse what internationalisation might achieve. Global perspectives and national policies both have an impact on higher education, which is a dynamic field (Internationalisation of Higher Education in India, 2021).



Source: All India Survey of Higher Education, MoE 2019-20

For many years, India's culture of 'Atithi Devo Bhava' has attracted international students to study there. The government, on the other hand, is currently concentrating on developing India into a centre of higher education for international students. Nirmala Sitharaman, the Minister of Finance, introduced the 'Study in India' project in her budget address, with the goal of elevating the country's standing in higher education. As a result, Study in India, a collaborative project between the Ministry of Human Resource Development (MHRD) and Educational Consultants India Limited (EdCIL), was created with the objective of increasing the number of international students to 2 lakhs over the following five years. The government has allocated a budget of Rs. 150 crores for the programme for the next two years, which will be utilised mostly for brand marketing activities, according to the official website (Mishra, 2020).

According to the plan, India would seek students from nations in Asia and Africa as part of its outreach efforts. The initiative anticipates the involvement of chosen reputable Indian institutions in the form of 15,000 seats available at reasonable prices to overseas students. Candidates for study in India must first pass the IND SAT (Scholastic Assessment Test), which will serve as a benchmark for their academic performance in the country. From streamlining the visa application process to offering students a substantial price remission ranging from 100 percent to 25 percent, the initiative represents a concerted attempt to diversify Indian university campuses.

### Recent developments on policies and strategies in India

In the last decade, India's educational system has advanced by leaps and bounds (Carnoy and Dossani, 2012). As in prior years, a rich country is defined by its skilled workforce, globalised economy, and high-quality education. Internationalisation has had a significant influence on the world's higher education system. The Indian government has been pushing for changes via a variety of policy initiatives and plans in order to provide equitable educational opportunities for its young residents and to bring India's education up to world standards. The government has also backed a number of programmes and initiatives aimed at providing young

people with equitable educational opportunities that meet international standards.

Collaboration with international academic establishments is the first step towards empowering Indian educational institutions. The Global Initiative of Academic Networks (GIAN) was created in 2015 with the goal of improving the country's research capability so that it can embrace new knowledge frontiers with international brilliance. It enables Indian students and professors to engage with the greatest academic and industrial specialists from across the globe, enhancing the country's current academic resources, scientific and technical capabilities, and bringing it up to international standards (PIB, 2015). Since the government modified legislation in 2016 to improve synergies between Indian and foreign institutions, the number of collaborations with overseas universities has continued to grow. Foreign universities and institutions from a variety of nations, including the United States, the United Kingdom, Canada, Australia, the Netherlands, Germany, and others, have previously partnered with Indian institutes and universities. According to recent studies (AISHE 2019), there are around 600 international cooperation relating to student, teacher, and scholar exchanges.

The Indian government announced in 2017 that selected Indian institutions will be recognised as 'Institutions of Eminence,' with worldwide standards. These institutions were anticipated to get more academic, administrative, and financial resources. It is seen as a beneficial trend since it will push institutions to internationalise in order to become more competitive in the global marketplace (PIB, 2019). SPARC (Scheme for Promotion of Academic and Research Collaboration) was launched in 2018 to encourage Indian universities and colleges to enter into partnerships and collaborations with reputable top-ranked international universities in order to gain knowledge, information, and experience in order to explore a variety of other opportunities (PIB, 2018).

In 2014, India became a member to the Washington Accord, which promotes and enables worldwide mobility for engineering graduates and professionals. It allows any student who completes a programme authorised by the National Board of Accreditation (NBA) to work as an engineer in their field in any of the Washington Accord's member nations (Mohanty and Dash, 2016). Involving the greater community via the use of Information and Communication Technology (ICT) has proven to be a successful approach for institutions and universities, allowing millions of students to enter higher education who would otherwise be unable to do so.

In India, the use of ICT in Massive Open Online Courses (MOOCs) provided by multinational education organisations is becoming more popular (Chauhan, 2017). After the United States, India has the second-largest MOOC enrolment (Alcorn et al., 2015). International education businesses collaborate with local universities and institutions to give degrees in such ICT-based courses, which are fast expanding in popularity (Roberts, 2018). Multiple programmes are being promoted by the national and state governments throughout India to increase online



learning quality and provide effective skill development for future generations. One of the most recent instances is the Maharashtra State Government's cooperation with Google to expand internet penetration in rural locations among the youthful people in order to enhance the availability of high-end vocational and skill development training courses.

Enrolling in distant or online language classes via websites or even mobile applications is becoming more popular as a way to save money. With international tie-ups with top global institutions, certain new-age private universities are offering their stakeholders an advantage at a time when world-class facilities, international standards, and outlooks are concerns for Indian higher education. While it is difficult to modify the teaching and research paradigm at older institutions, a few Indian private universities are doing things differently, which benefits students, staff, and researchers. Ashoka University, Shiv Nadar University, OP Jindal University, and others have partnered with some of the world's best overseas institutions. Students may participate in semester abroad and summer school programmes at top-ranked international institutions such as Stanford, Yale, Sciences Po (France), King's College (London), Tel Aviv (Israel), and others (Chakraborty, 2020).

Students, on the other hand, learn directly from foreign teachers who travel to India to educate via successful international collaborations. According to analysts, these international collaborations enable academics and researchers at these institutions to take use of the partner foreign universities' research, educational, and industrial links in order to better comprehend the demands of the global marketplace. The 'Study in India' initiative was introduced in 2018 to encourage international students to study in India (PIB 2018). The effort is comparable to those established in Australia, Malaysia, and Singapore, and aims to promote India as a major higher education destination. It caters to students from around 30 countries, mostly in Asia and Africa, and provides tuition exemptions and scholarships to deserving foreign students.

According to a recent research, approximately 70,000 foreign students are enrolled in Indian colleges. The majority come from Nepal, Afghanistan, and Bangladesh, which are all close neighbours (AISHE 2019). The government has set a goal of doubling the number to 2 lakh by 2022. The programme actively supports various processes such as outreach and marketing of Indian universities in target countries, streamlining visa procedures for students, improving facilities in host institutions, and signing international agreements with institutions and universities abroad, among others. The recent announcement of the New Education Policy 2020 (NEP, 2020) in India has sparked a lot of discussion about several recommended changes, such as moving towards a more holistic and interdisciplinary education with a heavy emphasis on internationalisation.

All higher educational institutions will become interdisciplinary as a result of this plan, and will be able to provide high-quality teaching, research, and service to students. The new NEP has advocated for allowing the world's most prestigious universities to work with them and even open branches in the nation (Tilak, 2019). Even in the regulated sector, the strategy favours foreign direct investment and external commercial borrowings by promoting less complex requirements for foreign partnerships in education. The government is currently drafting regulations in this area. The government wants foreign companies and international institutions to invest in India's cash-strapped education industry. The government has developed legislation to replace numerous regulatory bodies with a 'Higher Education Council of India,' which would have multiple compositions and powers (PRS, 2020). Multiple regulating agencies for higher education, including professional education, are being eliminated. As the world's largest democracy and second-most populous country, India's higher education policymakers are focusing more on various aspects of internationalisation of higher education, realising that in order to develop as a powerful nation, India must first achieve pre-eminence in the global higher education arena.

### **Favourable Factors attracting foreign students to India**

By nominal GDP, India has become the seventh-largest economy in the world, and by purchasing power parity, it is the third-largest (PPP). Slowly but surely, the nation in the third world is losing its stigma as a poor one. Indian IT firms have built a reputation as being among the best in the world. Start-ups are associated with Bengaluru, and it's easy to see why. Globally mobile young people are very interested in it.

We have world-class institutions, like the IITs, which are ranked high in the top 200 of the world's best colleges and universities. Sundar Pichai and Satya Nadella, two CEOs of Indian descent, have done much to improve the image of Indian academicians throughout the world.

There are a considerable number of Indian students who get hired by Fortune 500 organisations. Developing nations that seek to create a commercial footprint in emerging markets put a premium on experiences in these regions. Students will be able to immerse themselves in India's rich cultural and artistic landscape. Having English as a widely spoken language gives India an edge over China, and India's low cost of higher education makes it an intriguing entry point in the cost-value matrix.

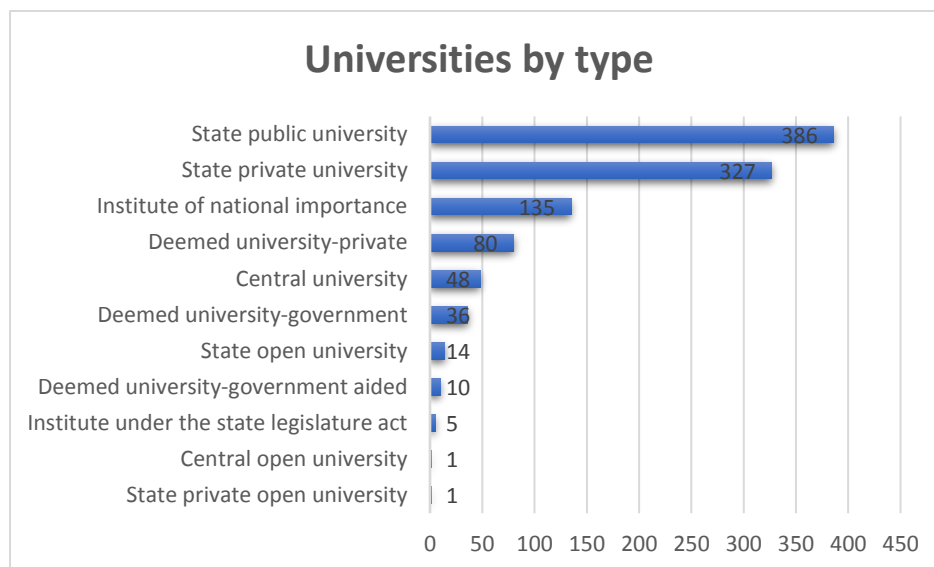
### **Issues and Challenges in Higher Education in India**

Lack of infrastructure and access to high-quality education, financing limits, and underdeveloped support networks are only few of the obstacles preventing the Study in India project from being very effective. At the moment, India's bordering nations account for the

majority of international student admissions. Nepal is home to more than a quarter of the world's overseas students, followed by Afghanistan, Bangladesh, Sudan, Bhutan, and Nigeria. We need a more planned approach to international student recruitment. Steps must be carefully assessed and well-planned in order to get the greatest potential outcomes from the programme. To begin, India has identified 32 countries as prospective destinations, but there is a need for more awareness and capacity development on how elite universities such as IITs and IIMs can strengthen their infrastructure to attract more international students. These elite universities must pull their socks up and take responsibility for reinventing themselves in terms of educational quality, faculty, programmes, safety, and infrastructure. Institutions must invest in providing positive experiences for overseas students, therefore developing brand advocates for their programmes.

Second, bridging information gaps is critical as students search for signs that might help them reduce the risk of studying abroad, taking course fees, cost of living, and distance into account. Regardless of the wealth of material accessible online, students will need counselling and a reliable source of information in order to make educated decisions. Investing in such services in several languages is also necessary for the programme to succeed. The Study in India project is a smart first step in improving India's global education rankings and growing the economy, and it addresses some of the higher education sector's present weaknesses. Yet, for higher education to be genuinely effective, the nation must solve several social, cultural, and logistical difficulties (Mishra, 2020).

Altbach and de Wit (2018) explored the Fundamental Challenges to Internationalization in Higher Education. Varghese (2015) discussed the issues associated with the massification of higher education in India. Although India is still in the early stages of massification of higher education, the author claimed that the nation has the world's second biggest higher education system, with around 30 million students, 0.70 million professors, and 36 thousand institutions (in 2012-13). Unlike in established market economies, where state institutions supported universalization of higher education, in India, massification of higher education is a market-mediated process assisted mostly by private institutions and funded by families. These massification-related difficulties include concerns about fairness, quality, financial mobilisation, and system management and regulation. The state's role seems to be shifting away from funding and administering institutions and toward building a framework for regulating the system to assure access fairness and excellent results.



*Source: All India Survey of Higher Education, MoE 2019-20*

Wing Ng (2012) observed that higher education in the twenty-first century has enormous obstacles in terms of governance structures, curricular creation, research, and budgeting. One key tendency of globalisation in terms of changing and restructuring higher education is the need to increase the global competitiveness of higher education systems. Thus, the character of competitiveness is being emphasised in the process of globalisation of higher education. According to Chakraborty's (2020) research, India's higher education industry has produced some of the world's most talented individuals. Several institutions, such as the Indian Institutes of Technology (IITs), the Indian Institutes of Science (IISc), and the Indian Institutes of Management (IIMs), developed a brand identity and became worldwide recognised over time. Nonetheless, these programmes fall short of meeting the nation's expanding demands. While Indian higher education has grown significantly in terms of enrolment, some areas, such as a lack of high-quality faculty, a lack of new curriculum that meets global standards, a lack of international perspectives, and gaps between the skills imparted to students and the skills require in the workplace, continue to require serious attention (Gupta and Gupta, 2012). Indian institutions' performances in international university rankings are unsatisfactory (Jalote, 2019). The government has been unable to develop a sufficient number of universities of international standing. Internationalisation of higher education is one strategy for resolving these issues. Given the expected need for massification, internationalisation, and quality enhancements in India's higher education sector, foreign collaborations provide an enormous potential.

Despite the enormous demand, international institutions face significant barriers to enter into the Indian education industry. Regulation uncertainty, restrictive bureaucratic processes, and relatively modest fee structures are significant impediments for overseas firms and investors (Altbach, 2014). Additionally, there is widespread resistance in India's many states and

provinces against the commercialization of education. Worldwide, various nation-states have been obliged to restructure their higher education institutions in order to accommodate multiple developments brought about by the growth of the global economy, which mandated cross-border commerce, investment, human movement, and job. India has also initiated systematic changes in the higher education sector, based on the recommendations of many high-level commissions and committees established to give policy direction and promote international collaborations (Mathew, 2016). The administration has established new policies and initiatives to overhaul higher education through expanding cooperation with international institutions on a variety of levels. While the existing structure and restrictions of India's higher education system make international providers' admission difficult and restrictive, the government is re-examining laws and expanding opportunities for foreign providers.

Transnational, cross-border, off-shore, and borderless higher education have been fashionable phrases in recent years – notably after 2000, when mobility in higher education gained form and progressed. Mobility in higher education has evolved from person-to-person (students, professors, scholars) to program-to-program (twinning, franchise, virtual) to provider-to-provider (branch campus) mobility, and, most recently, to the purposeful construction of education hubs (Kosmutzky and Putty, 2016).

Higher education in India is a complicated industry due to its size, diversity of culture, lengthy history, and the heterogeneous structure of the Indian politics and policymaking process (Agarwal 2009). While there are several research papers, reviews, and reports on Transnational Education (TNE) and internationalisation of higher education in the literature, there are relatively few studies on the Indian context. Surprisingly, Indian universities place little emphasis on 'Higher Education' as a topic for teaching or study, and a sizable portion of India's university and policy officials lack knowledge on how universities operate, their role in society, or the financial aspects of academe (Agarwal and Kamalakar, 2013). Their inability to comprehend genuine concerns is evident in their duties, and often appropriate thinking is lacking when it comes to managing trustworthy data and established facts when formulating policy, with judgments being made more on the basis of politics and perception (Altbach, 2014).

### **Challenges to overseas partnerships in Indian higher education sector**

Due to the absence of a complete regulatory framework for transnational education, foreign providers in the regulated higher education sector, such as universities, colleges, and institutes, are discouraged (Singh and Awasthi, 2016). Education in India is a 'not-for-profit' industry available to only donors and religious organisations. While 100% Foreign Direct Investment (FDI) is authorised in the Indian education sector, no foreign investment (direct or indirect) is permitted in any higher education institution's sponsoring body. This rivalry has resulted in significant bottlenecks in the sphere of higher education by prohibiting foreign investment

(PwC, 2012). As a consequence, foreign investment in India is mostly concentrated in unregulated education sectors such as vocational and distant learning education with an emphasis on online technologies.

State universities and their associated colleges, which account for the majority of higher education enrolment, get extremely little funding and consequently lack basic facilities. According to the UGC, 35% of all sanctioned teaching positions are empty, including professor positions, 46% associate professor positions, and 26% assistant professor positions. There is now no structure in place to ensure professors' accountability and performance at universities and colleges. This is in contrast to international institutions, where teacher performance is judged by their colleagues and students. According to a recent survey on employability, over 80% of engineers in India are unemployed due to a lack of technology skills needed by businesses today. According to eminent scientist and Bharat Ratna laureate CNR Rao, 90 percent of the country's universities and higher educational institutions have outmoded curricula.

Few nations, such as Dubai, Singapore, and Qatar, are effectively marketing themselves as a global education centre and offering significant financial incentives to host off-shore international campuses (Knight, 2011). India is unable to offer total autonomy or financial incentives for international colleges due to its socio-political atmosphere. Indian policymakers have yet to strike the optimal balance between rules and innovation in terms of international universities' admission. India is a federal republic, with separate policies for central and state universities. When it comes to international providers entering the higher education industry, Indian states fall into two categories: those that encourage foreign providers and those who signalled resistance. Regional political instability and frequent administration changes in various Indian states and provinces have traditionally harmed the education sector's development, particularly universities.

Disparities in vision and a lack of communication between the federal and state governments further complicate the operation of colleges. The legacy of economic and political interactions, as well as mutual distrust, are impediments to transnational collaboration in higher education (Reisberg, 2019). Compliance with regulatory requirements for legitimate concerns such as espionage, research security, and intellectual property theft also limits students' and researchers' movement across national boundaries (Kumar, 2019). Thus, foreign collaboration in Indian higher education continues to be a complex and unresolved problem.

The majority of overseas cooperation at Indian colleges face stiff bureaucratic enforcement and control. Inadequate data management and inconsistent implementation of laws by Indian regulatory bodies are dampening global partners' excitement (CIHE, 2013). The government has supported many new cooperation avenues for international institutions to join the Indian higher education sector. The most common is 'twinning programmes,' in which a portion of the academic curriculum is taught on the campus of the foreign partner to foster collaboration

between Indian and international educational institutions. The degree transcript may incorporate the names and crests of both partnering institutions. However, the essential uncertainty persists, since no joint or international degree may be awarded, which is unappealing to the foreign partner (Garrett, 2017).

Due of their incapacity to issue degrees, international colleges are less interested in them. Complicated examination and approval processes based on a variety of characteristics such as required operating money, stipulated fee structures, courses, and curriculum are significant restraints (AICTE, 2019). In India, fees for degree programmes are quite cheap, which presents a significant barrier for international colleges with a greater cost base. Numerous engineering and management colleges in India are experiencing a shortage of student seats (Varghese and Panigrahi, 2019).

In the case of foreign participation in faculty exchange, recruiting internationally renowned and capable professors is challenging in the Indian context. It requires major changes in a variety of areas, including not simply flexible financing for salaries and benefits, but also modifications to institutions' present governance structures and changes to government rules aimed at recruiting the finest personnel. For decades, academics have flowed the other way - from India to other nations. While the cost of living in India is comparatively cheap, remuneration for academics and researchers at Indian universities are not internationally competitive. From the standpoint of the host country, India is seen as a cost-effective location for higher education. Nonetheless, the negative reputation of colleges, notably the quality of their facilities, is a substantial barrier to foreign student recruitment.

At the present, the Indian government permits the allocation of 10% to 15% supernumerary seats for overseas students enrolled in higher education (PIB, 2018). This resource is often underutilised across universities and colleges. The majority of Indian institutions are not internationally renowned and are rated low as a result of students' and instructors' poor academic performance and teaching-learning activities, which are reflected in their citation and research output. There is no sufficient positive correlation between market needs and graduating students' talents. Most major Indian colleges' foreign student outreach suffers at the price of the home market, and universities are less inclined to provide competitive scholarships to overseas students than in other emerging nations such as China (Agarwal, 2011).

### **Challenges and Issues in Internationalisation in India**

According to Knight (2007), 'internationalisation provides several advantages to higher education, but it is also obvious that the complex and expanding phenomena has significant concerns.' Developing nations rely heavily on education services as a source of revenue. Institutional trading has grown to be a multibillion-dollar industry (Yang, 2003). Participating in the global education market has become a must for even the most elite colleges (Naidoo,

2018).

As is the case in the majority of nations worldwide, education for children is a basic human right in India. However, higher education in India is a voluntary pursuit that requires financial assistance to increase both its quality and quantity. It is critical that Indian higher education results in an overall rise in labour force productivity and an increase in educated individuals' engagement in nation-building. Despite fast expansion, higher education in India remains inaccessible to the poorest parts of society. A group of educational professionals is opposed to the establishment of foreign institutions in India (Sardana and Hothi, 2011). The issue is that it will increase the expense of school, and that only the wealthy will have a chance to enter.

According to several experts, as a result of current trends in internationalisation, university administration is increasingly focusing on the corporate and entrepreneurial model at the cost of the institution's traditional missions of teaching, research, and service (Jiang and Carpenter, 2014). Significant non-financial programmes such as student exchange, internships, and curriculum development are losing importance, occasionally jeopardising institutions' academic relationships (Morey, 2004). It undercuts the key function of partnerships in higher education and may jeopardise research and academic works (Scott, 2003). Internationalization has evolved into a new metric of quality (Bijedic et al., 2015).

A fundamental problem for the multi-campus global university model is the difficulty of continuously delivering on the brand promise of a high-quality education and student experience that is led by the home campus. Global marketing and competitive pressures are eroding the quality of research and education. In the current context, higher education in India must be equipped to address the country's social, economic, and cultural concerns. The public and social purpose of higher education should not be eroded cumulatively as a result of certain international collaborations that place an excessive emphasis on entrepreneurialism and commercialization (Chakraborty, 2020).

### **Concluding Observation**

During the last several years, higher education in India has increased by leaps and bounds, and this trend will continue. As a consequence of the increase in the number of state-funded schools, private operators have been granted permission to supplement education. The construction of high-quality higher education institutions that are capable of handling the challenges is critical to India's future. Inadequate government resources are available for higher education, hence private and foreign involvement in this field is encouraged. India need a comprehensive plan for private higher education that includes overseas universities interested in establishing campuses in India or developing joint ventures with Indian institutes of higher learning. This bill, which would enable foreign educational institutions to operate in India if it were passed, has not yet been signed into law by the president. Foreign universities should also be forbidden from encouraging an excessive amount of



commercialization of higher education, according to the consensus. Admission should be restricted to recognised colleges alone, and these institutions should be required to construct full-fledged campuses in India. India must re-examine its policies on the admission of foreign students to its educational institutions. The availability of adequate highly skilled human resources would be critical in determining India's potential to become an economic powerhouse, and this will need an improvement of the country's educational system to international standards.

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## COMPARISON OF SHORT- TERM FINANCING OPTIONS; FACTORING AS THE BEST ALTERNATIVE

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### **Abstract:**

Studying the relationship between factoring and other short-term financing with reference to India's micro, small, and small businesses The basis for comparison is average interest rate, general repayment period, execution time, commission charge, application of agreement between or among the parties, requirement of securities, whether it creates assets or liabilities, the intended use of the available funds or credit, whether GST Report and CIBIL Score are required for obtaining funds/credit or not, and any restrictions on drawing the funds or credit. With the use of a tabular comparison, the benefits of factoring funds over other forms of short-term borrowing.

**Key Words:** *Factoring, Trade Credit, Short-Term Finance, Cash Credit, Working Capital*

### **Introduction:**

Steep rivalry in the corporate sector is a result of changes in the business environment. At the same time that well-established large business hubs are experiencing intense rivalry, MSME commercial firms are also coming under pressure. Along with other big/large business operations around the world, MSME is one of the most crucial components for economic development in any developed, developing, or under-developed country in the world. However, as a result of fierce competition between giant corporations and a disregard for the significance of MSME businesses, MSMEs are struggling and are unable to expand in this constricting business environment. There are a few ways that MSME may serve in order to broaden or enhance the MSME world.

A MSME can succeed in this cutthroat business environment by using the financial tools offered by various financial institutions, such as short-term financing. To better execute short-term financing, MSME businesses may find some of the short-term finance and its comparisons valuable. The conclusion drawn from the short-term finance data may be useful to MSME decision-making.

### **Background**

The term "short-term finance" was first used to describe bridging loans half a century ago, although it was initially applied to repair the damaged link in the housing supply chain. Although short-term loans were employed in the 1960s to buy and sell houses, their true value

wasn't seen until the 1980s. The next best option available in this time period to speed up the market was a short-term loan because secured loans from banks were currently offered slowly.

The globe was in shock in 2007 when there was a credit crunch brought on by a scarcity of credit on the market. Thus, practically all of the banks in the globe start implementing short-term loans to finance a variety of market services in order to overcome the aforementioned problems. Since then, banks have formally adopted short-term loans and credit in an effort to end the credit crunch in the markets.

Current market conditions allow for a variety of short-term credit products, including Trade Credit, Cash Credit, Bank Overdraft, Working Capital Loan, Factoring, etc. The most crucial aspect of all is that each of these credits has unique qualities, importance, application, etc.

### **Purpose of the Investigation**

The purpose of the title is to evaluate the many forms of credit that are now available and show how, after comparison, short-term financing might benefit MSME. All forms of short-term financing for MSME will be compared to factoring as a new source of alternative credit on the market. A comparison table will be created, and the results of the comparison will be explained, in order to show the significance of factoring as the best alternative source of financing for MSME.

### **Definition**

Factoring is a tried-and-true alternative source of financing that clients can employ by using their own accounts receivable after giving the Factors their customer information. After reviewing the client's customers, if the factor is confident in their authenticity and creditworthiness, it will authorize the advance payment to the client. The clients' capacity to manage their day-to-day business operations is made possible by the factor's provision of advance cash. With the development of alternative finance, small businesses worldwide can thrive and expand, providing crucial or tested services that could significantly increase a nation's GDP. It will help to fill the time gap of account receivables in one hand and on the other hand the available advance money can re-invested into business which may defiantly increase the sales volume of business in every rotation.

**Trade Credit:** Because trade credit transactions are typically B2B, they can be viewed as an agreement or understanding between two parties who are actively conducting business. Supplier firms let such credit transactions to be completed with the promise of future payments when a company that falls under the MSME category or any other company wants to buy specific goods and services on credit. Depending on the terms of the agreement, the payment period may range from 7, 30, 60, or 120 days. One of the fascinating aspects is that there is no

interest charged on trade credit. After certain agreements between its respected parties and taking into account the benefit of trade credit, MSME enterprises may purchase their raw materials for inventory on credit.

**Bank Overdraft:** An overdraft is a situation in which a business or individual overdraws money from their bank account to cover a shortfall in funds. It's a type of service that banks offer to their valued customers that allows them to withdraw more money than is now in their bank accounts. Every bank has set a maximum on how much money can be overdrawn from accounts and given to clients, taking into account those clients' ability to pay back the money. The maximum amount that can be withheld is determined or specified by the bank or other financial institution, and the volume or frequency of withdrawals may vary from one bank to another and from one consumer to another. Interest is applied to the amount that the consumer used, not the maximum allowed by the banks.

**Cash Credit:** Cash credit is a facility provided by a financial institution, such as a bank, to its firms or clients, allowing them to withdraw additional funds from their cash credit accounts up to the limit that the bank has previously set for such companies. The purpose of a cash credit account is similar to a current account with the addition of check-writing capabilities. To monitor changes in raw materials, work in progress, finished goods, etc., cash credit can be used.

After providing guaranteed book debts, collateral securities, etc. and taking into account bank requirements, cash credit may be used. Cash credit is mostly used to meet a company's need for working capital. The maximum amount of cash credit must be equal to the company's required working capital, less any margin paid to the company.

**Working Capital Loan:** Working capital loans are available to MSMEs to help with day-to-day operating costs. Accounts payable, salaries, the cost of purchasing raw materials, etc. are examples of daily operational costs. It is among the best ways for MSME to accelerate their rate of growth. India is a very well-liked nation, which aids in addressing their particular financial demand. However, these loans are not appropriate for buying long-term company assets. Working capital is typically thought of as an unsecured loan, however risky loans could need for some form of security. Working capital loans have terms of six to twelve months, with annual interest rates ranging from 11% to 16%, depending on the lending institution's/regulations.

**MSMEs:** The production of goods and commodities is the main activity of MSMEs. In accordance with the MSMED Act of 2006, the Indian government developed the MSMEs concept in 2006. MSMEs are categorised according to their investment and revenue.

Due to its roughly 8% GDP contribution, MSME is significant to the Indian economy. Additionally, it offers job chances to young Indians who are talented, semi-skilled, and/or underskilled. Both the public and private sectors are unable to accommodate India's growing population of young people. In actuality, MSMEs are responsible for solving the majority of India's job issues. MSMEs have the ability to hire a large number of qualified, semi-skilled, and unskilled youngsters in India, but the actual reality is that there are some methods in which they lack funding or a source of credit. MSMEs have been impacted by financial problems for many years. MSMEs must be given access to the simplest forms of financing, or the government must set up a reliable and ongoing source of funding for them, to enable them to effectively use the readily available funds to carry out their daily operations.

Sr. No.	Enterprise Size	Investment Amount	Turnover Of Enterprise
1	Micro Enterprise	Less than Rs. 1 Cr	Less than Rs. 5 Cr
2	Small Enterprise	Less than Rs. 10 Cr	Less than Rs. 50 Cr
3	Medium Enterprise	Less than Rs. 20 Cr	Less than Rs. 100 Cr

\*Classification of enterprise on the basis of capital.

The delay in accounts receivable, which are meant to be received from consumers on time, is the most significant and real issue encountered by Indian MSME, according to a review of numerous research papers, articles, and journals. Most management tasks are postponed as a result of these late receivables, which ultimately poisons management operations. The problem of fluctuating staff, inverse or negative inflow/outflow of raw materials/finished goods, gaps in sales turnovers, overloading of overheads, complete failure of planning and marketing strategies, etc. are caused by a lack of cash flow and simultaneous blocking of funds for longer periods of time. These are the key issues that Indian MSME companies encounter, which forced their managers to resign and shut down their management functions. In other words, some of these companies have disappeared from the Indian market or have been acquired by large corporations.

We applaud the success of MSME businesses in other nations and aspire to it, but we fall short of implementing or adopting an adequate alternative financing service in our MSME. We refer to the Factoring Service when we discuss other sources of funding. The main and most effective tool used by the majority of foreign nations to seriously improve their MSME is the factoring service.

### Literature Review:

**Ivanovic, Sasa; Baresa, Suzana; Sinisa, Bogdan(2011).**

Any business organisation must engage in ongoing, routine business activities like paying debts owed to customers in order to succeed and maintain that success. Selling

receivables assets on time and without suffering a substantial loss is one of the simplest ways to fulfil business obligations. Receivable non-cash assets are the second most liquid type of asset that every organisation owns after cash. The corporation may be able to raise the amount of cash in its organisation if it is able to use these non-monetary assets in a major way. Businesses that are able to handle their cash flow issues can benefit from selling their receivables to factoring companies. The ability of the business to produce cash from its receivables can increase working capital, which may have a positive effect on everyday operations. Factoring is a tested alternative source of financing instrument that customers can employ by using their own accounts receivable after giving the Factors their customer information.

**Eddie Casey1 and Conor M. O'Toole(2014)**

It emphasised the significance of trade credit. Trade credit might replace bank credit during a period of tightening financial conditions, despite financial results showing that bank credit and trade credit financing are complementary. Trade credit is the second-most significant external source of debt financing for SMEs and is regarded as a viable alternative to bank lending. After examining the results of the numerous studies, it is evident that there is a relationship between trade credit and SME financing during a crisis, or more specifically, when shock is present. Evidence thus shown that a company experiencing financial shocks relies more on trade credit as a result of shocks or crises.

**Dr. Sumita Shroff Goyal (2019)**

The cash conversion cycle is crucial in determining the amount of working capital needed. Cash flow from sales can be used to measure the investment in inventory, receivables, and other sources, but during this time, working capital is either blocked or in the process of generating cash, necessitating a positive level of working capital.

**Juhi Raghuvanshi, P.K. Ghosh, Rajat Agrawal and Himanshu Gupta (2017)**

More than 80% of industrial units in India fall within the MSME sector, which produces more than 8,000 different items. Despite the known facts, new innovation in the MSME sector is lacking, and as a result, Indian MSME have not benefited from novel production technologies, alternative channels of distribution, new designs, or cutting-edge technologies that could have improved their efficiency for the proper and efficient use of available resources.

**Maumita Choudhury & Chandana Goswami (2019)**

Both the public and private sectors in India are unable to accommodate all of the country's young people. In actuality, MSMEs are responsible for solving the majority of India's job issues. MSMEs have the ability to hire a large number of qualified, semi-skilled, and

unskilled youngsters in India, but the actual reality is that there are some methods in which they lack funding or a source of credit. MSMEs have been impacted by financial problems for many years. MSMEs must be given access to the simplest forms of financing, or the government must set up a reliable and ongoing source of funding for them, to enable them to effectively use the readily available funds to carry out their daily operations.

**Mr. Abijeet Biswas, Dr. Shashi Srivastava & Prof. Raj Kumar (2019)**

MSMEs have overtaken the agricultural sector as India's second-largest employer, according to the 4th Census in MSMEs. Thus, expanding lending for MSMEs is urgently needed. To improve the current situation of MSMEs, a variety of operational tasks must be modernized, diversified, and managed to install cutting-edge technologies.

Despite having a larger percentage of the Indian economy, MSMEs have an extremely tough time obtaining finance. Due to their operational activities, banks frequently hesitate to offer long and short-term financing to MSMEs. Banks obliged MSMEs to provide transparent financial information, however the majority of their transactions and business operations are conducted in an opaque manner.

The expansion of MSMEs depends on timely credit, however there is a lack of this type of financial assistance for MSMEs. The quantity of capital needed by MSMEs is covered by internal resources, while occasionally such emergency funds might be covered by borrowed capital from outside sources. MSMEs continue to struggle with timely finance, thus the government must intervene to make it easier for them to get this type of loan by creating the necessary financial institutions.

**Objectives:**

- Factoring and other forms of short-term financing for MSMEs are theoretically compared.
- Factoring has advantages over other forms of short-term financing for MSMEs.

**Methodology:**

The data which has been collected from different resources like of websites RBI, ICICI, SBI, IFCI, etc. Its foundation is research in terms its quality. This article will analyze the nature, characteristics, definitions, numbers, and facts of each type of short-term credit, including factoring, trade credit, cash credit, working capital loans, and cash credit. There will be comparison of each type of factoring with listed short-term financing options available to MSME's. Since this is an empirical study analysis will be of qualitative in nature and there will not be any need of the measures of central tendency like ratio, percentage etc.



**Analysis:****1. A Comparative Between Trade Credit and Factoring**

For Indian MSMEs, factoring is a brand-new notion when it comes to short-term financing, but trade credit is one of the MSMEs' most traditional short-term financing options. Factoring is a tried-and-true alternative source of financing that clients can employ by using their own accounts receivable after giving the Factors their customer information. After reviewing the client's customers, if the factor is confident in their authenticity and creditworthiness, it will authorize the advance payment to the client. The clients' capacity to manage their day-to-day business operations is made possible by the factor's provision of advance cash. With the development of alternative finance, small businesses worldwide can thrive and expand, providing crucial or tested services that could significantly increase a nation's GDP. On the one hand, it will aid in closing the time gap for account receivables, and on the other hand, the advance funds are accessible for reinvestment in the company, which may undoubtedly improve the sales volume of the company in every rotation.

Trade credit is a type of credit that is given from one trader or firm to another. the location where products and services are purchased and sold on credit. Suppliers offered the option of a delayed payment under trade credit, but there was no interest charged. It is referred to as an interest-free loan that providers extend. If payment is not paid by the deadline, it could be pricey. Borrowers are obligated to pay greater costs, such as late fees or interest rates, in such situations. Trade credits are a frequent short-term financing option utilized by commercial organizations in addition to conditional interest rates and late fines.

According to an internal agreement between suppliers and buyers, suppliers typically provide trade credit terms of 30, 60, or 90 days. Banks like Bank of Borada, DCB Bank, HDFC Bank, and United Bank of India also provide trade credit.

Table – 1: Comparison between Factoring and Trade Credit for MSME

<b>Basis</b>	<b>Factoring</b>	<b>Trade credit</b>
<b>Average Interest rate</b>	1% to 4%	Nil or conditional rate
<b>General repayment period</b>	30,60,90,120 days	7,30,60,90 days
<b>Time of execution for funds/credit</b>	2 to 7 days	Same day when buying and selling proceed on credit
<b>Commission</b>	1% to 2%	Nil
<b>Agreement</b>	Required	Internal agreement / Understanding
<b>Securities</b>	Not required	Not required
<b>Creates Asset/Liabilities</b>	Encumber assets	Liabilities of buyers
<b>Use of funds/credit</b>	Fund Used in any operational activities and other payments also	Credit on commodities helps to maintain the inventory and working capital.

### **Observations from the Table – 1**

When comparing factoring and trade credit, factoring has an interest rate that can range from 1% to 4% whereas trade credit has no interest charge or interest that is conditional if the buyer doesn't pay on time. The length of the factoring repayment period typically depends on the agreement between the clients and customers because the terms of the repayment are solely up to the clients and customers; the factor has no say in determining the length of the repayment period for the customers. Typically, the terms of the repayment period are 30, 60, 90, and 120 days, depending on the terms of the clients and customers' agreement.

The process of allocating funds to clients for factoring often takes 2 to 7 days, however in the case of trade credit, credit is issued to buyers on the same day as internal agreements or understandings between suppliers and buyers. Trade credit does not need the use of funds, so there is no commission fee. In contrast, commission is charged by the factor in the factoring industry, ranging from 1% to 2% depending on the time frame or type of business. Both factoring and trade credit required an agreement, but for trade credit, an internal understanding or agreement sufficed for credit. Both financial services do not require any securities. In factoring, encumbrance assets are generated when a customer sells its own account receivables to raise money from factoring, but in trade credit, encumbrance liabilities are created when buyers are required to pay the full amount after the due date. The money that the clients' factoring generates is used for the organization's daily operations, including paying salaries, buying supplies, and paying debts. One benefit is that clients can grow their businesses without experiencing cash flow problems by frequently converting their accounts receivable to factoring, as opposed to trade credit, where buyers must make timely payments whether they are able to use the credit to acquire stocks or not. It will only be feasible to repay credit on time if all of the credit purchase stocks are sold by the buyers. Otherwise, handling credit will be very difficult, adding additional burdens and responsibilities for the buyers in terms of term credit.

After weighing the benefits of factoring over trade credit, MSMEs may decide to use factoring to increase account receivable utilization or improve cash flow inside the company when they want to expand their current business. The majority of the financial issues related to MSMEs will be automatically resolved once the cash inflow process is continued with the aid of factoring.

## **2. Comparison between Factoring and Bank Overdraft**

Banks offer facilities such as overdraft to MSMEs to support their growth and development. Recently, ICICI Bank has introduced digital overdraft facilities ranging from Rs. 25L to Rs. 1 Cr for its customers. Non-ICICI Bank customers can also avail this service. Before granting instant credit to an MSME, the bank assesses the creditworthiness of the business, which is based on its financial profile and credit score. MSMEs can avail unsecured overdrafts

digitally up to Rs. 10 L without any documentation. Other banks such as YES Bank and SBI Bank also offer overdraft facilities to MSMEs, but the amount and documentation requirements may vary. MSMEs registered under the scheme are exempt from the rate of interest on overdrafts and can avail the benefit of 1% on the overdraft, subject to the bank's scheme. ICICI Bank has introduced a new concept called GDT OD, which allows MSMEs to withdraw overdraft amounts up to Rs. 1 Cr after verifying their GST returns, income statement and related documents within two working days.

Table – 2: Comparison between Factoring and Cash Credit

<b>Basis</b>	<b>Factoring</b>	<b>Bank Overdraft</b>
<b>Average Interest rate</b>	1% to 4%	Nil or exempted
<b>General repayment period</b>	30,60,90,120 days	Agreed Date of agreement
<b>Time of execution for funds/credit</b>	2 to 7 days	Within 2 working days
<b>Commission</b>	1% to 2%	Not Applicable
<b>Agreement</b>	Required	Required
<b>Securities</b>	Not required	Required
<b>Creates Asset/Liabilities</b>	Encumber assets	Liabilities of organization
<b>Use of funds/credit</b>	Fund Used in any operational activities and other payments also	Fund used for working capital and term loan.
<b>GST REPORT</b>	Not Required	Required
<b>CIBIL REPORT</b>	Not Required	Required

### **Observations from the Table – 2**

When comparing factoring with bank overdraft facilities for MSMEs, it is important to note that the rate of interest is exempted if the MSME uses a bank overdraft facility. However, if the MSME uses factoring, it needs to pay 1% to 4% rate of interest. The general repayment period for factoring is 30, 60, 90, or 120 days, as per the agreement about account receivables. On the other hand, the repayment period for an overdraft amount is dependent on the agreement between the MSME and the bank and is confidential in nature. Factoring funds can be executed within a week, whereas the credit from an overdraft account is executed by the bank in two working days after verifying the documents, income statement, and GST returning reports. However, such reports are not required for factoring.

This means that MSMEs that are filling GST or able to maintain financial statements on a daily basis and maintain a CIBIL score are only entertained by banks for overdraft facilities, while other MSMEs may not be able to use overdraft facilities. Both factoring and bank overdraft require an agreement, but when it comes to securities, factoring does not require securities, whereas bank overdrafts require securities for obtaining an overdraft amount.

Factoring does not create liabilities but encumbers assets, whereas bank overdrafts are liabilities of the MSME or organization that overdrafts amount from the bank. The funds received after factoring can be utilized in numerous ways without restriction to uplift the financial position of MSME, whereas the amount received in the name of an overdraft will be used to fund the working capital of the MSME.

### 3. Comparison between Factoring and Cash Credit for MSME

MSME uses a cash credit loan to satisfy their need for working capital. It is known as short-term credit, and the bank determines the credit limit. Cash credit is a short-term, interest-bearing form of credit. The bank determines the maximum loan sanction amount for cash credit. Stocks are used as collateral for cash credits, and MSME is owed money. Once the bank has examined the MSME's securities, the MSME will be able to continually withdraw the set amount of money from the cash credit account. The bank will make a regular running account with a multi-city check facility available, subject to the borrower's ability to draw money from the account.

On stock and receivables, the cash credit margin is available at 25% and 50%, respectively. In order to obtain a cash credit loan for an MSME, the bank will evaluate security, and certain documentation procedures must also be taken into account. Banks charge interest rates on cash credit that range from 1.75% to 9.25%. The bank would evaluate its primary securities, which are based on current assets like inventories and receivables of 180 days, in order to avail loan to MSME. On the entire cost, the borrower is required to make the marginal contribution. This bank will add processing fees and other costs along with a minimum margin money charge of 25% of the entire loan amount.

Table – 3: Comparison between Factoring and Cash Credit

Basis	Factoring	Cash Credit
Average Interest rate	1% to 4%	1.75 % to 9.25%
General repayment period	30,60,90,120 days	Conditional
Time of execution for funds/credit	2 to 7 days	3 to 6 weeks
Commission	1% to 2%	Not mention
Agreement	Required	Not required
Securities	Not required	Required
Creates Asset/Liabilities	Encumber assets	Liabilities
Use of funds/credit	Fund Used in any operational activities and other payments also	Working capital
Restriction of drawings	No restriction	Highly restricted

### **Observations from the Table – 3**

The average rate of interest required for Factoring is 1% to 4% whereas the cash credit for MSME is ranges from 1.75 % to 9.25 as an average interest rate. The repayment system of cash credit is conditional because it is decided between bank and MSME. But the credit repayment system of factoring ranges normally from 20 to 120 days and most of the time credit repayment period depend upon the client's customer's agreement for repayment. Factoring fun cane be executed within a week for MSME whereas cash credit absorbed 3 to 6 weeks for execution of credit. Commission charge against factoring fund is ranges from 1% to 2% whereas such kind of commission is not mention on cash credit fund for MSME user. Agreement between the parties is mandatory in terms of factoring but suck kind of agreement is absent in cash credit policies of bank to its MSME but amount if credit funds are depended on creditworthiness of MSME or bank will entertain to only those MSME who hold good financial position.

Factoring funds are extremely advantageous for MSME since they provide clients with advance liquid cash once they sell their own accounts receivable, and there are no securities to take into account. In addition, there are no obligations or loans for MSME that must be repaid on schedule. Cash credit, however, is time-consuming and a liability for MSME because it requires collateral securities in order to acquire funding. After paying the lowest rate of interest and commission, MSME typically prefer factoring funds over cash credit.

#### **4. Comparison between Factoring and Working Capital Loan for MSME**

Working capital loans are short-term loans used by MSME companies to support their day-to-day operational activities. These loans were introduced to meet the financial needs of companies, business owners, and MSMEs. The interest rate on working capital loans varies from bank to bank and depends on the MSME's profile and loan amount. Typically, the interest rate ranges from 9% to 18%, and it includes a higher risk component as MSMEs may default on their loan repayments, making it difficult for banks to recover their funds. Additionally, processing fees ranging from 1% to 3% on the loan amount are also charged, along with documentation processing fees. The collateral securities considered for working capital loans may include commercial property papers, shares, stocks, book-debts, gold, etc. However, in some banks, securities may not be required, depending on their policies. The loan tenure ranges from 12 months to 84 months, depending on whether it is a short-term or long-term working capital loan. To apply for a working capital loan, MSMEs must have a good CIBIL score and repayment history, along with an annual turnover report and work experience defined by the lender. The financial statement of the MSME plays a critical role in obtaining a working capital loan from a bank.

Table – 4: Comparison between Factoring and Cash Credit for MSME

Basis	Factoring	Working Capital Loan
Average Interest rate	1% to 4%	9% to 18%
General repayment period	30,60,90,120 days	9 months to 12 months
Time of execution for funds/credit	2 to 7 days	Conditional
Commission	1% to 2%	Dependable
Agreement	Required	Required
Securities	Not required	Required
Creates Asset/Liabilities	Encumber assets	Liabilities
Use of funds/credit	Fund Used in any operational activities and other payments also	Mostly on operational activities
Restriction of drawings	No restriction	Restricted
Processing fees	2% to 8 %	1% to 3%
CIBIL Score	Not required	Mandatory

#### **Observations from the Table – 4**

This paper discusses various types of working capital loans used by MSMEs, including factoring, which is considered a short-term fund received by clients after selling their own account receivables, rather than a loan. The interest rates for factoring typically range from 1% to 4%, while for working capital loans, they can range from 9% to 18%, depending on the type. Factoring generally has a repayment period of 30, 60, 90, or 120 days, while working capital loans have a tenure of 9 to 12 months. Factoring agreements may involve a commission charge of 1% to 2%, while commission charges on working capital loans vary by bank and amount. Both factoring and working capital loans require agreements between parties, but collateral securities are not required for factoring, while they are for working capital loans. Factoring funds can be used for any purpose, while working capital loans must be used for operational activities only, with a restriction on withdrawals and a requirement to provide progress reports to banks every three months. CIBIL scores are not required for factoring, but they are mandatory for working capital loans.

One of the main advantages of factoring for MSMEs is that it does not create any liabilities; instead, it acts as an asset. While the amount received by companies from their debtors is reflected on the asset side of the balance sheet, factoring funds are considered encumbered assets rather than liabilities, as the clients receive them after selling their account receivables. Factoring can enhance working capital and provide liquid cash without the need to consider collateral securities or CIBIL scores. However, processing fees for factoring may be higher than for working capital loans, and the timing of the release of funds may also differ.

## 5. Overall Comparison of Factoring with other Short-Term Finance

Table – 5: Overall Comparison between Factoring with other Short-Term finance

<b>Basis</b>	<b>Factoring</b>	<b>Trade Credit</b>	<b>Bank Overdraft</b>	<b>Cash Credit</b>	<b>Working Capital Loan</b>
<b>Average Interest Rate</b>	1% to 4%	Nil or conditional rate	Nil or exempted	1.75 % to 9.25%	9% to 18%
<b>General Repayment Period</b>	30,60,90,120 days	7,30,60,90 days	Agreed Date of agreement	Conditional	9 months to 12 months
<b>Time of execution of fund/credit</b>	2 to 7 days	Same day when buying and selling proceed on credit	Within 2 working days	3 to 6 weeks	Conditional
<b>Commission</b>	1% to 2%	Nil	Not Applicable	Not Mention	Dependable
<b>Agreement</b>	Required	Internal agreement / Understanding	Required	Not required	Required
<b>Securities</b>	Not required	Not required	Required	Required	Required
<b>Creates Assets/Liabilities</b>	Encumber assets	Liabilities of buyers	Liabilities of organization	Liabilities	Liabilities
<b>Use of fund/credit</b>	Fund Used in any operational activities and other payments	Credit on commodities helps to maintain the inventory and working capital.	Fund used for working capital and term loan.	Working capital	Mostly for operational activities
<b>GST Report</b>	Not Required	Not Required	Indirectly Required	Indirectly Required	Indirectly Required
<b>CIBIL Score</b>	Not Required	Not Required	Indirectly Required	Indirectly Required	Mandatory
<b>Restriction of drawings</b>	No Restriction	Restricted	Restricted	Highly restricted	Restricted
<b>Possession fees</b>	2% to 8%	NIL	Not required	Not required	1% to 3%

### **Observations from the Table – 5**

When comparing factoring to other short-term finance options for MSMEs, it becomes clear that factoring funds are obtained from account receivables, and not from a loan sanctioned by a financial institution. This sets factoring apart from other short-term finance options that involve borrowing money to manage the day-to-day operations of the organization. When funds are obtained through a loan, there is always an additional burden on the organization since the borrowed amount, along with interest, must be paid back to the respective bank after proper utilization. However, if MSMEs consider factoring funds to meet their day-to-day operational expenses, they are not required to provide GST reports, CIBIL Score reports, etc., unlike other short-term finance options. One of the advantages of factoring is that it provides hard cash to clients after considering their account receivables. With liquid cash flow, companies have the flexibility to utilize it in numerous ways. Hence, there are no restrictions on using factoring funds, unlike other short-term loans.

### **Findings & Conclusion:**

In comparison to alternative forms of short-term financing for MSME, employing factoring funds has a significant advantage, according to reviews of numerous websites and articles. The major benefit over other short-term funds is that factoring offers actual cash in hand under the guise of factoring funds. After selling their own accounts receivable to a factor and generating revenue, an MSME may be able to abolish the term "bad debts" in the future because factoring involves collecting money from debtors on their behalf. In comparison to other forms of short-term financing, the factoring process is more convenient, requires less paperwork, and provides funds faster. Factoring works in the concept of account receivables for MSME where as other short-term finance is works on the concept of account payable for MSME.

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## **An Analytical Study on Performance of Academic Organizations in SSIP 1.0**

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### **Abstract**

The Gujarat Government is taking many steps to improve the skills and starting new startups with new ideas. As our Prime Minister Narendra Modi is also believe in Skill India, Make in India, Made in India. He always inspires the new entrepreneur to start the business for that, Government has many different schemes like ‘Students Startup and Innovation Policy’, Pradhan Mantri Mudra Yojana etc. The objectives of the research paper are to analyze year on year grantees of SSIP scheme, to investigate the key out come variables viz, Number of POC, Startup and Patent. This research will help to Government, Entrepreneur, Student and Faculties for their future endeavor. Major findings of the research paper is that Central Gujarat is leading in every stage of SSIP from application to conversion of SSIP ideas into commercialization where the lowest performance was performed by the East Gujarat where a Government needs to give more attention so that the activities of SSIP can improve.

**Keywords:** Students Startup and Innovation Policy, *Entrepreneurship, Startups, Patents,*

### **Introduction**

The Gujarat Government is promoting more and more schemes for Students Startup’s. Students who are actively wants to do work on innovation and startup’s they can registered themselves with the help of institution where he/she is studying. As per the analysis many institutions and universities are supporting to this march and students are actively participating into the startups. As it has been Said that Gujarat is Land of Entrepreneurs, however after actively participation of both the parties (i.e., institution and students) the result of reaching out to the stage of patent is less.

### **Conceptual Frame Work**

Startups and Innovation aids for economic growth because it is not only creating the job but it also provides the stiff competition. The SSIP has couple of objectives like developing student centric innovation and preincubation Ecosystem for Students, creating environment for creativity to flourish and an end-to-end support system in educational institutions to allow ample support to ideas for better execution, build internal capacity of educational institutions and key components of the innovation ecosystem to enable deployed processes to make sustainable impact at scale [[sippgujarat.in/a\\_about\\_ssip](http://sippgujarat.in/a_about_ssip)]. A Student startup is led by the students who focus more on innovation-based startup. The student can apply for startup program until he/she not crossed 5 years after their

graduation from recognized universities/educational institute in the state, with or without the help of faculty guidance and outsider support counselors.

Gujarat is one of the states where a large number of synopses, thesis and newly ideas emerged every year. It is compulsion for Gujarat Government to help and promote the startups with the help of Student Startup Innovation Policy where the ideas are transformed into new product. Always the notional ideas are the first stage towards the invention and innovation.

Government has innovated rules and regulation for providing guidance to Startups/Innovation. Under the policy, any group or individuals/ individual having creative ideas/ Concept will be qualified.

### **Process of Startups**

1. Proof of Concept: Proof- of -concept is the stage where the innovator/startup demonstrates a fundamental functioning demonstration of the idea/hypothesis/ innovation. [<https://ssipgecg.wixsite.com/ssip/poc>]
2. Prototype Stage: A prototype- Stage is pre-production/ pre- launch stage where innovator/ startup team has developed a basic minimum viable product (MVP) with most key features desired in the final product. [<https://ssipgecg.wixsite.com/ssip/poc>]
3. Startups: After the prototype the students will have to focus on startups by taking the help of angel investors or getting the central government grants.
4. Patent: If a student doesn't want to do the startups, then they can file a patent so that their ideas can be secured and future they can sell their patent to the innovator who is interested to produce.

### **Literature Review**

**Dr.S.& S.S. Ghandhy College of Engineering & Technology, Majura gate, Surat:** From their report the meaning and objectives of SSIP were mention.

**Dr.Deval Patel and Dr. Samit Dutta (2020):** Both researcher has found some problems and challenges faced by the students where Student Startup Innovation Policy needs to focus which inspire for further research should be done according to variable vise and region vise.

**Ales Pustovrh, Marko Jaklic, Domen Bole & Bilaz Zupan (2019)** they have did the research on startup ecosystem in Europe which inspires researcher to do the same type of research with context of Gujarat.

**Amaia Zurutuza and Claudio Marinelli (2014)** from their research paper it can be easily found the factors which are supporting to speedy commercialization and conversion.

**Saxena (2012)** has made an effort to address the issues facing rural businesses. He has also provided several answers to the same. **Nandanwar Kalpana (2011)** has made an effort to highlight the

contribution rural entrepreneurs make to the growth of rural communities. It has been stressed that any region may grow if entrepreneurs start in that region.

**Dhaliwal (2016)** has also sought to demonstrate the contribution of business people to the growth of the state's economy. He has done a great job of explaining that the entrepreneur is often a lone proprietor, a partner, or the person who holds the majority of the stock in an integrated business. The capacity of enthusiastic, driven, and active entrepreneurs to explore potentials of the availability of resources, technology, labor, and money is now widely acknowledged. Making qualitative and quantitative strides in entrepreneurship is crucial for accomplishing the objective of economic development.

### **Research Objective**

- To analysis the key out come variables Viz Number of Proof of Concept, Startups and Patent during the study period.
- To analysis the key out come variables Viz Number of Proof of Concept, Startups and Patent on the basis of Gujarat State Region wise.

### **Methodology**

Selecting the methodology is an important task for the researcher while doing the research, here researcher has used the descriptive research method where all the data will be described in detail. The data collection method is secondary data which are received from Student Startup Innovation Policy, Gandhinagar. Time period is taken from 2017- 2022 which is as per the financial year (i.e., 2017-18, 2018-19). Sample size and sample profile are 185, Universities and Institutions respectively.

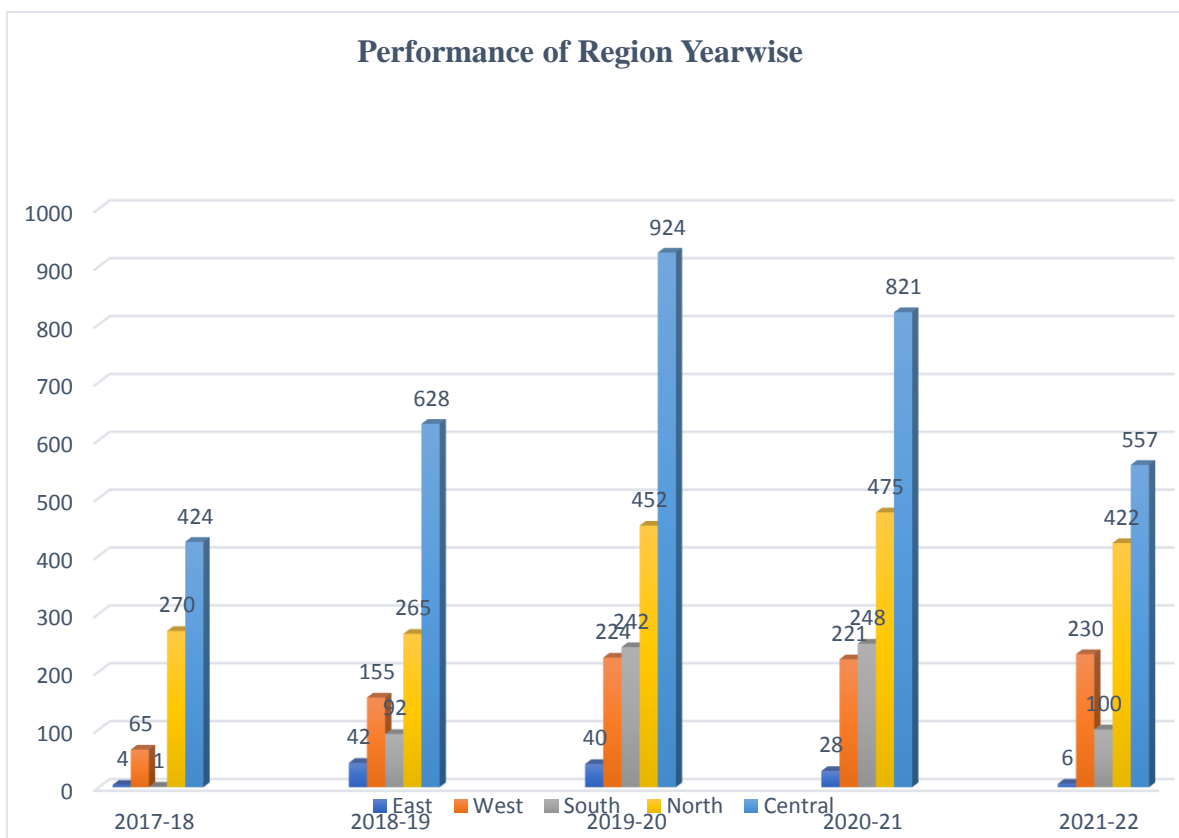
### **Data Analysis**

The data analysis part is divided in two categories, first is the year wise analysis of number of proofs of concept registered by the different institutions and universities. As per the data collection there are 186 different universities and institutions amongst them 39 Universities are Private universities and the rest are either public universities or affiliated colleges by Gujarat Technological University.

Second in which the data has been divided in five different regions of Gujarat, i.e., East, West, North, South and Central. Researcher has done his analysis on the basis of three variables like Proof of Concept, Startups and Patent.

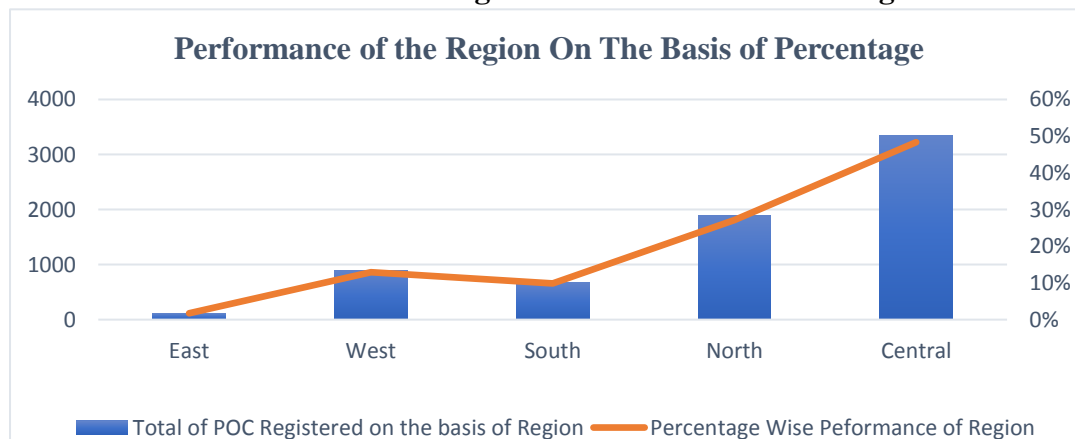
All the data collected which is according to individual institute wise and the time period is taken from 2017-2022 which is as per the financial year.

**Proof of Concept Analysis**

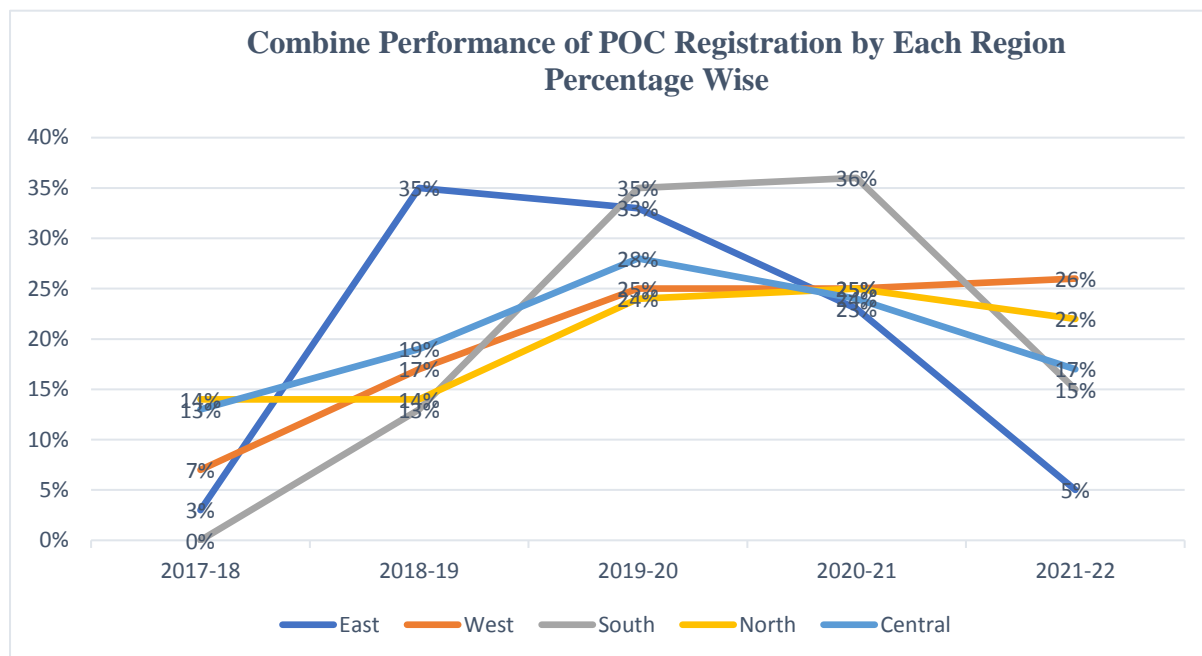


- Above bar chart represents the performance of POC registered by the different region of the Gujarat. In the bar chart the performance of Central Region is best than the other region in Gujarat. The number of POC registered by the Central Region in the SSIP 1.0 were 3354 since 2017-18 to 2021-22 which is the highest amongst the other region and as per the year the highest POC were filed in 2019-20 which were 1880. Followed by the Central Region, the Second Highest POC registered in the SSIP 1.0 was the North Region which were 1884. The lowest POC registered by the East region in SSIP 1.0 were only 120.

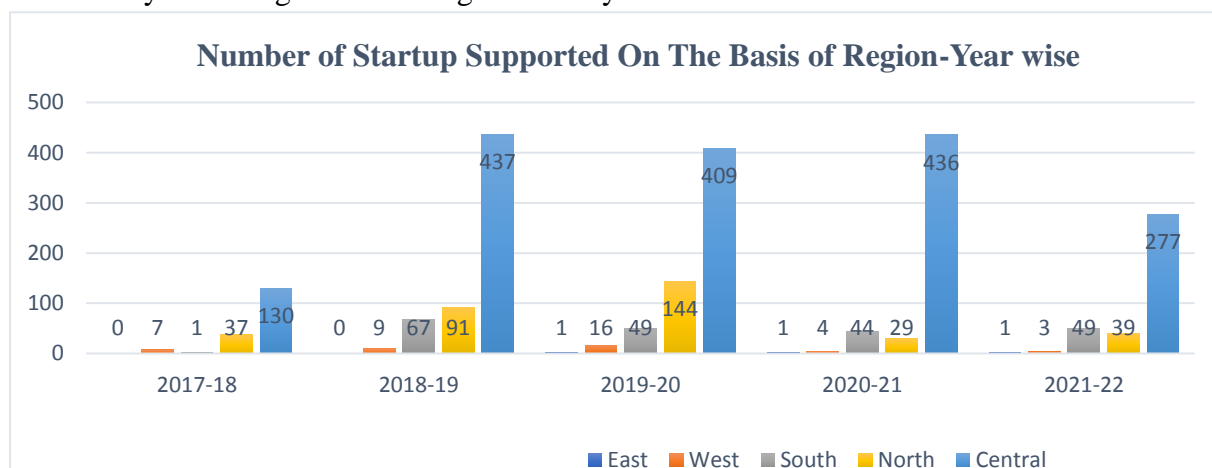
**Performance of the Region on The Basis of Percentage**



- ▶ Chart represents the performance of region which registered POC in SSIP 1.0 on the basis of percentage.
- ▶ Again, the highest percentage region is Central it represents 48% registration of total POC which was registered since 2017-18 to 2021-22.
- ▶ The second highest followed by the Central region is North which represents 27% registration of total POC which was registered since 2017-18 to 2021-22.
- ▶ East represents the lowest percentage which is 2% of the total POC registered since 2017-18 to 2021-22.

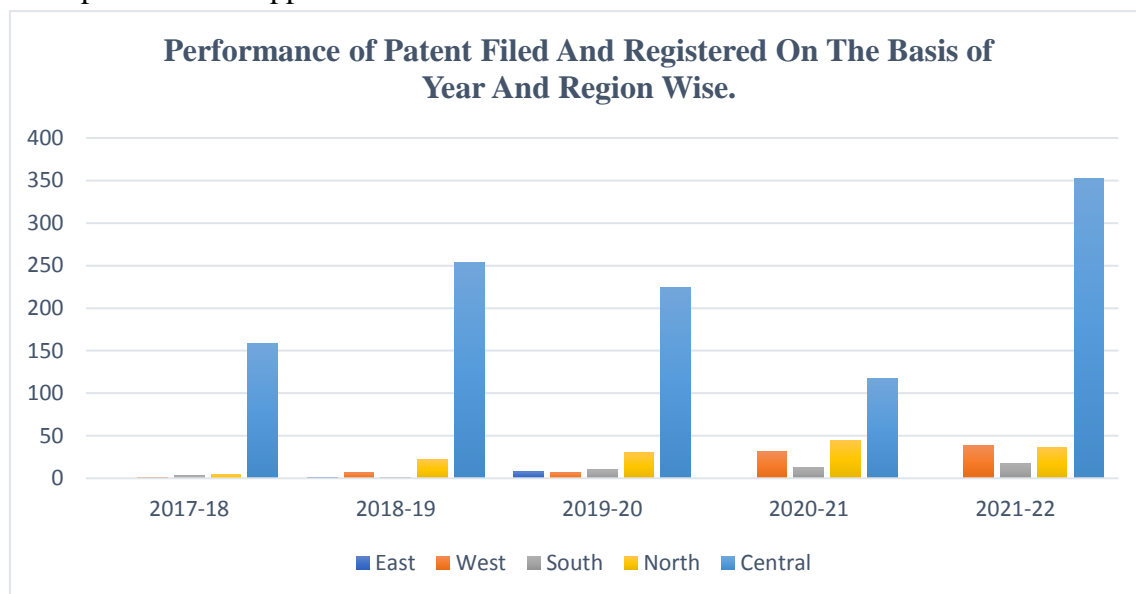


- ▶ Above line chart represents combine analysis of POC registration by each region year wise.
- ▶ As per the chart highest percentage as per total POC registration of the individual region represent by the South in the year 2020-21 i.e. 36%.
- ▶ Amongst the lowest is also a South region in the year 2017-18 i.e. 0% and second lowest followed by South region is East region in the year 2017-18 i.e. 3%.



- ▶ Above chart represents the start-up supported by the Government in SSIP 1.0

- ▶ The highest start-up has been supported by the Government on the basis of year wise is 2019-20 where 619 Start-up have been supported and guided for the further process. This Central Region has been supported of total 1689 start-up which is the highest amongst the other region of Gujarat.
- ▶ The lowest start-up has been supported by the Government on the basis of year is 17-18 and region wise is the East Region where the lowest was 175 in the year 17-18 and only 3 Start-up have been supported.



- ▶ In the above Chart the highest patent has been filed under the year of 2021-22 i.e. 443.
- ▶ While as per the comparison with all other region again central region is leading at highest registration since last 5 years i.e., 1105.
- ▶ The lowest region is again East Region which has filed only 9 Patent.

### Findings

- By doing an analysis as per the objectives, the number of Proof of Concept registered by the Central region is highest comparative to another region of Gujarat.
- The lowest Proof of Concept registered by the East region of the Gujarat.
- As per the year wise analysis the highest Proof of Concept were in the year of 2019-20 which was around 1880 and the lowest was in the year 2017-18 around 764.
- The highest percentage has led by the Central around 28% and that was the highest amongst the other years. i.e.,2019-20.
- The lowest percentage performance has reveals by the South which was 0% in the beginning and then gradually it increases.
- Similarly, as per the data analysis the highest conversion had happened in the year of 2019-20 around 619 again here the central region has taken the lead and then north Gujarat followed by central.

- As per the data patent filed and registered by the central region is more than other region. There were 352 patents have been filed by the central region around 352.
- The east was the lowest in number amongst the other region of Gujarat.
- 2021-22 is the year where the highest registration of Patent filed and applied.

### **Conclusion**

The purpose of the research is to assist the Gujarat government in better enhancing SSIP activity in various Gujarat regions. Institutions and Universities participated fewer at first, but with time, that number grew. The purpose is to find the conversion of Proof of Concept (POC) into the Patent filing. As per the research there were 5 regions that a researcher has defined i.e. Central, East, West, North and South regions. As per the analysis it has found that Central Gujarat has more active participation in application of SSIP and conversion of basic ideas into patentable while in other regions the East region was having less participation in SSIP application and conversion of ideas into patentable. The government needs to improve and promote the SSIP activities in East region. The year wise also the highest application was submitted by the Central region comparative to the other regions and the less application were submitted by East region.

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## **A Perception of Investors regarding Investment in Life insurance with special reference to Rajkot City**

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### **Abstract**

In this research I have found that most of respond are aging 21 to 30 years are more interested in buying life insurance. There are various types of life insurance service provider. Different companies provide different benefits so have choice to select the best plans for them which gives them good returns.

Research Methodology: -

In this study I have taken 100 respondents through online questionnaire. In this research connivance sampling and judgmental sampling to know the perception of investors regarding investment in life insurance. For analysis I have used chi-square.

Findings: -

Majority of respondents age group is 21 to 30 years as well as their family income is between 2 lacs to 5 lacs. Most of respondents wants long term investment.

### **Introduction: -**

#### **• Insurance: -**

An insurance is a legal agreement between an insurer (insurance company) and an insured (individual), in which an insured receives financial protection from an insurer for the losses he may suffer under specific circumstances.

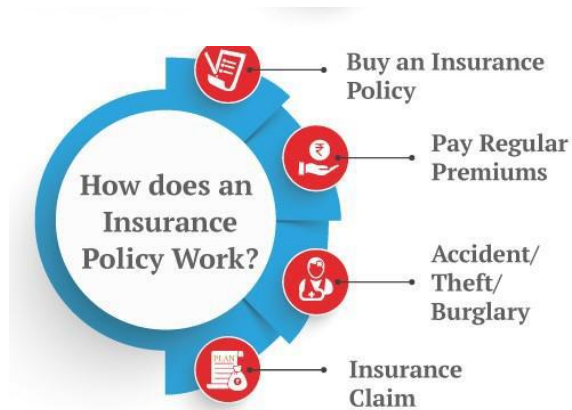
Under an insurance policy, the insured needs to pay regular amount of premiums to the insurer. The insurer pays a predetermined sum assured to the insured if an unfortunate event occurs, such as death of the life insured, or damage to the insured or his property.

The literal meaning of insurance would be an assurance against unforeseen and unfortunate loss. This means, that if you encounter a less than normal event in your normal course of life, and happen to incur a financial loss because of it, you can be compensated.

For example, you met with an accident on your way to the office in your car and the car suffers damage. Your insurer can reimburse the repair expenses in this case. However, the insurer will not reimburse normal wear and tear like a headlamp stopped working.

Legally insurance has been defined as a contract where the insurer agrees to compensate the insured against the losses incurred due to any unforeseen contingency. The contract also involves a consideration which is called a premium. The maximum available benefit amount is called sum assured or sum insured.

- How does an Insurance Policy Work?



To understand how insurance works, you should know below terms:

1. Premium
2. Sum Insured
3. Sum Assured

- **Types of Insurance: -**



- **Life Insurance Meaning: -**

Life Insurance can be defined as a contract between an insurance policy holder and an insurance company, where the insurer promises to pay a sum of money in exchange for a premium, upon the death of an insured person or after a set period.

- **Life Insurance Policy Meaning: -**

Life insurance is defined as a legally binding contract between a policyholder and an insurer in which the insurance company provides financial protection to the policyholder and pays a death benefit to the nominee when the insured dies. For a life insurance policy to remain in force, the

policyholder must pay regular premiums over the period of time or pay a single premium upfront.

In a nutshell, all the benefits of a life insurance policy are tied to the payment of premiums, which is why one should opt for a premium that can be easily serviced. A life insurance policy works only if the policyholder has paid all premiums regularly.

As you have understood the meaning of life insurance policy you will find it easier to know how life insurance works.

- **Factors that affect life insurance premium: -**

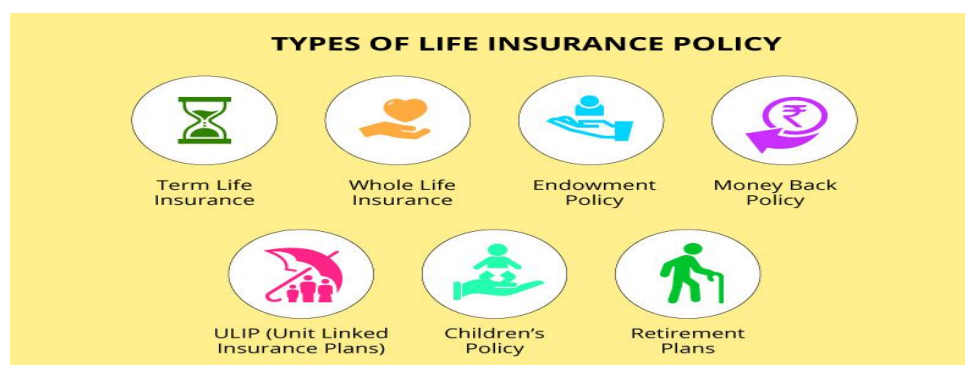
Now that you know what life insurance is and why you need it, find out the factors that can affect the life insurance premium:

1. Age
2. Gender
3. Health conditions
4. Family health history
5. Smoking and drinking alcohol
6. Type of coverage
7. Amount of coverage

- **Benefits of Life Insurance Plans: -**

1. Financial Protection
2. Builds saving Habit
3. Helps in Tax-Savings
4. Achieve your Big Financial Goals
5. Wealth Protection & Distribution

- **Different Types of Life Insurance: -**



**Objective of the study: -**

1. To determine the awareness level of consumers regarding life insurance policies and the number of consumers who have actually invested in life insurance policies.
2. To examine the attributes that consumers prefer while purchasing a life insurance policy.

**Literature Review: -**

**1. Sandeep Chaudhary and Jasneet Kaur (2016) in their article “CONSUMER PERCEPTION REGARDING LIFE INSURANCE POLICIES: A FACTOR ANALYTICAL APPROACH”** The study has extracted six factors that affect the buying decision of a consumer are Customized and Timely Services, Better Company Reputation, Effective Service Quality, Customer convenience, Tangible Benefits and Healthy Customer Client Relationship. In nutshell we could say that human life is a most precious asset and life insurance is one of the ways which provides financial protection to a person and his family at the time of any uncertainty.

**2. Swati Jain in their article “A STUDY ON CONSUMERS” PERCEPTION TOWARDS INSURANCE AS A FINANCIAL PLANNING TOOL”** Consumers prefer term deposits, money market funds, mutual fund and metals (gold & silver) for their short-term investments. Mostly preferred mode of investment for long term are Equity shares, bond & Debentures, life insurance policy and real estate. Safety, high returns, liquidity & risk evaluation these four are significant factors which helps the consumer in taking his or her decision of buying a particular investment plan.

**3. Mahajan (2013);** conducted a study on consumer decision making process in life insurance services and found that there are 5 stages i.e. need recognition, search of alternative, evaluation of alternative, purchase decision and post purchase evaluation. Special considerations pertaining to insurance industry are perceived risk, risk and standardization and risk and information. She even formulated certain stages to improve customer awareness about benefits of life insurance products like focusing on marketing techniques. Thus she concluded that the consumer’s perception towards Life Insurance Policies is positive. There is a positive mind sets developed for their investment pattern, in insurance policies. Still some actions need to be for developing insurance market.

**4. Shamrao and Vibhute (2013);** conducted a survey in Kohlapur on 127 respondents to find out the preference of customers towards insurance policy, the satisfaction level towards ULIP plan and traditional plans and the factors influencing the investment decision. It was found that LIC to be major insurance player and traditional plans being more preferred than ULIP plans. Majority of holders think insurance to be purely protection option followed by tax savings and pension scheme. Majority of holders take policies from financial advisors and banks. Investor opinion of investment also depend upon service quality, reputation, trust worthiness and future plans of company.

**5. Jain and Saini (2012);** in their article has highlighted the role of IRDA for life in insurance industry in India and has concluded that social, cultural, political, personal, psychological and demographic factors influence the consumer behaviour. This study reveals that the demographical factor has the major impact on the purchasing decision of consumer. The leadership does not lie in getting the maximum number of policies sold but in understanding

the demography of the customer and targeting them in their way. Finally, being they considered the success of insurance marketing dependent on understanding the social and cultural needs of the target population.

**6. M.Epctimchin (2011);** conducted a survey in Nigeria to find out factors enhancing the purchasing of life insurance and found that company loyalty is the major factor influencing purchasing decision and company client relationship as the last. These factors are beneficial to company as well as consume

**7. Uma, Selvanayaki & Shankar (2011) based their article titled “A Survey of Life Insurance Customer’s Awareness, Perception and Preferences”** on the survey of 100 customers of life Insurance policies, carried out in Coimbatore. It throws light on various aspects related to customers' awareness, perception and preferences pertaining to life insurance. The primary objectives of this survey were to find preferences of customer’s towards various life Insurance policies, factors influencing choice of life Insurance policy and awareness about life Insurance brands.

**8. K.V. Ramanathan (2011) in his article “A study on policy holder’s satisfaction with reference to Life Insurance Corporation of India”** identified a reliable and valid instrument for assessing customer perceived service quality, awareness level, and satisfaction level of customers for life insurance industry. Here, service quality needs to be measured using a six dimensional hierarchal structure consisting of assurance, competence, personalized financial planning, corporate image, tangibles and technology dimensions. This would help the service managers to efficiently allocate resources, by focusing on important dimensions first.

**9. Dr. Anshuja Tiwari & Ms. Babita Yadav in their article “A Comparative Analysis of Investor’s Risk Perceptions towards Public & Selected Private Life Insurers in Jabalpur District of Madhya Pradesh”** concluded that LIC was the only company in Indian life insurance business till 1999 and today facing tough competition with the existing and new private insurer which has resulted downfall in the market share of LIC. LIC is an old brand and majority people continue to buy policy from it because of security and trust on the brand.

**10. Selvakumar & Priyan (2010) in their article “A comparative study of public and private life insurance companies in India”** found that insurance companies are increasingly tapping the semi-urban and rural areas to take across the message of protection of life through insurance cover. Higher level of protection implies that customers are more conscious of the need for risk mitigation, greater security, and about the future of their dependents. Insurance sector has been evolving and improving its underwriting and risk management abilities.

**11. Keerthi, R Vijayalakshmi (2009) in their article “A study on the Expectations and perceptions of the services in private life insurance companies”** the policy holders’ expectations are well met in the case of certain factors like quality. But in the case of other variables, there exists a significant gap which means that policy holders have experienced low levels of service as against their expectations. If all the players in the life insurance industry

focus on the effective delivery of services, they can win the hearts of customers and anticipate their increased market share.

**12. Debasish (2004) in the paper titled “Exploring Customer Preference for Life Insurance in India-Factor Analysis Method”.** He made analysis and explores the various factors which customer takes into consideration while purchasing life policies and also determine the extent to which these factors are considered by the customers.

### **Research Methodology**

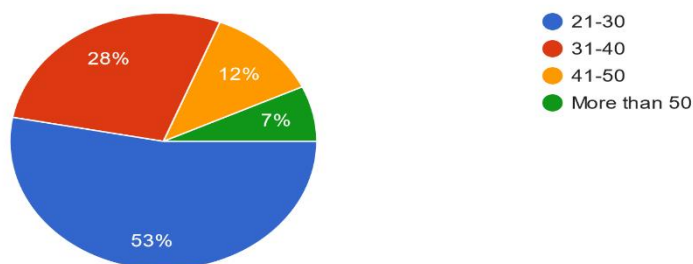
1. Hypothesis: -
  - Null Hypothesis: -  
There is no relationship between factors affecting investing in life insurance and perception of investor.
  - Alternate hypothesis: -  
There is relationship between factors affecting investing in life insurance and perception of investor.
2. Type of Research: -
  - Exploratory research Method.
3. Sample Size: -
  - In this research I have taken 100 respondents.
4. Sampling Technique: -
  - Convince Sampling & Judgmental Sampling techniques is used in this research.
5. Data Collection Source: -
  - In this research I have used Primary & Secondary Data
6. Data Collection Instruments: -
  - In this research I have collected data through online questionnaire & some books.

### **Data Analysis & Graphical Presentation**

**Age: -**

<b>Sr. No</b>	<b>Age Group</b>	<b>No. of Respondents</b>
<b>1</b>	<b>21-30</b>	<b>53</b>
<b>2</b>	<b>31-40</b>	<b>28</b>
<b>3</b>	<b>41-50</b>	<b>12</b>
<b>4</b>	<b>More than 50</b>	<b>7</b>
<b>Total</b>		<b>100</b>

Age  
100 responses



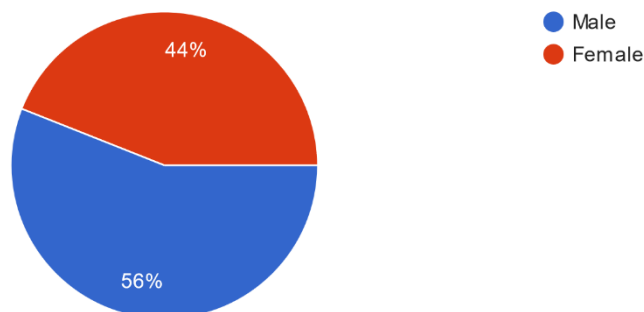
**Interpretation: -**

From above graph we can analyse 53% of respondents are of 21-30 age group. 28% of respondents are of 31-40 age group. 12% of respondents are of more than 50 age group.

**Gender: -**

Sr. No	Gender	No. of Respondents
1	Male	56
2	Female	44
<b>Total</b>		<b>100</b>

Gender  
100 responses



**Interpretation: -**

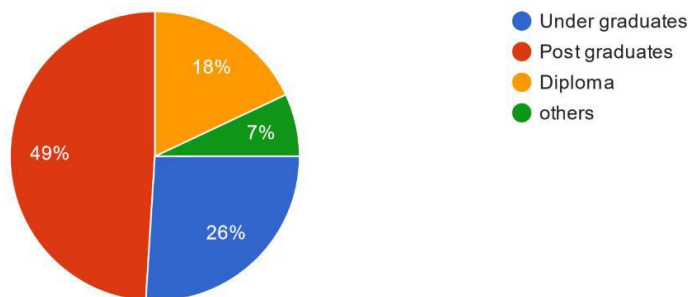
From above graph we can easily analyse that 56% respondent are male & 44% respondents are female respondents.

**Education Qualification: -**

Sr. No	Particular	No. of Respondents
1	Under-graduate	26
2	Post-graduate	49
3	Diploma	18
4	Others	7
<b>Total</b>		<b>100</b>

Educational qualification

100 responses



**Interpretation: -**

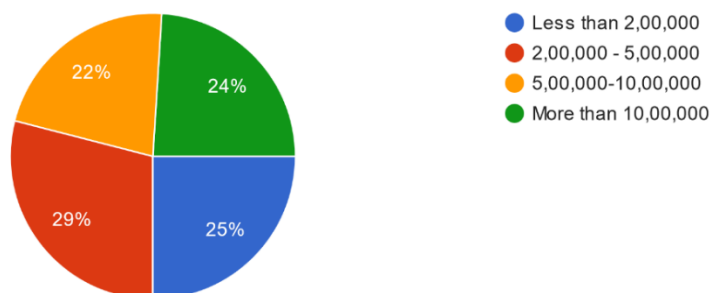
From above we can analyse that large number of respondents are Post Graduate i.e. 49%.

**Annual Income Level:-**

Sr. No	Particular	No. of Respondents
1	Less than 2,00,000	25
2	2,00,000-5,00,000	29
3	5,00,000-10,00,000	22
4	More than 10,00,000	24
<b>Total</b>		<b>100</b>

Annual income level

100 responses



**Interpretation: -**

From above graph we can analyses that 29% respondents income is between 2 Lac to 5 Lac. 25% respondent's income is less than 2 Lacs .24% respondents' income is more than 10 Lacs.22% respondents' income is between 5 Lacs to 10 Lacs.

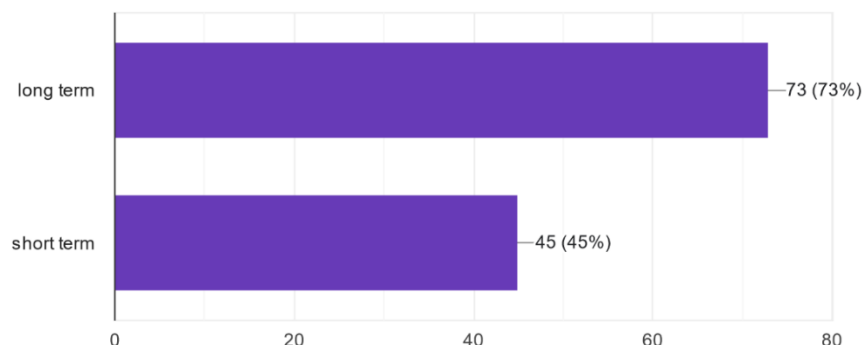
**What kind of investment do you refer: -**

Sr. No	Particular	No. of Respondents
1	Long Term	73
2	Short Term	45
<b>Total</b>		<b>100</b>



what kind of investment do you prefer?

100 responses



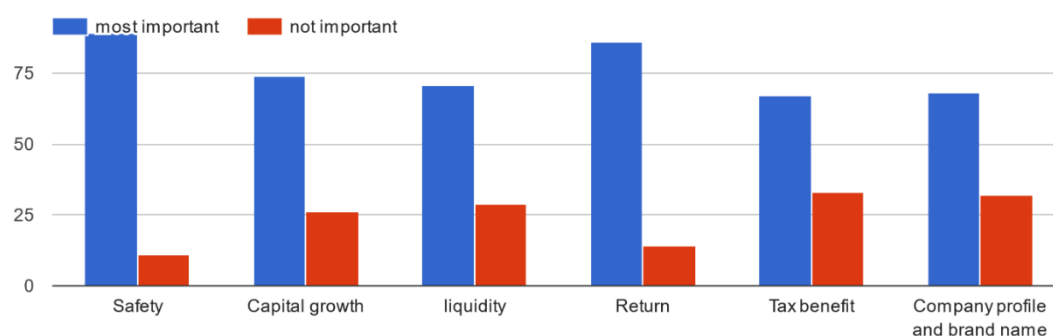
**Interpretation: -**

From above graph we can analyse that 73% respondents are interested in investing in long term & 45% respondents are interested in investing in short term investment.

**Q.In which investment alternative you are ready to investment?**

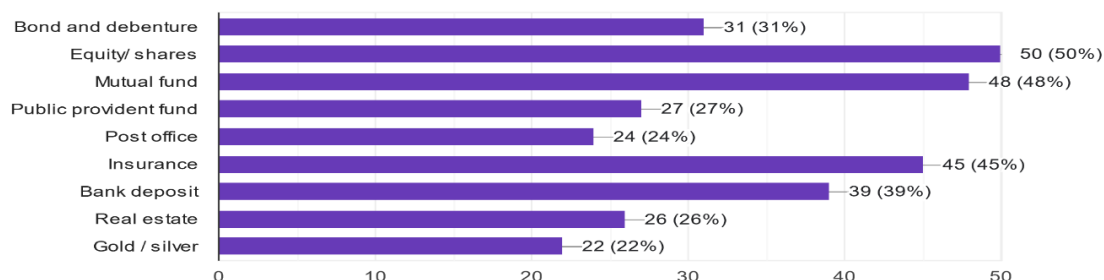
Investment Alternative	No of respondents	Percentage
Bond and debenture	31	31%
Equity/ shares	50	50%
Mutual fund	48	48%
Ppf	27	27%
Post office	24	24%
Insurance	45	45%
Bank deposit	39	39%
Real estate	26	26%
Gold / silver	22	22%

State your expectation on investment alternatives by ticking according to its importance.



In which investment alternative you are ready to investment?

100 responses



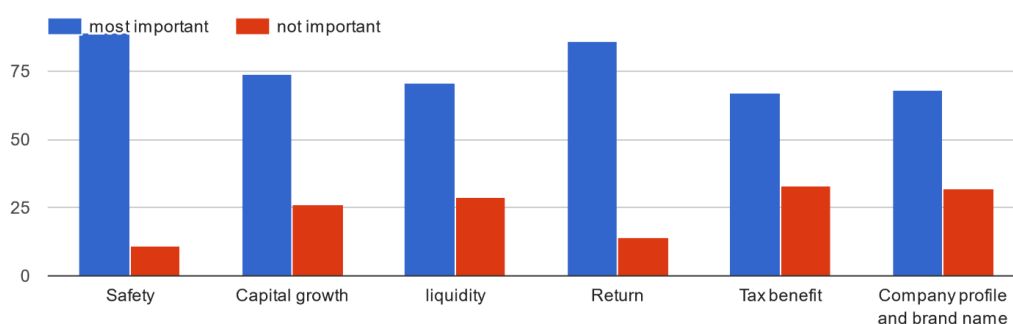
**Interpretation: -**

From above graph we can easily analysed that people are most likely to invest in equity /share. There are also investors who are willing to invest in mutual fund bank deposit and insurance i.e. 48% 39% and 45% respectively. Out of this entire investment avenue less percentage are ready to invest in gold i.e. only 22%.

**Q-State your expectation on investment alternatives by ticking according to its importance.**

Expectation on investment	Highly important	Not important
Safety	89	11
Capital growth	74	26
Liquidity	71	29
Return	86	14
Tax benefit	67	33
Company profile and brandname	68	32

State your expectation on investment alternatives by ticking according to its importance.



**Interpretation: -**

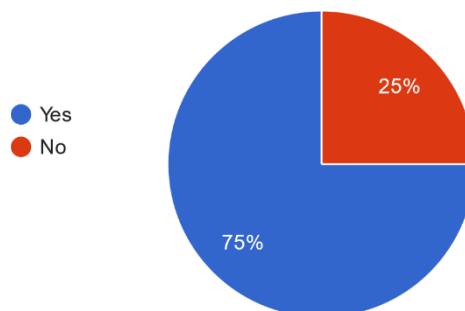
- This graph can be concluded like this
- Most of investors are expecting safety and return at appropriate percentage and at regular time interval.
- Another part of expectation is capital growth and good brand image of company
- Liquidity and tax benefit are also part of expectation but at less important thing.

**Do you invest money in life insurance?**

Sr. No	Particular	No. of Respondents
1	Yes	75
2	No	25
		100

Do you invest money in life insurance?

100 responses



**Interpretation: -**

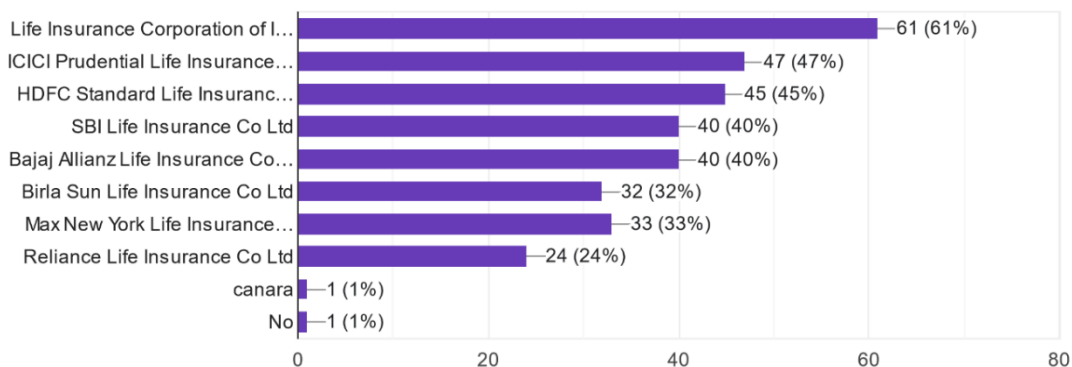
From above graph we can analyse that majority i.e. 75% respondents invest their money in Life Insurance.

**Which life insurance company do you know?**

Company	No of respondents	Percentage
Life Insurance Corporation of India	61	61%
ICICI Prudential Life Insurance Co Ltd	47	47%
HDFC Standard Life Insurance Co Ltd	45	45%
SBI Life Insurance Co Ltd	40	40%
Bajaj Allianz Life Insurance Co Ltd	40	40%
Birla Sun Life Insurance Co Ltd	32	32%
Max New York Life Insurance Co Ltd	33	33%
Reliance Life Insurance Co Ltd	24	24%

Which life insurance company do you know?

100 responses

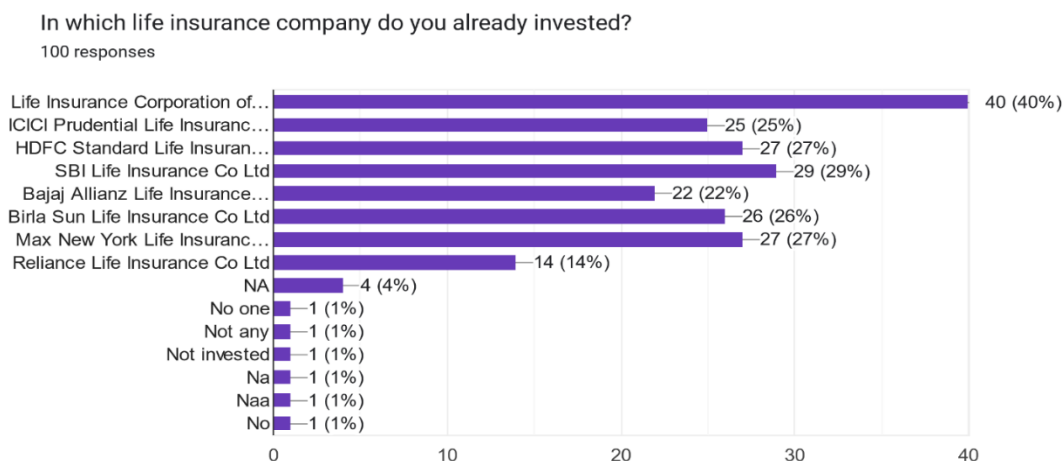


**Interpretation: -**

This graph shows investors are aware about which insurance companies. These all are having very good brand image. More than 60% respondents are aware about Life insurance Corporation of India. More than 45% respondents are aware about ICICI prudential life insurance and HDFC standard life insurance. Less than 25% respondents are aware about Reliance Life Insurance Company.

**Q.In which life insurance company do you already invested?**

Company	No of respondents	Percentage
Life Insurance Corporation of India	40	40%
ICICI Prudential Life Insurance Co Ltd	25	25%
HDFC Standard Life Insurance Co Ltd	27	27%
SBI Life Insurance Co Ltd	29	29%
Bajaj Allianz Life Insurance Co Ltd	22	22%
Birla Sun Life Insurance Co Ltd	26	26%
Max New York Life Insurance Co Ltd	27	27%
Reliance Life Insurance Co Ltd	14	14%



**Interpretation: -**

This graph indicates in which insurance company investors are already invested, Life Insurance Corporation of India is on top i.e. 40% and all other company is having range of around 25% and other part reliance life insurance is at 14%.

**Test Applicable**

A chi- square test for independence is used to analyze the data as it compares two variables in a contingency table to see if they are related.

**Factors Included**

To measure preference of individual investors regarding investment in life insurance. They are as follows:

Safety

Capital growth Liquidity Return

Tax benefit

Company profile and brand name

Factors	Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total
Individual perception of investment	Safety	55	15	6	16	8	100
	Capital growth	40	20	10	15	15	100
	Liquidity	35	30	20	5	10	100
	Return	80	15	1	2	2	100
	Tax benefit	45	16	18	11	10	100
	Company profile and brand name	52	28	6	10	4	100

O <sub>i</sub>	E <sub>i</sub>	O <sub>i</sub> -E <sub>i</sub>	(O <sub>i</sub> -E <sub>i</sub> ) <sup>2</sup>	(O <sub>i</sub> -E <sub>i</sub> ) <sup>2</sup> /E <sub>i</sub>
55	51.16	3.84	14.7456	7.3728
40	51.16	-11.16	124.5456	62.2728
35	51.16	-16.16	261.1456	130.5728
80	51.16	28.84	831.7456	415.8728
45	51.16	-6.16	37.9456	18.9728

52	51.16	0.84	0.7056	0.3528
15	20.66	-5.66	32.0356	16.0178
20	20.66	-0.66	0.4356	0.2178
30	20.66	9.34	87.2356	43.6178
15	20.66	-5.66	32.0356	16.0178
16	20.66	-4.66	21.7156	10.8578
28	20.66	7.34	53.8756	26.9378
6	10.16	-4.16	17.3056	8.6528
10	10.16	-0.16	0.0256	0.0128
20	10.16	9.84	96.8256	48.4128
1	10.16	-9.16	83.9056	41.9528
18	10.16	7.84	61.4656	30.7328
6	10.16	-4.16	17.3056	8.6528
16	9.83	6.17	38.0689	19.03445
15	9.83	5.17	26.7289	13.36445
5	9.83	-4.83	23.3289	11.66445
2	9.83	-7.83	61.3089	30.65445
11	9.83	1.17	1.3689	0.68445
10	9.83	0.17	0.0289	0.01445
8	8.16	-0.16	0.0256	0.0128
15	8.16	6.84	46.7856	23.3928
10	8.16	1.84	3.3856	1.6928
2	8.16	-6.16	37.9456	18.9728
10	8.16	1.84	3.3856	1.6928
4	8.16	-4.16	17.3056	8.6528
				<b>1017.334</b>

Degree of Freedom = (C-1) \* (R-1) (5-1) \* (6-1)

4 \* 5

20

Calculated Value = 1017.33 Tabular value at 5% = 31.41

### Interpretation of the Result

The Chi- Square Test was conducted for testing the statistical significance of association between perceptions of investor regarding invests in life insurance. Decision at 5% level of significance, the calculated value 1017.33 which is More than critical level of 0.05, the table value 31.41 therefore the Null Hypothesis H0 is Accepted, and Alternative Hypothesis H1 is rejected. From the above test we can these factors are not too much affecting to life insurance.

### Results and findings

- Majority 32% of respondents belongs to age group of 21 – 30.
- Majority 56% of respondents belongs to male.
- Majority 29% of respondents were having family income between 2,00,000 to 5,00,000.
- 75 % of the respondents are invest in life insurance
- Most of the respondents want long term investment.

### Suggestion and conclusion

The insurance sector has a vast potential not only because incomes are increasing and assets are expanding but also because the volatility in the system is increasing. In a sense, we are living in a more risky world. Trade is becoming increasingly global. Technologies are changing and getting replaced at a faster rate. In this more uncertain world, for which enough evidence is available in the recent period, insurance will have an important role to play in reducing the risk burden individuals and businesses have to bear. In the emerging scenario, the insurance industry must pay attention to

- (a) Product innovation,
- (b) Appropriate pricing and
- (c) Speedy settlement of claims.

### Limitation of the study

- The following limitations can be pointed out from the research
- The sample size chosen for the questionnaire was only 100 and that may not represent the true picture of the consumer perception about the Life Insurance sector.
- The research got confined to the city of rajkot district only. The respondent belonged only to Rajkot city and not others who were out of Rajkot city.
- The selection of people for the questionnaire will be done on the basis of convenient random sampling, so, there were certain cases in which the people selected did not have any life insurance policy, so they could not give any positive feedback regarding the important criteria to be considered before taking a life insurance policy.
- The product offered by different companies had different options and names in them, so at the time of comparison it will become very difficult. The parameters for comparison will also different in the selected companies.
- Resource Constraint
- Time Constrain

### Scope of the Study: -

- The result of this research would help the company to have a better understanding about the consumer's perception towards life insurance products offered by LIC of India.
- The study helps the LIC of India to focus the consumer's preferences and expectations on the product which they offer.

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**Annexure**

**"A perception of investors regarding investment in Life insurance with special reference to Rajkot City"**

1. Name
  
2. Age
  - a. 20 – 30
  - b. 31 – 40
  - c. 41 – 50
  - d. 51 – 60
  - e. More than 60
  
3. Gender
  - a. Male
  - b. Female
  
4. Contact number
  
5. Educational qualification
  - a. Under graduates
  - b. Post graduates
  - c. Diploma
  - d. Other
  
6. Annual income level
  - a. Less than 2,00,000
  - b. 2,00,000 - 5,00,000
  - c. 5,00,000 - 7,00,000
  - d. 7,00,000 - 10,00,000
  - e. More than 10,00,000
  
7. What kind of investment do you prefer?

- a. Long term
- b. Short term
- c. Both

8. Rank these various investment alternatives According to your preference

Sr no	Investment alternative	Rank
1	Bond and debenture	
2	Equity/ shares	
3	Mutual fund	
4	Ppf	
5	Post office	
6	Insurance	
7	Bank deposit	
8	Real estate	
9	Gold / silver	

9. State your expectation on investment alternatives by ticking according to its importance.

Expectation on investment	Highly Important	Important	Neutral	Less important	Not important
Safety					
Capital growth					
Liquidity					
Return					
Tax benefit					
Company profile and brand name					

10. Do you invest money in life insurance?

- a. Yes
- b. No

11. Which life insurance company do you know?

- a. Life Insurance Corporation of India
- b. ICICI Prudential Life Insurance Co Ltd
- c. HDFC Standard Life Insurance Co Ltd
- d. SBI Life Insurance Co Ltd
- e. Bajaj Allianz Life Insurance Co Ltd
- f. Birla Sun Life Insurance Co Ltd
- g. Max New York Life Insurance Co Ltd
- h. Reliance Life Insurance Co Ltd

12. In which life insurance company do you already invested?

- a. Life Insurance Corporation of India
- b. ICICI Prudential Life Insurance Co Ltd
- c. HDFC Standard Life Insurance Co Ltd
- d. SBI Life Insurance Co Ltd
- e. Bajaj Allianz Life Insurance Co Ltd
- f. Birla Sun Life Insurance Co Ltd
- g. Max New York Life Insurance Co Ltd
- h. Reliance Life Insurance Co Ltd

13. What parameters do you look into before you take up a life insurance policy ?

Parameters	Highly Important	Important	Neutral	Less important	Not important
Premium					
Charges					
Policy terms					
Riders benefit					
Bonus and interest					
Services					
Accessibilities					
Company image					

## AN EMPIRICAL STUDY ON RETAIL INVESTOR'S BEHAVIOUR TOWARDS THEMATIC MUTUAL FUND IN SAURASHTRA

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### ABSTRACT

The study is about the investor's behavioral pattern towards Thematic mutual fund investment with reference to Saurashtra Region. It seems that many investors are preferring whimsical mutual fund investment in order to maximize returns and with the expectation of lower the risk than direct investment in stock market, safety and liquidity with professional management fund manager. Routine investment pattern of investors keeps on changing and behavioral pattern of investors is highly influenced by their demographic profile and the features of investment. In India investors are preferring more systematic way of investment like mutual fund investment in which the basic aim of investment is diversification of risk but still it's not like developed countries like the US and the UK, to increase the mutual fund investment up to that maximum level and to create such investment awareness this research will be done and convenient suggestions will be given to mutual fund house which would be helpful to them for fabricating more investment in mutual fund. The conclusions will be drawn only with respect to investors of Saurashtra. This study will conclude that several demographic factors like age, marital status, gender, city, level of income, occupations and qualifications etc. have major impact on investment decision of investors towards mutual fund. There has been a remarkable growth noticed in the mutual fund industry in India in last dickey. Expanding number of Asset based Management Companies which are providing various schemes and different modes of investment to the Investors has encouraged more and more investors.

**Keywords:** *Assets Management Company, Mutual Fund, Risk, Return*

### INTRODUCTION

Thematic investments are fundamentally the investment strategies that help investor to recognize the existing trends/themes for having investment decisions. Thematic investment strategies are for a remote future and need to be well-researched before making such investment decisions.

How are thematic funds different from the sectoral funds or regular mutual funds? Thematic funds have a much wider area than that of the sectoral funds as they may include various companies from different sectors united by theme(s). For example, Nifty Infrastructure Index is an infrastructure thematic index that consists of companies representing diversified sectors belonging to telecom, power, airlines and others.

Theme	Benchmark	Beta against Global Market Index*
Energy Transition	MSCI World Climate Change CTB Select Low Carbon 100 Europe	0.98
Environmental Sustainability (equities)	MSCI AC Asia x-Japan ESG Leaders ECPI Circular Economy Leaders MSCI World SRI	0.97
Environmental Sustainability (bonds)	MSCI Global Green Bond	0.98
Health Care Innovation	MSCI World Health Care	0.74
Consumer Innovation	MSCI World Consumer Discretionary	1.15
Disruptive Tech	Nasdaq CTA AI NTR Morningstar Exponential Tech	1.24

## REVIEW OF LITERATURE

**Agrawal and Jain (2013)** The author investigated the mutual fund investing behaviour of Mathura investors compared to alternative investment options. Even though many investors are aware of the prospects offered by mutual funds, the data showed that banks and LIC remain popular due to their reputation for safety. Investments in mutual funds are made primarily for tax advantages and return.

**Khitolya (2014)** - The author looked at how investors felt and knew about mutual funds. The study discovered that half of the respondents knew about investing in mutual funds. The tax advantages came out on top amid factors including flexibility, openness, diversity, expert management, return potential, and affordable stock access. The biggest barriers to the growth of the mutual fund sector are investors' lack of in-depth understanding.

**Sindhu & Kumar (2014)** investigated how individual investors' perceptions of risk and return affected their choice to invest in mutual funds. The study found that because investors are very risk-averse, they favour efficient portfolios that offer the highest return at the lowest amount of risk. The outcome of the regression showed that an investor's perception of risk has a significant impact on their investment decision.

**Ashraf and Sharma (2014)** From 2007 to 2012, the performance evolution of equity fund schemes was examined. It has been noted that changes in the market's state directly impact the performance of mutual funds. Only effectively diversified funds can successfully weather the effects of market factors. Only the fund managers' fund selection skills and market timing abilities can improve fund diversity. Asset management firms were discovered to be capable of outperforming the typical benchmark.

**Maheshwari (2015)** - According to the study, investing in mutual funds offers the most variety, flexibility, diversification, liquidity, and tax advantages. High turnover and large asset fund organizations are said to perform well. The expense ratio has a direct and advantageous effect on a fund's performance. When compared to foreign funds, local mutual funds are shown to be superior. One of the fundamental and essential platforms for superior fund plan returns.

**Wadhwa et al. (2015)** found that most respondents have indifferent opinions about investing in mutual funds. The people were discovered to be showing mutual fund assistance and protection. Any degree of education invests money in hopes of receiving a satisfying return. However, occupation does factor into decisions about investing in mutual funds.

**Joseph and Joseph (2015)** The study looked at the perceptions and expectations of retail mutual fund investors in Kerala regarding perpetual factors. These are divided into four categories: information and awareness, law and openness, practicality and adaptability, and value and affordability. The study also concludes that small retail investors support purchasing mutual funds. The degree to which investors' income levels have an impact is likewise debatable.

**Sharma Arti (2015)** To determine the correlation between sector fund portfolio returns and benchmark portfolio returns, the author examined the performance of a few chosen sector-specific funds. The outcome showed that the Reliance Pharmaceutical sector fund found the highest association between portfolio returns and benchmark portfolio returns. The riskiest sector funds among the top ten sector funds are the UTI transportation and logistics fund.

**Arathy, et al. (2015)** The writers concentrated on several aspects, such as return price, tax advantages, and capital appreciation, affecting the investment choices of retail investors. It was also looked at whether the research's conclusions would aid mutual fund companies in determining the types and applications of cutting-edge marketing strategies. Numerous investors will be drawn to the mutual fund business by robust complaint mechanisms, rules, and professional assistance. The survey indicated that almost all investors follow a similar investment strategy.

**Kothari and Mindargi (2016)** - This study examined how different demographic characteristics affected investors' perceptions of mutual funds. According to the report, many people lack the psychological motivation to invest in the mutual fund industry. Most investors choose open-ended plans over other types of investments.

**Unnamalai (2016)** Age, marital status, occupation, and income level impact investing decisions. Most investors learn about mutual funds from brokers and make SIP investments. The study also found that concerns about brokers are due to their preference for pitching investment ideas to clients over offering post-sale support. The right communication route should be used to transit timely market information.

**Krishna (2016)** The report examines aspects that can assist India's mutual fund industry to grow. According to the study, more than half of the respondents thought the risk of mutual

funds was moderate. It has also been discovered that single investors reported less risk in a mutual fund than married investors. It shows that married investors are less risk-loving than single ones.

**Aizenman et al. (2016)** The impact of systematic risk on the performance of foreign mutual fund investments is a topic of investigation. Because it decreases fund size, the anticipated outflow of funds has a smaller systematic risk. This effect may be disproportionately great when the financial market is in a situation of turmoil. The study examines the non-linear relationship between the anticipated flow of capital and the systematic risk contribution.

**Sudhakar and Aravinth (2016)** - The survey determined that investing in mutual funds was one of the greatest ways for people to use their resources. The tax benefit is still another significant benefit. Retail investors, however, are not taking advantage of mutual fund schemes since they are accustomed to the banking and insurance industries due to a lack of information and complete faith.

**George and Chandran (2016)** found that while most investors favour a secure investment, small investors opt to adopt high-risk investments. According to the research, mutual funds and bank deposits rank highly as investment options, but no investors prefer debentures or derivatives. The key reasons mutual funds are favoured are better returns and safety, followed by diversification and tax advantages. According to the study, most investors are married, demonstrating the impact that marital status has on investment choices.

**Mamgain (2016)** The article's primary goal is to assist fund managers and investors by pointing them in the direction of excellent performing schemes. The study found that equity funds are more sought after than debt funds. Additionally, it has been noted that the mutual fund industry makes up a very small fraction of the financial market's overall assets compared to bank deposits, insurance, and provident funds. A reliable and important source of information on mutual fund schemes is determined to be independent financial counsellors and banks. However, outside of banks, the contribution of public sector banks was found to be depressing.

**Alamelu and Indhumathi (2017)** claimed vehemently that Systematic Investment Plans (SIPs) are a cutting-edge and superior option for regular investors. The article advised risk-takers to choose a small- and mid-cap equity fund. The funds' return is modest since there is less risk. They discovered that the equity programmes offered by ICICI, Reliance, and UTI offered higher returns than other funds.

**Pandow (2017)** outlined the growth prospects for the global money market industry in India using data on the number of global funds, the growth of schemes in terms of numbers, and AUM by schemes. According to the survey, growth plans were second in importance to regular income schemes in terms of how well they worked.

**Baliyan and Rathi (2017)** The author assessed the performance of infrastructure mutual funds in India. A brief comparative study was conducted on AMC's Scheme. Their estimates indicate that Reliance mutual fund is at higher risk, nevertheless. The authors argue that Reliance needs

to run advertising campaigns. According to the report, public business funds are chosen since they are safer and carry less risk.

**Bandi (2017)** - The study examines how agents and advisors view and act about investments made through Micro SIPs offered by mutual funds. It covers investment patterns, stock selectivity, selling interest for Micro SIPs, financial inclusion, and the growth of the mutual fund industry's economy. In comparison to dealers of securities, insurance products, and Ponzi schemes, it has been observed that the majority of agents sell mutual fund schemes. Additionally, it shows that the mutual fund industry follows promotions more closely than the banking and insurance industries.

**Banerjee and Goyal (2017)** Many elements influencing people's investment decisions are examined in this research. Investors in contemporary investment channels are found to have relevant educational and professional backgrounds. Risk-takers are young investors. Closed-ended plans are less desired than open-ended plans. Along with the fund, company reputation and the fund management's track record are also important factors in investment decisions.

**Bhayani (2017)** - The researcher looked at the main developments in investing in mutual funds. The study focused on two types of cities: those that are highly developed and those that are not. According to the study, institutional investors hold more industrial securities than individual investors. Furthermore, institutional investors hold most mutual fund investment accounts, with the share held by individual investors being quite small. It also helps promote financial literacy and understanding among the general public.

**Varun Sagar Singal and Dr Rishi Manrai (2018)** discovered factors influencing mutual fund investment decisions and the impact of behavioral factors on investors; the factors include safety of 47 investments, tax advantages, better returns with less risk, transparency, small amount requirements, automatic re-investment, and others. Additionally, they have concentrated on how investors see themselves and a few fundamental variables like age, gender, income, occupation, and education that are crucial when choosing a mutual fund. According to research, men who reside in metropolitan areas, have graduate and postgraduate degrees and earn a salary invest more in mutual funds than people in business do.

**Reddy, B. A., and Ram, A. S. (2018)** referred to a sector when describing the timeliness and selection of a particular set of mutual funds. Sector fund managers do demonstrate some positive but statistically insignificant selectivity talent, but there is no indication that sector funds have any market timing talent. Despite their expertise, many sector fund managers have poor timing skills.

**Mehrotra, R., and Kandpal, V. (2018)** looked at the responses of 75 professionals from different regions of India, including UP, Bihar, Uttarakhand, and Delhi. They discovered mutual funds are more popular among educated urbanites with high incomes than those with lower middle-class and rural residents. The majority of people invest for tax benefits.



**Nagajyothi, S., and Srinivas, G. (2018)** discovered that large-cap equity growth funds outperformed small and mid-sized funds. Nevertheless, compared to small and mid-cap funds, large-cap growth funds are less hazardous. They have demonstrated that investing in equity funds is necessary for good returns. The ideal option for a good long-term return is an equity-based SIP.

**Dr A. Bhuvanewari and Mrs Bridarubini (2018)** investigated the awareness of investors toward mutual funds. They discovered that many investors use wealth managers and portfolio managers, but these services are expensive—lack of mutual fund management services, difficulties faced by the Indian mutual fund business, and more.

**Kumar, A. A., and Babu, M. (2018)** analyzed the responses of 100 salaried investors from Tiruchirappalli, south India, and studied the socioeconomic factors influencing their behaviour toward investing using a T-test. They found that female investors are underrepresented and tend to avoid taking risks more frequently than male investors. They also found no correlation between risk-taking ability and marital status.

**Vijay, R. 41 (2019)** He used the Sharpe, Treynor, and Jensen ratio to analyze data from the top mutual funds' Axis, SBI, Franklin, and ICICI with the standard of the Nifty Small Cap 250 for a five-year period beginning in 2014 and ending in 2019. It was discovered that the majority of small-cap funds are showing higher returns and that SBI, AXIS, and Franklin small-cap funds have shown high return 53 than standard performance while ICICI small-cap has shown less return than the threshold.

**Busse, Jeffrey A., Ding, Jing, Jiang, Lei, and Wu, Ke (2019)** concentrated on daily returns instead of monthly returns. He investigated market timing based on beta asymmetry and showed that good market timers could generate extraordinary gains, investor confidence, and greater capital inflow than non-timers. Additionally, it was discovered that there is a bad association between portfolio concentration and market timing.

**Gupta, K. (2019)** He conducted an online analysis of 382 mutual fund schemes. The best funds, according to all three models, are those offered by Birla Sun Life Equity Fund, Birla Sun Life Frontline Equity Fund, Birla Sun Life MNC Fund, DSP BR Opportunities Fund, and Franklin India Blue-chip Fund, which account for 28.57% (14 out of 49) of the schemes.

**Magdum, A., and Samant, C. G. A. (2019)** used the CAPM model to analyze the success of equity-based mutual fund schemes in India. A five-year review of data from June 2013 to September 2019 showed that private sector mutual fund companies had outperformed public sector funds commencing with the launch. The data show unequivocally that private sector mutual fund companies, such as ABSL and ICICI, have outperformed public sector funds, such as SBI and UTI, over the last five years.

**Bano, Y., and Vasantha, S. (2019)** investigated five NIFTY Index companies—UTI, SBI, TATA, HDFC, and IDBI—to assess performance for five years beginning in 2012 and concluding in 2017. They examined the performance of an index mutual fund that followed the

CNX Nifty index, which served as its underpinning index. Additionally, it was found that the tracking error is greater than 1 in all funds, which is good.

**Amadi, F. Y., & Amadi, C. W. (2019)** looked into the connections between investment horizon, investment style, and results from various years. Investors must choose their financial objectives and time horizon, which can be realized with careful planning.

**Niessen-Ruenzi, A., & Ruenzi, S. (2019)**, there are gender biases. Fewer investors invest in funds managed by women than those managed by men. Fund flow from female managers was found to be much lower. Women have little potential in the mutual fund industry because female managers have a mind-set of taking very little risk and cannot make quick decisions.

**Kumar, R., Sharma, D., & Singh, J. (2019)** Researchers used the chi-square test and percentages to analyze responses from 150 investors in the Alwar district of Rajasthan. They discovered that most investors are male, businessmen and undergraduates and want to invest more in mutual funds for tax benefits or capital appreciation. They advised mutual fund companies to raise investor understanding of risk, return, and how they operate. They also stated that digitalization would raise customer awareness.

**Kapoor, A. (2019)** - She researched the recent global trends in India's mutual fund market. The investment in mutual funds increased with a discernible growth rate. However, compared to the investment of developed nations, it was observed to be less, so a sizable market is waiting for potential investors in the Indian financial market, indicating that there is still an opportunity in the Indian market.

**Guha Niyogi, G., Mandal, N., and Das, R. (2019)** conducted a credit rating survey using the Standard & Poor's and Moody's models and discovered a connection between equity funds and debt funds, finding that downgrading debt funds will result in downgrading equity funds and upgrading debt funds will result in upgrading equity funds. They also stated that the relationship between credit rating agencies and customers is similar to that of a principal and agent because investors rely on the ratings provided by credit rating agencies before making investment decisions.

**Tandon, S., and Chopra, T. (2019)**-They observed the attitudes of 100 investors from Jalandhar toward mutual funds and discovered that the preferences of investors are related to occupation and education rather than income, age, or gender. The goal of investing in mutual funds is to receive a high return with little risk and liquidity. Additionally, it was noted that although investors prefer to invest through agents, they research online and in other media before making a decision.

### **Research Methodology**

Research Topic “An Empirical Study on Retail Investors Behavior Towards Theatrical Mutual Fund in Saurashtra”

Research Objective

The main objective of the study is

- To study the demographic profile of MF investors in Saurashtra.
- To examine the investment pattern of MF as adopted by investors in Saurashtra.
- To study the satisfaction level of investors with investment in MF.

#### Data Interpretation and Analysis

The interpretations are listed here along with tables and write-up in the following sequence:

- Thematic Mutual Fund analysis with respect to investors of saurashtra region
- Overall analysis
- Analysis about factors which are connected with mutual fund analysis.

Note: Total 19 Research Paper consists of different factors which gives different view on mutual fund analysis. In this analysis I taken sample of 19 research paper in which 39 literature review and did the analysis that what is the factors and how its impacts of mutual fund in different regional background.

#### Tabular Form Analysis of all Literature review

Sr. No.	Paper	Research Problem	Findings
1	Jaydip Sen and Tamal Datta Chaudhuri (International Journal of Scientific & Technology Research) (2020)	Decomposition of time series Data to check consistency between equity fund style and actual fund composition of Mutual Fund	A better service for determining whether a mutual fund's style and actual fund composition are consistent will be made possible by the research. The proposal from a mutual fund is based on the time series decomposition of the individual equities in the fund. In order to determine whether the fund style and the actual fund composition are consistent, this fund composition is then contrasted with the fund style that the fund manager had originally intended.
2	Keye Somefun, Chenyang Yin, Romain Perchet, Raul Leote, (SSRN Electronic Paper-3 Journal) Jan 2021	Allocating of Thematic Investment	Themes are fundamental developments that are anticipated to have a substantial impact on economies and reshape business structures. Thematic investing enables portfolios to achieve excess returns from assets whose returns are affected by the structural shifts underlying pertinent themes. Thematic investing is a component of portfolios that, while extending beyond

			the boundaries of asset classes, sectors, locations, and styles, is not entirely unrelated to them. Adequate risk management is necessary when building portfolio investments with a certain theme.
3	Rama Malladi (Research Gate) 2019	KIDS Thematic Indices: Enabling investors to invest in firms that cater to Children	As shown by a Sharpe ratio about three to four times that of the S&P 500 index, this article shows that a children-oriented thematic investable index (KIDS) successfully beats the S&P 500 index. An equal-weight portfolio produces the best Sharpe ratio for children, followed by value-weight and price-weight. All three KIDS outperform the S&P 500 when weighted equally and when given value.
4	Ms. Kavitha Ranganathan (SSRN)	A STUDY OF FUND SELECTION BEHAVIOUR OF INDIVIDUAL INVESTORS TOWARDS MUTUAL FUNDS - With Reference To Mumbai City	These groups' changing perceptions and behaviours will be captured in studies carried out on a broad scale and regularly by organizations like AMFI/SEBI. These studies will also serve as early warning signals that will allow the deployment of timely remedial actions. The study's findings may aid in formulating cost-effective strategic decisions which would interest individual investors, fund managers, and both new and current MFs.
5	Dr. K. Rakesh, Mr. V S M Srinivas (INTERNATIONAL JOURNAL OF MANAGEMENT)	UNDERSTANDING INDIVIDUAL INVESTORS INVESTMENT BEHAVIOR IN MUTUAL FUNDS (A STUDY ON INVESTORS OF NORTH COASTAL	Overall, it is obvious that investors of all ages participate in mutual fund investments, but specifically that participants under the age of 35 have a defined investment plan and want to assume more risk to earn higher returns. Therefore, businesses must concentrate on this demographic to increase mutual fund investments.

	(Volume 4, Issue 3, (May - June 2013), pp. 185-198	ANDHRA PRADESH)	
6	Pratyashi Tamuly, Samaresh Nandy, (International Journal of Management (IJM) Volume 11, Issue 10, October 2020)	INVESTORS BEHAVIOUR AND MUTUAL FUNDS - A REVIEW ON AVAILABLE LITERATURE	The investor must comprehend the multidimensional aspects that can affect the flow of funds in the fund market to make an investment. Investors should study the factors that might be used to buy. The study focuses on the variables that influence investors' behaviour and the variables that act as constraints.
7	Sujit Deb, Ranjit Singh, Iranian Journal of Management Studies (IJMS) Vol. 11, No. 2, Spring 2018	Dynamics of Risk Perception Towards Mutual Fund Investment Decisions	Tripura bank employees generally perceive investing in mutual funds as posing a modest risk. Three factors—employees' fear of psychosis to invest in mutual funds, lack of information, and lack of confidence to do so—affect risk perception as a whole. Out of these three variables, the influence of fear psychosis on mutual fund investment decisions is comparatively the biggest. Therefore, awareness programmes of mutual funds should be organized for the bank workers to lessen the impact of these three risk perception elements on the choice to invest in mutual funds.
8	Ms. Prachi Jain, Dr. Rashmi Mate, Journal of business and management (2021)	A Study Of Investor's Attributes With Reference To Mutual Fund Investment.	Numerous investors were found to be familiar with mutual funds. However, the lack of knowledge regarding mutual fund schemes has negatively affected most investors. Investors are mostly worried about the risk involved with mutual funds. The major reasons that investors choose mutual funds are tax exemption and liquidity.

9	Prof. Dr. Basil John Thomas (International Journal of Economics, Business and Management Studies Vol. 7, No. 1, 167-175, 2022)	Investment Objectives of Mutual Fund Investors	With respect to their time horizon for investing, the investment goals and the degree of client preference for mutual fund products differ. Examining mutual fund investors' investing goals suggests that the primary goal they consider is a return on investment. The investors' secondary, tertiary, third, and fourth goals include safety, capital appreciation, and liquidity. In contrast, investors with investment time horizons longer than nine years prioritize making provisions for unforeseen circumstances.
10	S M Rakibul Anwar & Tanvir Mohammad Hayder Arif (Global Journal of Management and Business Research) Finance Volume 16 Issue 9 Version 1.0 Year 2016	Evaluation of Mutual Funds Performance in Bangladesh: Investors and Market Perspective	In addition to exploring the risk-adjusted performance of mutual funds using mutual fund performance evaluation models, this study reviews the Bangladeshi mutual fund market. The performance of the financial services sector and the function of regulatory agencies are key factors in this industry's success. Mutual funds will become more popular in Bangladesh due to strong performance and strict rules.
11	K. ELAKKIA, Mrs. K. MALARKODI, Dr. K. RAMPRATHA P (International Journal of Research in Engineering and Science (IJRES))	A Study on Investors' Preference towards Mutual Fund	Respondents felt safer investing in public sector mutual funds compared to private sector mutual funds. Numerous schemes are being introduced to meet the unique needs of investors because of the intense rivalry that exists in the market. The preference for mutual funds does not depend on age, education, employment, or annual savings. Most of the time, there is no correlation between preferred mutual funds and annual income.

	Volume 10 Issue 6   2022		
12	SIMRAN SAINI; DR BIMAL ANJUM; RAMANDEEP SAINI; International Journal of Multidisciplinary Research Vol.1 Issue 1, May 2011	INVESTORS' AWARENESS AND PERCEPTION ABOUT MUTUAL FUNDS	Investors' opinions and perceptions have been investigated on a variety of topics, including the type of mutual fund scheme, the primary goal of investing in a mutual fund scheme, level of satisfaction, the role of financial advisors and brokers, investors' opinions regarding the elements that entice them to invest in mutual funds, information sources, shortcomings in the services offered by mutual fund managers, and difficulties facing the Indian mutual fund industry, among others.
13	R.V.Suganya Dr.M.Chandran (IJMIE Volume 3, Issue 9) 2013	INVESTOR'S PERCEPTION OF MUTUAL FUND INVESTMENTS WITH SPECIAL REFERENCE TO HDFC MUTUAL FUND-CHENNAI	The mutual fund sector has made great strides in educating the public and assisting individuals in better realizing their financial goals. Indian investors now devote a sizeable percentage of their investing budget to mutual funds. The current year's mutual fund mobilization showed that much money flows into mutual funds.
14	Dr. Vikram K. Joshi (International Journal in Management and Social Science) Vol.04 Issue-11, (November, 2016)	PERCEPTION TOWARDS INVESTING IN MUTUAL FUNDS IN INDIA – AN EMPIRICAL ANALYSIS OF INVESTORS IN NAGPUR CITY	The goal of the current study was to pinpoint the key drivers of small investors' decisions to invest in mutual funds' equity and ELSS in Nagpur, India. The study concludes that the lock-in period, which separates mutual fund participants from non-investors, is one of the most important criteria.
15	Himanshi Prajapati, Ritisha Rathod	A STUDY ON CONSUMER PERCEPTION ABOUT GROWTH	Since most people invest in mutual funds, businesses must work to lessen the barriers that prohibit customers from investing by understanding their needs and desires.

	(International Journal of Management, Public Policy and Research) 2022	OF MUTUAL FUNDS	Customers must choose among the different schemes Mutual Funds offers, the best Mutual Fund management businesses, and the appropriate plans.
16	Aditi Pandey, (International Journal of Social Sciences Arts & Humanities) Vol. 8. No. 2. 2021	An Analysis of Investment Avenues in India: A Comparative Analysis of Government Benchmark Returns and Equity Mutual Funds in India	There are many opportunities for investors to invest their money, but it is crucial to seize the chance to yield the highest profits. As explained in the article, equity funds offer larger returns than government securities but also carry a higher level of risk. Because of this, all businesses are performing poorly. First and first, choosing a reliable fund is crucial, followed by monitoring its results and those of other comparable investment vehicles.
17	R. Idhayajothi, Dr. O.T.V Latasri (International Journal of Advanced Research in Management and Social Sciences) Vol. 3   No. 7   July 2014	A STUDY ON THE PERFORMANCE OF VARIOUS MUTUAL FUNDS SCHEMES	Because of their higher Sharpe ratios, CAGRs, and lower Beta and Standard Deviation than their rivals, Tata Dividend and HDFC Top 200 performed better in this study. Reliance Diversified & Sundaram's performance is inadequate due to their low Sharpe ratio & CAGR. Because of their high Beta, they are also riskier than their rivals.
18	Ravisha Chutani, Prof. (Dr) Harsh Purohit (International Journal of Management &	A Study on Urban Working Women's Attitude towards Mutual Fund Investment in Jaipur District, Rajasthan	By investing in mutual funds, which will diversify their portfolio and lower their investment risk, female investors can boost their returns on their corpus. Women investors tend to be risk adverse and favour assets with little risk and high returns. Due to their ignorance of mutual fund



	Social Sciences ISSN 2455-2267 Vol. 03 Issue 01 (April, 2016)		investments, they avoid making mutual fund investments in favour of less risky fixed and bank deposits.
19	Nidhi Walia, Dr. Mrs. Ravi Kiran (International Journal of Business Management) Vol. 4, No. 5 2009	An Analysis of Investor's Risk Perception towards Mutual Funds Services	The current study aimed to examine how investors view the risk-return trade-off for mutual fund services. Understanding investor expectations of mutual funds has become a crucial area of research since mutual funds cannot grow at the needed rate. Information from this study's findings highlights the interests of many people who want to invest in mutual funds but also need certain improvements and higher-quality additions to current offerings.

### Significance of Study

Many studies were done on mutual funds previously in India. This study will cover behavioral pattern of investors of Saurashtra, which includes perception and attitude of investors towards mutual fund. This study would be helpful to the administrators and policy makers of mutual fund companies to introduce and create such type of policies which will enhance satisfaction of investors and for the growth of mutual fund industry. This study would be helpful to future researchers to carry out their research in the area of behavioral finance with multi-dimensional aspects. This study will be also useful to the potential investors to take correct investment decision.

### Research Limitation

The limitations of the study are as follow:

- Taken and cover only 19 research papers and 39 literature review.
- Research Papers which were used as source of data those are very from each other in terms of many geography contexts.
- Majority research worked on factors and its impact on research only

### Conclusion

The basic perception of investors regarding themed mutual fund investments in Saurashtra will be covered in this study, including investor awareness and attitude. The results of this study will be helpful to the administrators and policymakers at mutual fund businesses as they adopt and develop the kinds of regulations that will increase investor happiness and promote the

expansion of the mutual fund sector. Future scholars could use this work to research theme-based investment with multiple dimensions. This study will also help prospective investors make the best choices out of all alternatives.

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## **A Study on Attrition Analysis and Talent Retention strategies for Millennials in IT Industry with special reference to Saurashtra Region- A Systematic Literature Review.**

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### **Abstract**

Employees in the millennial generation will soon make up the majority of the workforce as baby boomers retire. Retaining the young and new worker population could present a challenge for enterprises, particularly in the IT sector, given millennials' personal traits and work habits. There is a lot of literature on retention techniques but not enough on millennial retention. This study examines what millennials want from their workplace, the type of organizational climate they would like, and what HR policies top management should develop for millennials to retain technical talent, particularly in the Saurashtra Region's IT sector.

**Key words:** *Millennials, Attrition, Retention, IT sector, Saurashtra Region.*

### **Introduction**

In addition to being known as millennials, Generation Y refers to people born between 1980 and 2000. The primary characteristic of millennials is their frequent early exposure to technology, which has both positive and bad effects on emotional, cognitive, and social outcomes (Killins, 2017).

Future generations will differ from the current generation. Thus, businesses and institutions that can adjust quickly will be able to attract the best talent. Therefore, keeping your staff for employee attitude changes, new employment opportunities, hiring and training expenditures associated with new hires, a lack of skilled workers, and competition for talents worldwide is important.

As it is the first time, four different generations are currently working together. Traditionalists (born before 1946), Baby Boomers (1946–1964), Generation X (1965–1981), and Generation Y (Millennials) (1982–2000). The other three are among the generations ready to enter retirement, while Millennials are inundating the workforce. By 2025, "one in every five employees" employing millennials worldwide.

Millennials need to be kept in the business, and organizations want to remain competitive, according to a global study conducted by Deloitte. Nearly one out of every three millennials aim to quit their current work in the next year in search of new career prospects. To attract,

inspire, and retain today's and tomorrow's professionals, firms must adapt and change the work requirements of multigenerational workers.

Numerous studies and surveys have been conducted on the attraction, involvement, and inspiration elements that affect employee retention in firms. Still, there have been relatively few studies on millennials employed in the Saurashtra region's IT sector. Millennials make up a significant portion of the workforce today and will be key company decision-makers and employees in the future.

### **Literature Review.**

Literature reviews is an account of what has been published in connection with this research. The main purpose is to gain knowledge and conception based on the previous establishment and get to know what their strength and weakness are in order to further enhance and upgrade the integration.

**1. According to Srivastava, Tiwari, and Kumar (2011)**, unplanned exits cause organisations to counteract the amount of disruption. It is also emphasised that the larger the number of employees leaving the organisation, the higher the drain on its resources, such as time, training, talent acquisition expenses, and resource orientation.

**2. Sengupta (2011)** identified the factors of attrition and analysed the dimensions of attrition in the companies. From the identified factors, the dimensions of attrition were formulated as dissatisfied personal traits, equivocal organisational support, mystified career path, and low self-fulfilment factors.

**3. According to Self and Dewald (2011)**, when long-term employees are interviewed, there are typical elements regarding retention strategy that represent a sense of duty, an economic need to work, and a realistic job description. As times have changed, employee retention strategies have become an essential part of the organisational culture.

**4. (Winterton, 2011)**, organisations must focus on providing gainful employment with a desirable work setting to retain employees.

**5. According to the India Operations, Kronos Inc., Workforce Productivity India (2012)**, India's H.R. managers were "too caught up in firefighting" attrition, so they could not focus on the more strategic plans of their business.

**6. My Hiring.com, a popular talent acquisition service provider, surveyed "Worldwide I.T. Salary 2012."** According to this study, Indian software companies offer lower pay packages to their middle and senior-level employees, which is one of the prime causes for the higher percentage of attrition in the I.T. sector. According to this study, India ranks eighth among the countries with the worst I.T. pay scale.

**7. Maya and Thamilselvan (2012) researched wellness programmes**, mentoring/coaching, employee suggestion programme training opportunities - job-related personal development, and employee engagement programmes and found no significant association with any



demographic variables. Employees in I.T. companies identified alternative work schedules, promotional opportunities and new assignments, appraisal and reward systems, retention incentives/schemes, and share options (Employee Stock Ownership Plan) as the most perceived strategies.

**8. Kumar (2012) highlighted five HRM practises,** namely compensation, career opportunities, work engagement, work-life balance, and guidance support were all found to have a positive relationship with employee retention.

**9.** A common misconception about Millennials is that they are narcissistic and self-absorbed (**Westerman et al., 2012**). Selfish behaviour in Millennials results in expecting special favours and believing others should do what they want.

**10.** Workforce jobs require employees to be able to work in teams and have strong interpersonal skills, which may be a problem for narcissistic Millennials (**Westerman et al., 2012**).

**11. According to Derek et al. (2013),** the working environment and employees' lifestyles have changed dramatically in recent years. In order to keep their position, the employees prefer to run faster. The management, on the other hand, expects one employee to do the work of several people. As a result, employees are treated merely as commodities.

**12. According to Gask (2013),** poor communication and leadership can decrease employee retention and engagement. Relationships require effective communication.

**13. Prabandhan (2013) investigated attrition in the Indian I.T. and ITES industries.** The study's findings revealed that when employees have a positive job attitude, the attrition trend among employees is negative.

**14. Rawat et al. (2013)** discovered a causal relationship between supervisor support and employee retention. Companies use strategies at various levels, such as a high-paying salary, difficult work, career opportunities, flexible work hours, work from home, and reward strategy.

**15. According to Ahmad et al. (2013),** leave, loan, and retirement plans significantly positively affect employee retention. Leave was discovered in a public university as the most important benefit in retaining employees.

**16. Workplace stress can result in heart disease, psychological disorders, and other health problems, according to Zafir and Shaikh (2013).** There is abundant proof that occupational stress affects workers' mental health. There is substantial evidence that unchecked chronic and high levels of occupational stress are related to employee well-being.

**17. According to Kumar and Santhosh (2014),** the strongest dimensions influencing employees' intentions to leave or stay in an organisation are career growth and compensation, recognition and job support, and work adaptability.

**18. Employee attrition is operational when the perspective and opinion in workforce value are positive and large enough to help cover the cost of transacting the attrition (Rahman, 2014).** Employee attrition is non - functional when the resulting difference in labour value is negative or when the positive change in labour value does not offset the costs.

**19. (Kadam, Thakar, 2014)** Discovered that the majority of employees (42%) leave their jobs due to salary dissatisfaction, 23% leave due to a lack of career advancement, 2% leave due to relocation to another region, and 8% leave due to job quality.

**20. According to Kadam and Thakar (2014),** employees leave the organisation mainly because of boss issues, remuneration, limited career opportunities, and a work-life balance.

**21. (Mwema & Gachunga, 2014),** Performance appraisal criteria must be well structured, systematic, and valid to allow for objective analysis, calculation, and aggregation of results, which can lead to competent and productive employees and organisational effectiveness.

**22. (Goud, 2014),** The ability to retain Millennials will necessitate planning based on their behaviour by providing them with a longer-term plan to move up in organisations faster.

**23. According to Fortune (2015),** the best places to work include Google, the Boston Consulting Group, Acuity, the SAS Institute, and Robert W. Braid, to name a few. These businesses recognise their employees' value and contribution to their organisation's quality and productivity, and they make certain that appropriate strategies are implemented to keep their employees satisfied. The top organisations are there because their employees are valued. Intellectual employers recognise this and implement measures to keep their employees loyal to their company.

**24. Jyotsna Bhatnagar explored talent management and its relationship to numerous levels of employee engagement in her research paper "Talent management strategy of employee Engagement in Indian ITES employees: the key to retention."** The research showed that a high level of engagement might result in high retention, but only for a short duration in the ITES sector. The study indicates the use of a more rigorous employee engagement structure.

**25. Anjali and Anand (2015)** found that younger employees are less patient and more easily manipulated to modify their decisions. Infrastructure, cultural differences, language, etc are some factors. Make it a factor for the newcomer to quit or remain with the company.

**26. According to Vijayalatha, Brindha, and Krishnakumar (2015) 's study on "Employee Retention Among I.T. Industry with Special Reference to Chennai City,"** workers consider changing jobs due to the absence of future growth. As a result, businesses can look for advanced technologies to reduce attrition by offering growth potential.

**27. According to Imna and Hassan (2015),** health and safety, career development, and reward and recognition influence employee retention.

**28. Lyons et al. (2015)** assessed five types of career moves across generations. Organisational mobility, upward mobility, downward mobility, lateral career moves, and career track changes were among the career moves. Baby boomers changed jobs less frequently than Millennials and Generation Xers. On the other hand, millennials had more career moves per year than Generation Xers.

**29. (Lyons et al., 2015)** Organisational leaders need to use different retention approaches in managing each generation, particularly Millennials, who have many qualities that distinguish them from previous generations.

**30. According to Kim et al. (2015),** managers who offer a good coaching relationship by understanding the employee, creating an environment where positive reviews can be given, and building trust are more successful in retaining talent.

**31. Ajay Kumar G and M. Srinivasa Reddy (2016):** According to them, organisations should focus on Rewards and Recognition strategies to implement a strong employee retention policy. Organisations should prioritise employee orientation strategies because they will help employees adapt to the organisation's culture, environment, and technology by training employees on policies, procedures, and projects, among other things.

**32. Satpal and Manju Dhillon (2016),** The retention of valuable I.T. workers is becoming increasingly difficult due to the complicated needs of the work, as well as management's inability to understand their needs, leading them to change jobs. They discovered that the work environment, family problems, compensation, and relationship with superiors are the most key aspects to consider when intending a job change for an I.T. practitioner.

**33. Sharma (2016)** conducted a multinational response analysis of employee retention in the I.T. industry and discovered a gap between organisational efforts to retain employees and employee perception. He also concluded that career development, training and development, supportive managers, competitive pay, flexible timing, and open communication could help to retain professionals in the I.T. sector.

**34.** Employees want post-retirement benefits, pensions, provident funds, and gratuities, according to **Bhaduri (2016).**

**35. Hemalatha (2016)** investigated job hopping among women in the I.T. industry and discovered that women have more demanding work schedules, maternity or parenting issues, family life conflict, and advancement or networking issues when it comes to job hopping.

**36. Bussin (2016)** investigated how economic factors influence I.T. employees' job-hopping behaviour. Sex, age, and earnings all have an impact on job hopping. It was also observed that people between 30 and 40 years frequently quit their jobs.

**37. According to the findings of a study conducted by Eddy Madiono Sutanto and Milly Kurniawan (2016),** strategic design and application of recruitment and selection practice influences employee retention).

**38. Employee satisfaction is essential to any effective employee retention strategy, according to Latha Lavanya (2017).** H.R. professionals in I.T. must be flexible in developing, empowering, and maintaining their talent pool. I.T. management must effectively communicate I.T. policies to their employees. The company must focus more on working conditions and safety measures to attract and retain talent.

**39. Syed Mansoor Pasha and Badiuddin Ahmed (2017) researched "Talent Management Strategies in I.T. Industry".** They concluded that the service and information technology sectors are people driven and thus need proper employee management. Talent management is a critical practice for attracting the right people to an organisation.

**40. Lake et al. (2017)** discovered that career advancement and work environment are the primary reasons for frequent job changes. Those development motivations are associated with positive proactivity (growth needs strength, persistence) in a boundaryless career.

### Research Methodology.

**(i) Research Topic:**

“A study on Attrition Analysis and Talent Retention Strategies for Millennials in IT Industry with special reference to Saurashtra Region.”

**(ii) Research Objective:**

- To Know Attrition rate of Millennials in IT Industries.
- To Identify causes of Attrition among Millennials in IT Industries
- To study existing retention strategies of IT industries
- To suggest retention strategies for retention of millennials working in IT industries.

**(iii) Data Interpretation and Analysis**

The interpretations are listed here along with tables and write-up in the following sequence: - Research on Attrition and retention of Millennials - Overall analysis - Analysis about factors which are connected with retention practices for Millennials.

### Tabular Form of Review of Literature.

Paper	Research Problem	Findings
International Journal of Advance Research in Computer Science and Management Studies Vibha Gupta IIPS DAVV Indore – India	An Analysis of Attrition: Retention strategy for IT/BPO Industry	On the other hand, this study focuses on how softer factors such as organisational culture, inconsistent shift timings, and motivational factors influence employee attrition. This sector's traditional culture now necessitates a change in approach. Concerns can only be resolved by modifying workflow patterns, implementing more efficient tracking systems, improving training procedures, or employing more selective hiring practices.
Elite Research Journal of	Talent Attrition and Retention: Strategic	The causal link between higher attrition, higher compensation packages, and operational expenses must

Accounting and Business Management Lichia Yiu1, Ray mond Saner	Challenges for Indian Industries in the Next Decade	be reconsidered. If not, steadily increasing attrition rates will erode India's comparative advantage in the global market and Indian companies' ability to capture new markets, whether domestic or foreign.
journal homepage: Harikumar Pallathadka, V. Hari Leela, Sushant Patil, B.H. Rashmi, Vipin Jain, Samrat Ray	Attrition in software companies: Reason and measures	Employees will not leave or quit if given a good working environment. Offer employees growth, engagement, reward, recognition, and a competitive salary.
International Journal of Marketing and Human Resource Management (IJMHRM) R. Anbu Ranjith Kumar Dr. V. Antony Joe Raja	a study to reduce employee attrition in IT industries	The I.T. sector can retain employees and reduce attrition by addressing two major causes: a chance for development, growth, and salary. A competitive salary should be offered.
International Journal Of Core Engineering & Management (IJCEM) Dr. Shine David Saakshi Kaushik, Harshita Verma,	Attrition in "IT" Sector	Excessive stress due to high work pressure is one of the reasons for attrition in the I.T. sector. Workload has forced people to leave jobs and has emerged as the most commonly cited cause of attrition. It can be reduced by organising different management games and cultural activities related to employees' hobbies and fostering a positive environment.

Shivani Sharma		
IJRSS November 2012 Volume 2, Issue 4 J. Vijayakumar	the retention strategies of employees of IT industries	The majority of organisations use monetary strategies such as performance-linked incentives, rewards, and salary increases. Non-monetary practices are also being used to keep employees. These practices include job rotation, job enrichment, exit interviews, management participation, public recognition of accomplishments, etc.
Asian Journal of Management and Commerce 2021 Karishma Gajendra, Dr. J Gajendra Naidu, Kishore Jatty Gajendra and Kishan Jatty Gajendra	A study of employee attrition and retention strategies with special reference to telecom sector in Tamil Nadu	Knowledge workers in today's world are concerned with continuously improving their skills and competencies and, as a result, look forward to assisting in this regard. Failure to do so by bosses leads to employee dissatisfaction and exit.
Mukt Shabd Journal ISSN NO 2347-3150 Vinaya Saraf Dr.Milind Arun Peshave	an analysis on employee-attrition in IT industry	Young talent desires to work on cutting-edge technology and functional domains. Brand names or geographical locations less influence I.T. professionals in their early careers.
International Journal of Advance Research in Computer Science and Management Studies Dr. Pooja Jaiswal	A Study on determining factors of Employee Attrition and Retention	If the organisation attempts to frame its policies and practices so that employees feel valued, satisfied, and motivated, they will remain with the organisation. It is also necessary to align strategies with H.R. practices.

<p>Review of Public Personnel Administration Khalidoun AbouAssi, Jasmine McGinnis Johnson<sup>2</sup>, and Stephen B. Holt<sup>3</sup></p>	<p>Job Mobility Among Millennials: Do They Stay or Do They Go?</p>	<p>Aspects such as the time it takes to review, interview, and select candidates, as well as the eligibility requirements used in selection, may cause public and non-profit organisations to overlook qualified candidates, especially in good economic times when job seekers may receive competitive rates quickly.</p>
<p>Research-Technology Management Marcie Zaharee, Tristan Lipkie, Stewart K. Mehlman, &amp; Susan K. Neylon</p>	<p>Recruitment and Retention of Early-Career Technical Talent</p>	<p>The results indicate that the variations between millennials and previous generations, at least in terms of workplace preferences, have been overstated—both early- and late-career professionals want comparable workplace characteristics and career opportunities.</p>
<p>CALIFORNIA STATE UNIVERSITY, NORTHRIDGE</p>	<p>Workforce Generational Differences, Leadership, and Employee Turnover: Focus on Millennials Retention</p>	<p>Job hopping harms businesses. Retaining employees necessitates effective leaders who assist organisations in creating and maintaining a high-performing environment. Leaders play the most important role in establishing an organisational culture and must be constantly trained to enhance their leadership abilities.</p>
<p>International Journal of Entrepreneurship</p>	<p>redesigning the retention strategy against the emerging turnover of generation y: revisiting the long-standing problems from 20th to 21st century</p>	<p>There are no viable options for integrated retention policies and strategies. Active friendly involvement by leadership and management should be instilled, in addition to meeting criteria such as soft HRM, work-life balance, and ethical climates.</p>

Human Behavior, Development and Society Stamford International University, Thailand	A Study of Millennial Job Satisfaction and Retention	Offer to coach and mentor in a challenging, empowering, and meaningful job that allows for a work-life balance while collaborating with excellent colleagues and earning a competitive salary.
Article in Test Engineering and Management June 2020	Work life Balance of Millennial Dual Career Couples and its Impact on Organizational Culture: An Explorative Study in Textile Sector of Gujarat	Employees nowadays are so used to juggling multiple tasks that they may find themselves unable to finish all tasks in the allotted time. Anxiety and depression have increased as organisational stressors such as longer work hours, no job security, role overload, and role ambiguity has increased. This generation dislikes ambiguity and risk; they seek direction and clarity from their employers and become concerned when they do not receive it.
International Journal of Scientific & Engineering Research	Attrition Issues and Retention Challenges of Employees	Organisations should promote an environment that supports ample opportunities for growth, appreciation for the work done, and a friendly collaborative environment that helps make employees feel connected to the organisation in every way.
International Journal of Research in Business Management	employee attrition and retention in a global competitive scenario	Organisations must recognise that each employee is important and that, with time, their additional experience makes them even more useful.
European Journal of Business and Management	Assessment of individual and propel intention for job attrition on software Industry- Voice from software employees in Bangalore city, India	Employees resigned because the organisation did not meet their expectations.
International Journal of	A Study of Attrition in IT Industries In Pune	The voluntary attrition rate is high between the ages of 24 and 28. I.T. professionals with 2-4 years of



Advanced Research (2014),		experience have more opportunities for advancement, which is the primary reason for voluntary attrition.
International journal of Science Technology and Management Manju Dhillon	Attrition in Indian IT Sector	When an employee decides to leave his job, several factors contribute to his decision. These elements include organisational culture, social support, work-life balance, job stress, friendship relationships, management policies, and career options.

### Research Gap.

- Several Authors have conducted survey and identified about employee attrition in the organization. Also, there are several studies related to retention strategies adopted by IT industries., even though there are a number of studies examining the aspect of employee retention and employee attrition strategies but limited work has been done especially for retention of millennials in an organization.
- Keeping this research as the base, researchers can find retention strategies among employees of multi-generations, and strategies for different sectors.
- Analysing the existing studies, this study investigates about the various dimension for employee's attrition and give insight to HR manager about how to frame effective retention strategies specially to retain millennials (fast trackers) in an IT industry.

### Research Limitation.

- I have taken and cover only 20 research paper
- Only secondary source of data collection has been used.
- Research Papers which were used as source of data those are vary from each other in terms of many geographical context.

### Conclusion.

Attrition and retention are major concerns for organisations in this global marketplace, where talent is the main competitive factor. If the company tries to frame policies and practices so that employees feel valued, satisfied, and motivated, it will be beneficial. They must also align strategies with H.R. practices (i.e., recruitment and selection, training and development, performance appraisal and compensation). If any strategy does not align with these practices, it will give no results. Organisations should also look at other aspects such as job satisfaction, work-life balance, career progression, and compensation and benefit.

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## **A study on analysis of the relationship between Portfolio Turnover, Experience, Expense Ratio, and Tenure of the fund manager with Performance of Thematic Mutual Funds**

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### **ABSTRACT**

This study compares three thematic mutual funds' performance from March 2009 to December 2018. We have taken quarterly data for these years for evaluation and research. The returns of the plan were compared to four factors, including portfolio turnover, expense ratio, fund manager tenure, and experience. Mutual fund returns are the dependent variable, and each of these independent variables has a significant impact on it. We discovered some interesting results after using the Pearson Correlation Coefficient approach on the data we had gathered. According to the study, of the four variables, portfolio turnover and historical fund performance had a positive correlation with returns whereas fund age and tenure of the fund manager had a negative correlation. We believe that this study will be very beneficial in understanding the impact of these variables on fund's return.

### **KEYWORDS**

*Mutual funds, performance evaluation, portfolio turnover, expense ratio, experience, tenure of the fund manager*

### **INTRODUCTION**

Since the Unit Trust of India was founded in 1963, the mutual fund sector in India has experienced remarkable expansion. In ten years, the Assets Under Management (AUM) of the Indian mutual fund sector has tripled. AUM surpasses Rs. 10 million in 2014. The folio count has climbed over the past 72 months in a row. All of this demonstrates how mutual funds have developed as an investment choice and are becoming more popular with Indian regular investors. Reviewing the performance of mutual funds is crucial given this major change in mutual fund preferences. The association between several variables, including portfolio turnover, expense ratio, experience, and fund age, is examined in this study. All of these variables are compared with returns with the purpose to find the correlation among them.

Sources: AMFI (Association of Mutual Funds of India)

## REVIEW OF LITERATURE

Irwin, Brown FE (1965) analysed the issue in terms of investment policy, portfolio turnover rate, mutual fund performance and its impact on stock markets. They found that mutual funds had a significant impact on stock price movements. They concluded that there was no lasting relationship between portfolio turnover and fund performance.

Howell, Michel. (2001) found very interesting results in his research. He found that a 10% increase in a manager's age/maturity reduces potential return by 0.4%. This study showed a negative relationship between age and back.

Ippolito (1989) found an insignificant relationship between sales and returns, indicating that frequent portfolio changes produced sufficient additional return to cover higher transaction costs.

Medhanie G. Mekonnen (2017) attempted to find the relationship between investment fund type, portfolio turnover, duration, management turnover and performance. In the end, the result was very interesting, and they found that mutual fund longevity and management turnover explained no significant change in mutual fund risk-adjusted performance.

Vinita Bharat Manek (2016) studied growth-oriented open diversified equity funds. The purpose of the article was to find the effect of portfolio turnover on mutual fund returns. According to the results, portfolio turnover has a significant effect on plan performance. It is weakly positively correlated. Higher portfolio turnover allows the manager to outperform benchmarks and indices.

Sheng-Ching Wu (2014) reviewed the article to investigate the interaction between mutual fund performance and portfolio turnover. The results indicated that funds with a higher portfolio perform worse than funds with a lower portfolio turnover rate. The results supported the hypothesis that active trading affects performance.

## RESEARCH GAP

After consulting several studies, we found that there are not very significant studies on thematic funds and their performance. We also have found that some of the important attributes, such as experience or ownership of fund managers, need more attention as they play a very important role in generating returns for mutual funds.

## RESEARCH METHODOLOGY

To examine the performance of mutual funds, three thematic schemes of infrastructure mutual funds were selected for at least ten years since their inception. For study purposes, we took the data from 2009 to 2018 (ten years). Data was collected on a quarterly basis for each year. The entire study was based on secondary data published by mutual fund companies. The data was collected from the monthly fund factsheet on the AMFI website ([www.amfiindia.com](http://www.amfiindia.com)). we

applied the statistical technique of Pearson's correlation coefficient to determine how closely the variables are related to each other.

### **OBJECTIVE OF THE RESEARCH**

The present study is concerned with the following objective:

To assess the effectiveness of particular plans based on factors including portfolio turnover, expense ratio, experience, and tenure of the fund manager, and to determine the relationship between these factors and return.

### **SIGNIFICANCE OF STUDY**

This study will help investors understand the different variables and their impact on mutual fund returns. we strongly believe that this knowledge can be further used for the selection of various mutual fund schemes for investments.

### **DATA COLLECTION AND SOURCES**

We have considered Three Thematic Mutual Fund Schemes:

1. Invesco India Financial Services Fund
2. HDFC Infrastructure Fund
3. SBI Infrastructure Fund

Source: <https://www.amfiindia.com/investor-corner/online-center/trackmfinvestment.html>  
(AMFI India website)

### **THEORETICAL FRAMEWORK**

#### ***Portfolio Turnover***

Portfolio turnover is a measure of how quickly a fund's securities are bought or sold by fund managers over a given period. The turnover rate is important for potential investors to consider, as higher yielding funds will also have higher fees to reflect the cost of turnover. High yield funds are generally subject to capital gains tax, which is then distributed to investors who may have to pay tax on those capital gains. Growth funds and all actively managed mutual funds generally have higher turnover rates than passive funds. There are certain scenarios where the higher turnover rate results in a higher total return, mitigating the impact of additional fees.

#### ***Expense ratio***

An expense ratio (ER), also known as a management expense ratio (MER), measures how much of a fund's assets are spent on administrative and other operating expenses. An expense ratio is determined by dividing a fund's operating expenses by the average dollar value of assets under management (AUM). Operating costs reduce fund assets and therefore returns to investors.

***Experience of Fund Manager***

The best part about investing in mutual funds is that the funds are professionally managed. This is why fund managers play an important role in the world of investment and finance. A well-trained manager can ensure that their fund outperforms its competitors and benchmarks. In general, expectations are higher, experience leads to higher returns.

***Tenure of the Fund Manger***

The management mandate is the duration during which a manager or a team has managed a mutual fund scheme. A management tenure of five to ten years is considered an important indicator of a fund manager's investment capacity. It is important for an investor to select a fund whose management is responsible for the success and remains at the helm of the fund. The management mandate is greater for actively managed funds than for passively managed funds. The longer the discretionary mandate, the stronger the correlation with a fund that is not lagging.

**HYPOTHESIS**

Ho: There is no significant relation between Portfolio Turnover and Fund Returns.

Ho: There is no significant relation between Expense Ratio and Fund Returns.

Ho: There is no significant relation between Experience of the Fund Manager and Fund Returns.

Ho: There is no significant relation between Tenure of the fund manager and Fund Returns.

**ANALYSIS AND INTERPRETATION**

We applied Pearson's correlation coefficient technique to establish the relationship between different variables and returns. The value of the correlation coefficient is between -1 and 1. The higher the value of the coefficient, the stronger the relationship between the variable.

Size of Correlation	Interpretation
.90 to 1.00 (-.90 to -1.00)	Very high positive (negative) correlation
.70 to .90 (-.70 to -.90)	High positive (negative) correlation
.50 to .70 (-.50 to -.70)	Moderate positive (negative) correlation
.30 to .50 (-.30 to -.50)	Low positive (negative) correlation
.00 to .30 (.00 to -.30)	negligible correlation

source: towardsdatascience.com

After applying correlation technique, I found following results.

**Portfolio Turnover and Return**

Sr. No.	Schemes	<i>Portfolio turnover</i>
1	Invesco India Financial Services Fund	0.7833
2	HDFC Infrastructure Fund	0.5652
3	SBI Infrastructure Fund	0.2108

**Expense Ratio and Return**

Sr. No.	Schemes	<i>Expense Ratio</i>
1	Invesco India Financial Services Fund	-0.1250
2	HDFC Infrastructure Fund	-0.0322
3	SBI Infrastructure Fund	-0.7977

**Experience of the Fund Manager and Return**

Sr. No.	Schemes	<i>Experience</i>
1	Invesco India Financial Services Fund	0.8382
2	HDFC Infrastructure Fund	-0.7871
3	SBI Infrastructure Fund	-0.0211

**Tenure of the Fund Manager and Return.**

Sr. No.	Schemes	<i>Tenure of the fund manager</i>
1	Invesco India Financial Services Fund	0.8947
2	HDFC Infrastructure Fund	-0.6358
3	SBI Infrastructure Fund	0.5424

**FINDING AND SUGGESTIONS**

After analysing the data, I found significant relationship between the variables.

*Portfolio Turnover and Return*

We found, positive relationship in two out of three mutual fund schemes. It is as high as 0.7833 in Invesco Fund, in HDFC Infrastructure Fund which is moderately positive where as it is as low as 0.2108 in only one SBI Infrastructure Fund scheme. Overall result shows positive relationship between Portfolio Turnover and Return.

*Expense Ratio and Return*

After analysing the data, we found negative relationship between Expense ratio of the fund and return in all three Schemes. It is as low as -0.7977 in SBI Infrastructure Fund whereas it is -0.03022 in HDFC Infrastructure Fund. Overall, it shows moderately negative relationship between the mentioned variables.

*Experience and Return*

With the Pearson correlation coefficient, we found Moderately Negative relationship between Experience and Return as -0.7871 in HDFC Infrastructure Fund which very significant while it is positive at 0.8382 in SBI Infrastructure Fund. Overall, we found moderately negative relationship between the two variables.

### *Tenure of the Fund Manager and Return*

While analysing Tenure of the fund manager and return we found positive relationship between the variables in SBI Infrastructure Fund at 0.5424 while it is moderately negative in HDFC Infrastructure Scheme at -0.6358. In Invesco India Financial Service Fund, it is strongly positively correlated at 0.8947.

Overall, we can say Return is Positively Correlated with Portfolio Turnover while it is neutral with tenure of the fund manager. When return is compared with Expense ratio and Experience of the fund manager it is moderately negatively correlated.

### **CONCLUSION**

The research conducted yielded significant results, but we believe provided tremendous opportunities to further explore these multi-sample variables. We think there are other variables that could be explored further such as the aging of the fund, the plans managed by the fund manager, etc. and we are sure that will also have a significant relationship with the performance of the fund.

We firmly believe that the result obtained will be very useful for investors in making investment decisions. Since the mutual fund industry offers a variety of funds and schemes, it is very important for the investor to make a decision considering all the aspects involved. This search result will definitely help in making that decision.

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## **Pathways To Internationalise Indian Higher Education – Exploring Stakeholder’s potential**

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### **Abstract**

The internationalization of higher education has become an essential aspect of the global education system, and India is also striving towards it. The Indian higher education system is one of the oldest and largest education systems of the world and has evolved substantially over the past few decades. However, when it comes to internationalization of higher education in India there is scope for development, as part of which various measures have been undertaken by key stakeholders by opting for numerous strategies and policy measures.

This study explores the potential of stakeholders, including universities, government that have dispensed a primary role in the internationalization of higher education in India. The research work employed an exploratory research approach, where information was collected through available literature and document analysis. The findings suggest that stakeholders' involvement in internationalization is essential, and they can contribute in various ways, such as promoting international collaboration, creating opportunities for students and faculty to study and research abroad, scholarship opportunities and developing a globally competitive curriculum.

*Keywords: Internationalization of Higher Education, Student Mobility, Faculty Mobility*

### **Introduction:**

Internationalisation of higher education has been defined by the United Nations Educational, Scientific and Cultural Organization (UNESCO) as one of the methods through which education responds to various opportunities and challenges that includes elements like curriculum, learning, institutional agreements, faculty mobility, student mobility and such related operations. Internationalisation can be referred to as a process of integrating an international dimension to the teaching learning process with the purpose or function of inculcating the same within higher education with the aim of facilitating specific mandates and missions, that are defined as part of these internationalisation programmes (Rajkhowa, 2017) (OECD, 2012).

Consequently, in pursuance of above, the researcher under will determine under this study, the extent of internationalisation within India and higher education while highlighting the role of key stakeholders in facilitating the initiations development implementation of these internationalisation programmes with the aim of developing Indian higher education at par with internationalisation programmes of leading foreign nations.

### **Evolution of Indian Higher Education:**

Indian higher education system is recognised as one of the largest across the globe, which has today gone through considerable changes during the past many decades. Therefore, higher education within India was found to be deep-rooted within Vedic studies that cover a wide range of subjects including commerce, grammar astrology, mathematics and medicine. During the Vedic period they were Gurukuls which were recognised as the centre of learning where in learners lived and learnt from their respective gurus. However, the Vedic period last till 680 after which with the advent of Mughals during the year 1526 Madarsas were established with were recognised as Islamic institutions of education in India that taught grammar, mathematics, law and philosophy to the students. The true evolution of Indian education began during the pre-independence era when the Britishers introduced the system of Europe in higher education system, which further recognised English as a medium of instruction. Therefore, the very aim of the Britishers was to establish English educated human resource so as to serve the British administration (Cuesta Medina, 2022).

### **Indian Education Post-Independence Period:**

Once India became independent on 15th August 1947, it was left with a very small and imbalanced system of higher education with only 20 universities and 500 colleges. The first committee of independent India was formed was the university Education committee of 1948 founded by Radhakrishnan, which was formed to oversee the most crucial aspects of education and provide recommendations for improvements.

However, in order to transform the Indian higher education system the first National Education Commission or the Kothari Commission was formed in 1964 followed by the National Policy on Education in 1968 which was formed based on the recommendations of the Kothari Commission (Cuesta Medina, 2022).

It shall be recognised that the Indian higher education system has truly evolved today with recent trends in higher education reflecting upon the significance of high-quality education within the Indian economy under which Indian universities and the government both have undertaken measures for creating opportunities through which not only students that are studying in India could gain, but at the same time students from across the globe could also be attracted, something which can be achieved with extremely proficient and internationalise higher education programmes (Cuesta Medina, 2022).

### **Recognising The Role Of Indian Educational Institutions in Transforming Indian Higher Education:**

In India there have been various universities that have entered into MoUs (memorandum of understanding) with numerous universities across the globe for facilitating the internationalisation of education. Universities have tied up with more than hundred

international universities through which the university is now able to offer its students in India such internationalisation programmes, which provides a wide exposure to students in terms of the curriculum which is offered under these programs. There are also many universities in India that have partnered with foreign universities to provide dual degree (Knight, J. ,2014).

### **Facilitating Faculty Mobility:**

Another major contribution of Indian universities towards internationalisation of Indian higher education is in the form of faculty mobility through which Indian faculties are encouraged to enter into research collaborations with foreign universities (Yeravdekar and Tiwari, 2016). Through faculty mobility the professors which are sent overseas are able to develop more knowledge upon internationalised education and this can further result in enhancing their skills within a particular program which in turn can help in improving the overall quality of education within Indian universities (Godwin, Wit and Rumbley, 2019).

The technical know-how that are learnt by these faculty members in foreign universities can potentially be gained by the faculties during these faculty mobility programmes and accordingly these best practises can then be used by the faculties for facilitating an internationalised learning process, that can significantly uplift the quality of education across Indian universities from grassroot level (Knight, J. ,2014).

### **Establishing of Offshore Branch Campuses:**

Another way through which universities are contributing towards internationalisation of Indian higher education is by setting up their campuses in foreign nations wherein Indian and foreign students that are located in other countries can in fact enrol themselves in these offshore campuses and accordingly benefit from the higher education programmes of these Indian universities which provide for both high quality education and at the same time exposure to opportunities in terms of dual degree programmes and extensively developed education hubs which facilitate initiatives that can allow the Indian students studying abroad to enrol themselves at Indian University , thus allowing them to gain higher education without any linguistic barrier or cultural barrier (Chattopadhyay, Marginson and Varghese, 2022) .

### **Factors Influencing the Internationalisation of Indian Higher Education Programmes:**

Internationalisation of Indian higher education programmes have been influenced significantly by various factors which have had both a favourable and non-favourable impact upon the internationalisation of higher education within the country. Consequently, below is an analysis of these factors which shall be taken into consideration by the key stakeholders, for undertaking measures through which the internationalisation of Indian higher education could be at par with developed nations that are leading in internationalised education programmes:

**a. Objectives of Internationalisation:**

There are two key objectives with which the Indian government aims at internationalised higher education and these are primarily concerned with extension of diplomatic relation and secondly with enhancing the quality of domestic education which is provided to Indian students for the purpose of uplifting the current rank of India in the list of some of the best global universities across the globe when it comes to higher education. Therefore, these objectives definitely influence the position of the country in terms of it becoming a favourable destination for foreign students, through numerous programmes which aim at providing high quality education to both Indian and foreign students that are enrolled in Indian universities (Vargese, 2020).

**b. Availability of Scholarships:**

Another factor which can significantly influence the position of Indian higher education in the internationalisation across the globe is availability of student support. Therefore, one of the key objectives which have been undertaken by the Indian government for supporting students across the globe through its higher education programmes is the launching of scholarships which are expected to grow up to 50,000 by the year 2024. Therefore, not only this but Indian government is also striving to attain permit from foreign universities to establish their campus branches across India, an added advantage which can contribute to the potential of Indian higher education to attract more foreign students from across the world (Vargese, 2020).

**c. Absence of Internationally Relevant Curriculum:**

Internationalisation of Indian higher education is also restricted owing to the poor teaching standards as well as limited number of foreign faculty that is employed in higher education institutions across various states in India. Therefore, these poor teaching standards and lack of highly qualified foreign faculty is due to the extremely slow administrative process which restricts foreign faculty to teach in Indian universities for only a fixed and short duration (Vargese, 2020).

**d. Promote Student Mobility:**

A favourable factor which can aid in enhancing internationalisation of higher education in India is launching of the global initiative for academic network which attracts 1800 scholars from more than 56 countries to offer courses across the country during the year 2017-18 and 2018-19. Not only this, but the program was also promoted extensively by the government with the aim of increasing mobility of Indian faculty to teach across universities that are placed in leading foreign countries when it comes to higher education. Furthermore, there was another major initiative launched by the Indian government titled PM scholars returned to India, which aimed at bring all the leading Indian scholars which had already settled in abroad, country so as to fetch the talent which had left the country, by providing them with enough opportunities

in Indian higher education institutions wherein they could train students and offer technical know-how across universities in the form of various courses and programmes (Vargese, 2020).

**e. Collaboration with Foreign Universities:**

Collaborating with foreign universities can definitely allow our country to enhance the standards of their higher education and so India is been doing the same through the initiation of a scheme namely, the scheme for promotion of Academic research in collaboration which was launched during the year 2018 with the aim of promoting a collaboration between Indian higher educational institutions and reputed institutions abroad.

This kind of an institutional collaboration can definitely help Indian universities in enhancing the very credibility of their institutions by increasing international publications of India and faculty members and adding to their qualification of teaching abroad at reputed institutions which are today known for higher education standards and quality. One of the major steps which was undertaken by the Indian government towards the collaboration with foreign university was the MOOC Platform, a study webs of active and aspiring minds where in courses are provided to foreign students in the UK and South Africa, with the aim of enrolling the students courses that are offered in the form of an open University format.

**Key Stakeholders of Higher Education in India:**

The internationalisation of higher education in India has definitely helped in the expansion and globalisation of education within the country further resulting in opening borders for FDI in the field of higher education by various universities across the globe that can further help and support students to gain higher education from reputed foreign institutions within the country. Therefore, it shall be considered that when it comes to key stakeholders in terms of Internationalisation of higher education then there are two key systems which propel the same and these are:

**a. Inbound supportive system:**

The inbound support system is the one which is undertaken by the government when the government itself is the key stakeholders which initiates measures ,initiatives and policies for strengthening institutional capabilities of higher education institutions so as to make the courses which are provided by them capable enough to cope up with the standards of higher education which is otherwise offered internationally by recognised institutions (Kumar P. M. and Aithal, 2021).

As mentioned above the Indian government has not only initiated campus collaboration with foreign Universities but it has also facilitated the mobility of Indian professors , further

ensuring that they could gain the required skills ,knowledge and standards which can further enable them to educate Indian students with these high standards of internationalised higher education system. The government and the universities come together to establish a competitive environment within the country when it comes to higher education which can further ensure that better quality education is being provided, wherein every institution is contributing towards the standard of education and this can also result in achieving the international standards which are still not achieved by the Indian universities (Kumar P. M. and Aithal, 2021).

When it comes to support systems then too key stakeholders like the government and the universities can both provide support to foreign students to opt for higher education within India by providing them with scholarships, dedicated skill development programmes as well as post programme employment opportunities, all of which can reinforce a positive behaviour amongst the students to choose higher education programs that are offered by Indian universities.

Last but not the least, all the constraints that restrict foreign students from opting for Indian universities when it comes to higher education shall also be removed. Long-term interest on education loans , bureaucratic involvement and lack of orientation programmes, all of these can be removed by both the universities and government which are the key stakeholders when it comes to the imposition or removal of these constraints from the higher education system.

#### **b. Outbound Supportive System:**

When it comes to the outbound support system then providing students with suitable infrastructure, experienced faculties as well as innovative and effective teaching methods across developed countries, in overseas campus of these universities is recognised as an important aspect of internationalisation of education within India. Therefore, the students after returning from the developed nations would be able to provide for better knowledge to the existing students (Kumar P. M. and Aithal, 2021).

By providing economic advantage to Indian students so as to gain foreign education, key stakeholders like the government as well as the students themselves will be able to benefit substantially, by gaining strategic knowledge which may otherwise lack across the courses and programmes are offered in Indian universities (Kumar P. M. and Aithal, 2021).

#### **Future of Internationalisation within Indian Higher Education System:**

An integration of an outbound and inbound supportive system by the stakeholders will definitely act as an amalgamation of opportunities that can be utilised by the stakeholders towards a more secure future for the Indian higher education system. With experienced students, which possess required technical knowledge from leading universities in developed nations, all of this will be able to secure knowledge which can further be utilised towards

training and teaching students across the Indian higher education system. In light of this inbound and outbound support system, the government and universities will be able to empower the inbound support system which in any way aims at uplifting the interest of students by promoting educational courses and programmes across local universities in India, backed with such infrastructure, facilities and faculty that are well trained to keep up with international standards of education, through both tie-ups with international universities and collaboration with recognised international institutions through either establishment of their branch or programmes within India.

**Recommendations:**

On the basis of the above analysis, below are the recommendations which can be integrated and implemented by the key stakeholders of the Indian higher education system so as to enhance the process of internationalisation of higher education across Indian higher educational institutions:

a. Training faculty across Indian universities and sending them to international universities which are found to be leaders in higher education can definitely benefit the Indian education system in terms of the knowledge that they can gain while being trained overseas.

b. Providing scholarships to foreign students can definitely act as a positive stimuli which can further facilitate more mobility of international students towards Indian higher education programmes (Bhandari and Blumenthal, 2010).

c. Providing scholarships to students which are willing to study abroad and accordingly using their skill development and talent acquisition after the completion of the courses can further act as a significant aspect in uplifting the status of internationalisation across higher educational programmes within India, so that Indian students can come back and train the faculty with the necessary skills, knowledge and technical know-how (Bhandari and Blumenthal, 2010).

d. To uplift the standard of Indian higher education and attract more student, it is important for the Indian government to continue seek and undertake research and development for the purpose of enhancing the infrastructure that is being used across Indian universities, so as to ensure that the knowledge and skill that is acquired by Indian faculty overseas can be utilised optimally through this highly upgraded and efficient educational technology and structure.

e. As recognised above amalgamation of inbound and bound support system can act as a positive stimuli which can provide for a stimuli for the rapid upgradation system of internationalisation ,through which India can send its students overseas for acquiring

knowledge and at the same time attract students mobility by encouraging more students to enrol themselves at Indian universities for availing scholarships and securing employment opportunities that can be guaranteed under these HE programmes.

### **Conclusion:**

The above study reflects upon the extent to which Indian higher education has evolved so as to adopt and adapt to such higher education standards which can bring the standards of Indian higher education at par with the standards of higher education that are being followed across developed nations. However, it shall be considered that the route to internationalisation of Indian higher education, make it mandatory for key stakeholders, to come together and facilitate improvement within the higher education system through favourable policies, initiatives and measures, that can attract foreign student mobility and at the same time allow collaboration between Indian HE institutions overseas, for allowing the acquisition of prerequisite knowledge when it comes to standards and quality of courses which are being offered amongst leading institutions in developed countries across the globe. Ultimately, it is all about the outbound and inbound pathways, which can generate an influx of foreign students and accordingly cause an outflow of Indian faculty, for creating a clear balance in terms of acquisition of skills and upliftment of HE programmes across Indian universities.

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## **An exploratory study on Buyer's behaviour while purchasing a helmet in the Saurashtra region**

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### **Abstract**

According to Section 129 of the Motor Vehicles Act, 1998, "Every person, above four years of age, driving or riding a motorcycle of any class or description, shall, while in a public place, wear protective headgear conforming to the Bureau of Indian Standards. The Two-wheeler automobile market of India is one of the most competitive markets in the world and also has emerged as one of the largest automobile markets in the world. In the current paper, an attempt has been made to examine various factors that affect the buying behaviour of consumers while selecting a helmet. Primary data was collected from people of different ages, occupations, gender and etc. of the Saurashtra region through a structured questionnaire and further data were analysed using various statistical tools to derive a meaningful conclusion. So this study of consumer purchasing behavior will help everybody as all are consumers and so it is essential for a marketer to understand which factors affect the most for the consumer while they purchase the helmet. And this will help the marketer to formulate different marketing strategies.

**Keywords:** *Bureau of Indian standards, consumer, buying behavior, helmet, marketing strategies.*

### **INTRODUCTION**

The marketing concept is consumer, placing a greater emphasis on the consumer than the product. Modern marketing focuses on increasing profits while somehow satisfying customers, whose wants and preferences must be in line with the diversity of goods and production plans. As a result, the effectiveness of marketing rests on its capacity to foster a group of gratified customers. The business operations should satisfy customer needs.

A variety of factors influence consumer behaviour, comprising personal and professional interests, attitudes and beliefs, personality traits, social, economic, and cultural background, age, gender, professional standing, and numerous social forces from friends, family, colleagues, and the wider community. A combination of all these factors helps the buyers in decision-making. Moreover, Individual consumer needs, motivations, perceptions, attitudes, learning mechanisms, and personality traits are examples of psychological aspects that work in general across different kinds of individuals and affect behaviour.

With the help of 180 samples of customers who either wished to buy a helmet or were already using that one, a study on "Buyer's Behavior While Purchasing a Helmet in Saurashtra Region" was done. Data were gathered through structured questionnaires.

The marketing concept begins and ends with the consumer. The most important goal of a business enterprise is to satisfy the consumers. Understanding consumer behaviour, preferences, dislikes, expectations, and driving forces is key to ensuring customer happiness. It is particularly helpful to analyse customer behaviour in terms of consumption patterns, preferences, motivations, buying processes, and purchase behaviour while developing a company's marketing plan.

So the final objective of a business firm is to develop a consumer who is said to be the centre around whom the entire business of a firm revolves.

The marketing concepts are majorly consumer-oriented and hence stress more on the consumer rather than on the product. A consumer's decision to purchase a particular brand of helmets mostly relies on the shape of the product, promotion, and price and distribution strategy.

### **MAJOR FACTORS INFLUENCING BUYING BEHAVIOR**

Many factors are responsible for buyer behaviour. Consumer behaviour refers to the selection, purchase and consumption of goods and services for the satisfaction of their demands. Different processes are involved in consumer behaviour. Firstly consumer tries to search what commodities he would like to consume, then he selects only those commodities that promise greater benefits. After selecting the commodities according to the available money which can be spent, the consumer makes an estimation. Last but not least, the customer evaluates the current prices of goods and decides which goods he should buy. Meanwhile, a number of other factors, such as marketing, interpersonal, social, cultural, personal, and psychological ones, affect customer purchases.

**Marketing Factors:** Each element of the market mix – product, pricing, promotion and place has the potential to affect the buying process at various stages.

**Personal Factors:** The personal factors of a consumer may affect the buying decisions. Personal factors include age factor, gender, education, income -level, Status' in Society and other personal factors such as personality, lifestyle, family size, etc., which influence consumer behaviour.

**Psychological Factors:** A person's buying behaviour is influenced by psychological factors such as learning, attitudes, motives, perception and beliefs.

**Situational Influences:** Major situational influences include the physical surroundings, social surroundings, time, the nature of the task, and monetary moods and conditions.

**Social Factors:** Social factors such as reference groups, family, friend circle, role and social status affect buying behaviour.

**Cultural Factors:** Culture includes race and religion, tradition, caste, moral values, etc. Culture also includes sub-cultures such as sub-caste, religious Sects, languages, etc.

Although each individual's behaviour toward the purchasing process is unique, certain things have an impact on all of them. These impacts could be environmental, social, psychological, or even personal. However, cultural values are shared by all members of society and gradually

change over time. Additionally, depending on whatever group a person belongs to, society has distinct effects on that person's behaviour. Each user's impacts differ depending on their age, sex, perception, motivation, and learning processes. Those variables affect consumer purchasing decisions, so they must be taken into account. The most crucial elements in the consumer market are the consumers themselves, who make decisions. The local consumer behaviour in a market that a company seeks to penetrate is probably different from the client behaviour they deal with in their home country. Therefore, it is crucial that the marketing manager takes all these variables into account, assisting them in creating marketing campaigns for the worldwide market and improving the product to completely satisfy the customer, which ultimately leads to an increase in sales and global development.

#### **All about HELMET:**

A type of protective equipment worn to protect the head is a helmet. In order to protect the human brain, a helmet specifically cooperates only with the skull. Helmets are useful as safety devices to avoid a crash in an uncontrolled environment. A helmet can prevent or reduce damage to the head and brain if you can't avoid a crash or hit but you know it will happen.

We must repeatedly stress that reducing the likelihood of colliding or being hit is the first step in harm prevention. Avoiding hitting something is much better than hitting it while wearing a helmet.

Did you realise that you also need to buy a helmet when you buy a two-wheeler? So it is stated in the Central Motor Vehicle Rules. However, it doesn't appear that many two-wheeler dealers or buyers are aware of this.

When a two-wheeler is purchased, the manufacturer is required to provide protective headgear that complies with the specifications established by the Bureau of Indian Standards under the Bureau of Indian Standards Act, 1986, in accordance with Section 138(4) (F) of the Central Motor Vehicles Rule.

#### **What are the helmet-related traffic laws in India?**

In order to protect the community's legal safety, the Motor Vehicles Act of 1988 was established. It has undergone numerous revisions throughout time to include more provisions and strengthen compliance.

The most recent Motor Vehicles Amendment Act of 2019 added 63 new clauses that enhanced the fines for a variety of traffic infractions. Unsafe driving behaviours included not wearing a helmet.

Every person above the age of 4 must "wear protective headgear" when riding a motorcycle in a public place, according to Section 129 of this main Act. As was already established, both the driver and pillion rider are subject to these motorcycle helmet restrictions.

These regulations also demand particular criteria for the headgear or helmet to be used. These are:

- As per Section 129(a), a helmet must be built with such materials in such a shape that will provide the maximum level of injury protection in the event of an accident.
- According to Section 129(b), the helmet must be secured to the rider's or driver's head with powerful fasteners, such as straps affixed to it. This ensures that the wearer's protective headgear won't come off in the event of an accident.
- Motorcycle riders who violate the preceding laws may be subject to Section 194D of this Act punishment of Rs. 1000 for failing to wear a helmet. Additionally, this traffic violation includes a three-month licence termination penalty.

## REVIEW OF LITERATURE

This paper by (Ali et al., 2011) helmet use behaviour in an attempt to identify influential factors. Based on the results, 56 out of all the respondents (43.1%) had a history of accidents by motorcycle. Of these motorcycle riders, only 10.7% were wearing their helmet at the time of their accident.

(Dandona et al., 2006), In India two-wheel vehicle account for a large proportion of road traffic in India and the riders of these vehicles have a high risk of road traffic injuries. Data suggest the need to enact and enforce policy interventions for improving the driver's license system, mandatory use of a helmet, effective traffic law enforcement, and ensuring good vehicle conditions to reduce the risk factors that potentially contribute to mortality and morbidity in road traffic crashes.

Motorcycle helmet-wearing rates remain low in smaller cities in developing countries. (Li, L. P et al., 2008), therefore examined the knowledge, attitudes, and behaviour of motorcyclists towards helmet use in two mid-sized cities in China. Through roadside observation and interviews, A large proportion of both drivers and passengers did not wear a helmet or did not have their helmets fastened.

Humans adapt their risk-taking behaviour on the basis of perceptions of safety. Existing studies by (Gamble, T., & Walker, I. 2016) looked at people who know they are using safety equipment and have specifically focused on changes in behaviours for which that equipment might reduce risk. The results suggest that unconscious activation of safety-related concepts primes globally increased risk propensity.

Mathur, A. K., Gupta, S., & Bandhu, A. (2017), Head injuries during the crash are the main cause of death and disability so based on a baseline study was conducted by researchers to understand the pattern of helmet use in all 7 administrative divisional headquarters of the state of Rajasthan in 2015. Among 1, 17,553 two-wheelers observed, almost two-fifths of drivers (39.4%) wore helmets correctly, whereas, less than three-fifths (58.7%) did not. An almost equal percentage of males (58.6%) and females (58.9%) did not wear a helmet at all.

This was a quasi-experimental study conducted in three phases conducted by (**Peltzer, K., & Pengpid, S. 2014**). Motorcyclists were selected by simple random sampling and they were assigned to either the intervention or control group. A comparison was done in terms of group driver education versus no education, and pre- versus post-intervention. Out of an estimated 500 male drivers, 407 participated in the study. The control group showed no significant changes. Post-license road safety education significantly improved knowledge but not self-reported adherence to speed limits.

(**Karuppanagounder, K., & Vijayan, A. V. 2016**). In order to evaluate the factors influencing helmet use, including motorcycle riders' attitudes, the primary goal of this study is to look at the patterns of motorcycle helmet use in Calicut, India. In order to ascertain the helmet use rate among motorcyclists and pillion riders, a field study was carried out. Additionally, a structured questionnaire interview survey of 709 motorcyclists was carried out to ascertain the users' perceptions and attitudes surrounding the use of motorcycle helmets. A researcher discovered during the study that using a helmet as a protective device is preferable to doing so only when the helmet regulation is strictly enforced.

(**Bachani, A. M. et al., 2012**), Road traffic injuries (RTIs) are a leading cause of disability and fatality in middle-income countries. The observation was made by the author, the proportion of helmet-wearing across all study sites was 25 per cent at night and 43 per cent during the day among all motorcyclists in Cambodia. Almost 60 percent of respondents said that their use or non-use of a helmet depended on where they were driving. Helmet quality, price, style, and colour were important factors influencing the decision to purchase a helmet.

Article by (**J Edu Health Promot 2019**) Determinants of helmet use among healthcare providers in urban India: Leveraging the theory of planned behaviour: The aims of the study were (1) to determine the proportion of proper use of helmets and (2) to identify TPB-related factors and other factors influencing the use of helmets. The outcome of this research study is stated that the factors such as helmet quality, price, style, and colour as important influencing factors in the decision to purchase a helmet. There are many factors affecting the use of a helmet. Attitude, intention and subjective norms are the other factors which influence consumer buying behavior.

**ADILLA PONGYEELA, (2018)** .In this study author found that the motorcycle driver should be aware of helmet as well as he studied the behaviour of the helmet buyer & also how much risk is there if they does not wear helmet. Outcome of the study is that Females are more aware about helmet.

Researchers (**Yu, W. Y. et al., 2011**) carried out a case-control study to investigate how various helmet designs and incorrect helmet usage impacted Taiwanese motorcyclists' ability to prevent head injuries. According to the study's findings, motorcycle riders had the least protection against head injuries when wearing half-coverage helmets. Additionally, wearing a helmet that isn't securely attached.

(Bianchi, G. et al., 2011). The aim of this study is to examine the correlation between helmet use and on-slope ski Conduct. Three categories of people were identified: 1. Helmet wearers, 2. those who do not wear a helmet but intend to buy one, and 3. those who do not wear a helmet and have no intention of buying one by the researcher.

(Dr. Raj A. Jesu Kulandai, & Prof. Kaviarasu S. John, 2015) found in his study that the Indian two wheeler motorcycle industry is expanding and growing up each year. The study discovers that buying behaviour of two-wheelers in Chennai city is significantly influenced by a number of marketing stimuli offered by the manufacturers. It also reveals the people from low and middle class prefer two wheeler as it matches with their individual and family requirements. Majority of the respondents have claimed that Fuel-efficient, reliable brand and availability of spare parts are the most preferential factors for buying g of a two wheeler.

The study of (Dr. Ronald Mani & Mr. Debasis Tripathy 2013) is centred on the purchasing behaviour of the customer that provokes them to buy the two wheeler bike. The promotion was an exceptionally affecting variable for the Bajaj two wheeler customers, family members were exceedingly impacting element for the Honda two wheeler customers and friends were profoundly impacting component for the Yamaha two wheeler customers. Most influencing factor is Design for Yamaha followed by Bajaj, Honda, Hero MotoCorp and TVS. Mileage as an influencing factor was dominated among motor bike owners of Bajaj and Hero MotoCorp. For Yamaha bike owner's speed and technology was the influencing factor to purchase.

(M. Sathish & A. Pughazhend, 2011) have conducted the study to understand customer purchasing reasons and how they behave around two-wheelers. Customers' choices are heavily influenced by their needs, purchasing power, and the cost of the two-wheeler goods. Despite their lack of purchasing power, buyers are most likely to favour expensive motorcycles since they are more likely to have the advanced characteristics they desire, such as aesthetic appeal and value enhancement. The research report advises the two-wheeler companies to provide clients new models and distinctive designs. It has been shown that consumers prefer two-wheelers due to their utility and ease of control in busy, unpredictable traffic.

**NEED OF THE STUDY:** Buyer Behavior while purchasing and using are playing a remarkable role for preventing head injuries during road accidents and task for company growth in modern-day exhibit circumstances. Main aim is to increase helmet use and may need to focus on the strategies that strengthen motorcyclist's plans and objectives to helmet use.

### **RESEARCH OBJECTIVES**

- i) To know the usage of helmets among two wheeler drivers.
- ii) To Know Key reasons for buying a helmet.
- iii) To identify the factors or parameters influencing at the time of purchasing decision.

### **RESEARCH METHODOLOGY:**

The present study employs the exploratory research approach to evaluate the extent of the impact factor and establish association between consumers' purchase behaviour towards the helmet in saurashtra region of Gujarat. The population for this study was all consumers of the market who make are planning to purchases, already user and they had used of helmet. The entire sample size of 180 respondents—104 men and 76 women from the Saurashtra region—was chosen using the convenience sampling method. Both the primary and secondary data collection methods were considered.

However, primary data was gathered from the respondents with the help of pre-tested structured closed ended questionnaires. However, using pre-tested structured, closed-ended questions, primary data was gathered from the respondents. Secondary data sources, such as papers on the subject from journals, books, and the internet, have been used to support the primary data. The responses of the measurement were analysed using a 5- point Likert scale. The measuring items of the variables were designed based on the literature review. The relationships between hypotheses were examined using cross-tabulation and chi-square analytical tools. Analyses of data and testing of hypotheses were performed using SPSS version 17. The analyses have been in conformity with the objective and the hypotheses of the study.

### **HYPOTHESIS FOR THE STUDY**

In exploring the relationship between consumers 'buying behavior and helmet, the study addressed the following hypotheses;

➤ **H01:** Reasons for buying a helmet is independent of gender.

**Ha1:** Reasons for buying a helmet is dependent on gender.

➤ **H02:** Reasons for buying a helmet is independent of age.

**Ha2:** Reasons for buying a helmet is dependent on age.

➤ **H03:** Reasons for buying a helmet is independent of educational level of consumer.

**Ha3:** Reasons for buying a helmet is dependent on educational level of consumer.

### **RESULTS AND DISCUSSION**

Table 1 displays consumer demographics, with the majority of respondents (57.8%) being male and the age range of 18 to 30 years represented (56.7%). Additionally, the majority of them (57.22%) are Rajkot's urban region, and 45% and 41.1% have graduate degrees. The majority of them (40.56%) identify as professionals. Consumer from rural areas is plainly visible as having a low level of helmet use.

<b>Demographic Factors</b>		<b>Labels</b>	<b>n = 180</b>	<b>%</b>
<b>1</b>	<b>Gender</b>	Male	104	57.8
		Female	76	42.2
<b>2</b>	<b>Age</b>	18 - 30 years	102	56.7
		30 - 40 years	43	23.9



		40 -50 years	30	16.7
		50 - 60 years	3	1.7
		60 years and above	2	1.1
3	City	Rajkot	103	57.22
		Morbi	15	8.33
		Junagadh	29	16.11
		Porbandar	16	8.89
		Jamnagar	13	7.22
		Other	4	2.22
4	Area	Urban	103	57.22
		Semi Urban	54	30.00
		Rural	23	12.78
5	Educational Qualification	School Level	11	6.11
		Graduation	81	45.00
		Post-Graduation	74	41.11
		Doctorate	14	7.78
6	Occupations	Professional	73	40.56
		Business	42	23.33
		Housewife	15	8.33
		Student	48	26.67
		Retired	2	1.11

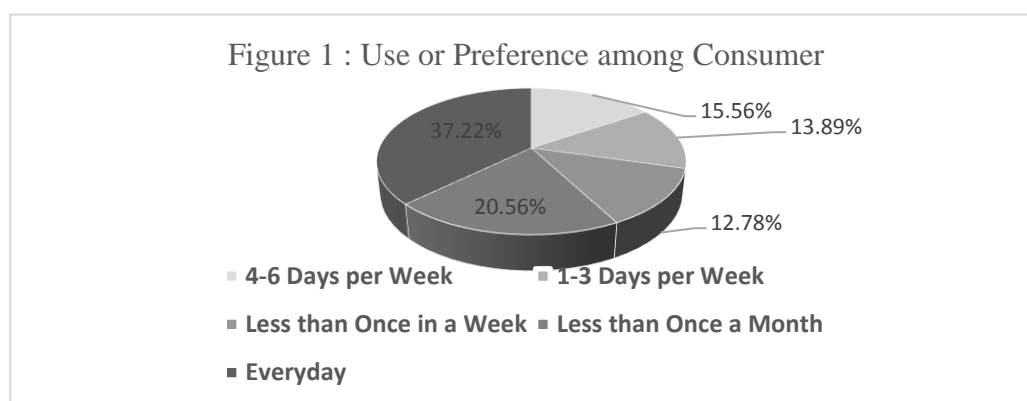
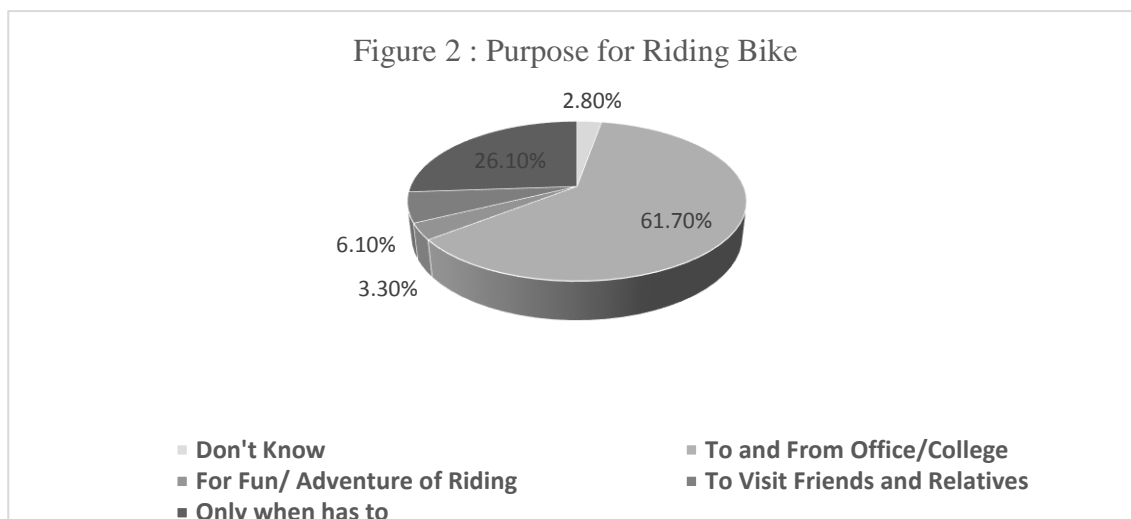
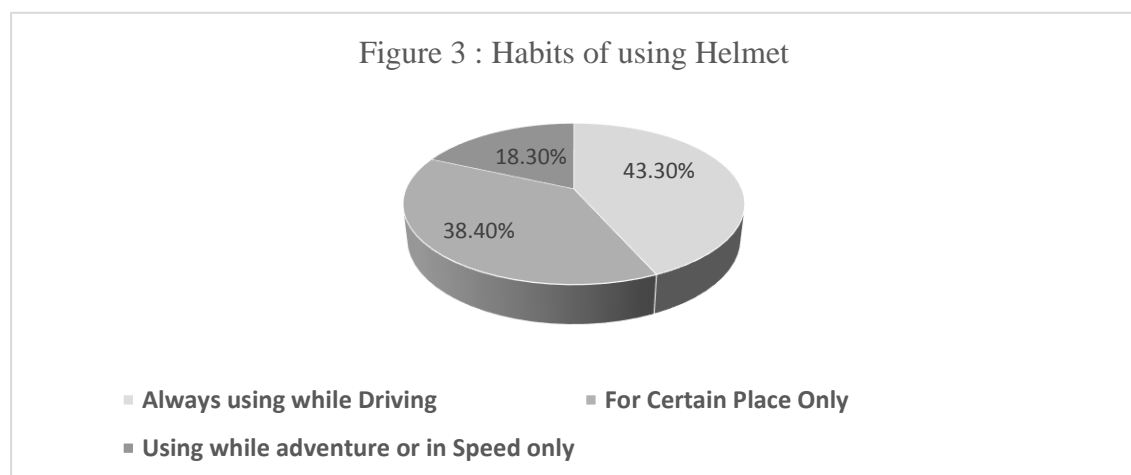


Figure 1 shows that 37.22% of consumers prefer to wear helmets every day, 20.56% wear them 4-6 days per week, 15.56% wear them less than once per month, 13.89% wear them for 1-3 days in a week, and 12.78% wear them less frequently means once in a week.



From figure 2 we can conclude that 61.70% of people use bike to go to office/college, this shows they are professional or have higher education, 26.10% uses when there is a need, 6.10% uses it to visit friends and relatives, 3.30% uses it for fun or adventure, 2.80% of them don't know their purpose of riding.



According to figure 3 it is found that 43.30% of public have habit to wear helmet while driving, 38.40% have the habit to wear helmet only at certain places, while remaining 18.30% use helmet when they drive for adventure purpose.

Figure 4 shows that when buying a helmet, the majority of buyers prioritise comfort. They then look at the ISI mark on the helmet, durability, the helmet's ejection process, warranty or guarantee, availability on the market, price, brand name, gender-specific colour schemes, and finally the helmet's design.

**Figure 4 : Descriptive Analysis of Factors influencing in the choice of helmet or while purchasing a helmet in percentage**

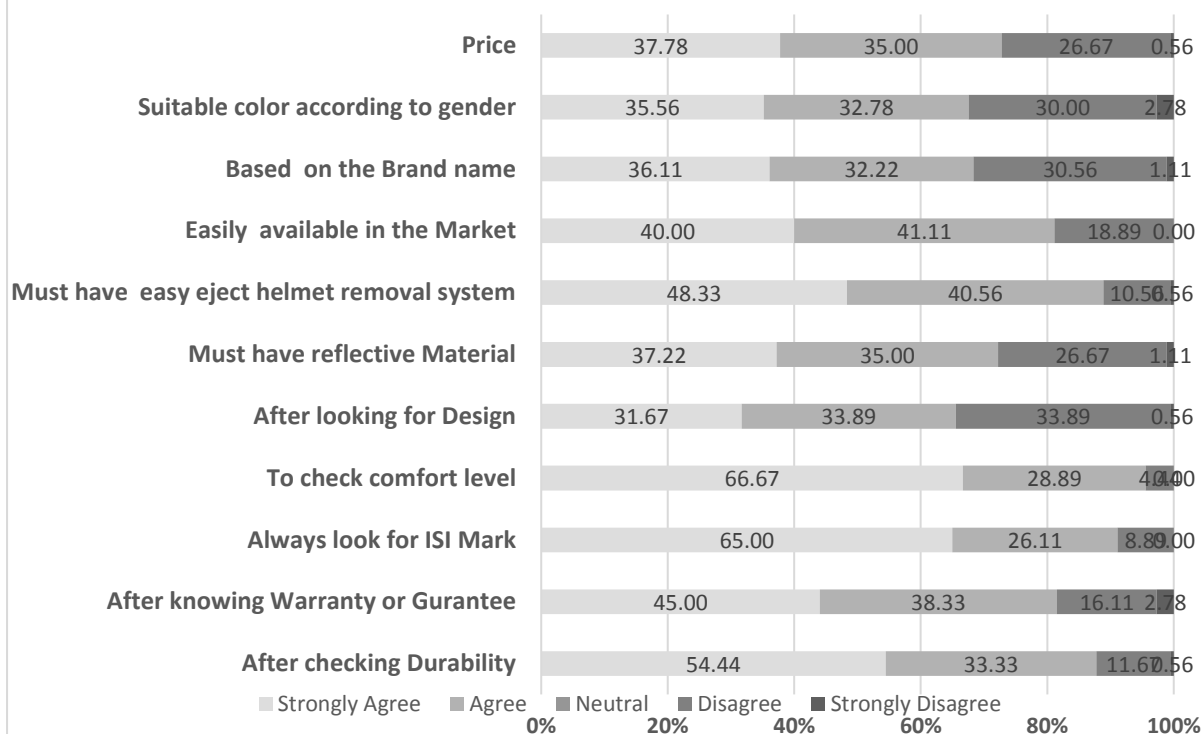


Table 2				
H01: Reasons for buying a helmet is independent of gender.				
Ha1: Reasons for buying a helmet is dependent on gender.				
Reasons for buying a helmet	Chi-Square	P Value	Significance	Hypothesis
Helmet only use for safety purpose	8.044 <sup>a</sup>	0.045	Yes	Null Hypothesis Rejected
due to legal requirement	10.396 <sup>a</sup>	0.015	Yes	Null Hypothesis Rejected
After being influencing by friends or family member	4.979 <sup>a</sup>	0.173	No	Fail to reject null hypothesis
Health benefits	2.319 <sup>a</sup>	0.509	No	Fail to reject null hypothesis
Escape yourself from paying penalty or fines	5.176 <sup>a</sup>	0.159	No	Fail to reject null hypothesis
To ensure better control of your vehicle while driving	.965 <sup>a</sup>	0.810	No	Fail to reject null hypothesis

According to table 2, only two reasons for purchasing a helmet—using it for safety reasons and because it is required by law—depend on a consumer's gender. Other considerations, such as family and friend's pressure, health benefits, avoiding fines or penalties, and improving vehicle control while driving, can all be considered as they are dependent on gender. In the context of Saurashtra, it indicated that purchasing a helmet was planned due to legal and safety requirements. While other factors have little influence on a consumer's intention to purchase.

<b>Table 3</b>				
<b>H02: Reasons for buying a helmet is independent of age.</b>				
<b>Ha2: Reasons for buying a helmet is dependent on age.</b>				
<b>Reason for Buying Helmet</b>	<b>Chi-Square</b>	<b>P Value</b>	<b>Significance</b>	<b>Hypothesis</b>
Helmet only use for safety purpose	14.740 <sup>a</sup>	0.256	No	Fail to reject null hypothesis
due to legal requirement	10.589 <sup>a</sup>	0.564	No	Fail to reject null hypothesis
After being influencing by friends or family member	4.979 <sup>a</sup>	0.406	No	Fail to reject null hypothesis
Health benefits	12.848 <sup>a</sup>	0.380	No	Fail to reject null hypothesis
Escape yourself from paying penalty or fines	7.686 <sup>a</sup>	0.809	No	Fail to reject null hypothesis
To ensure better control of your vehicle while driving	6.045 <sup>a</sup>	0.914	No	Fail to reject null hypothesis

Table 3 shows that all of the justifications for reason for buying a helmet—using it for safety reasons, using it because it's required by law, because friends or family members convinced you to, for health reasons, to avoid fines or penalties, or to improve vehicle control while driving—can all be ruled out as null hypotheses. In the context of Saurashtra, it suggests that customer purchasing behaviour for helmets is unaffected by age.

Table 4 shows that all of the justifications for reason for buying a helmet—using it for safety reasons, using it because it's required by law, because friends or family members convinced you to, for health reasons, to avoid fines or penalties, or to improve vehicle control while driving—can all be ruled out as null hypotheses. In the context of Saurashtra, it suggests that customer purchasing behaviour for helmets is unaffected by educational level of consumer.

#### **POSSIBLE OUTCOME AND APPLICATIONS:**

This study is basically concerned with consumer buying behaviour towards helmet. The basic objective behind caring this study is to consumer purchasing behaviour i.e. (helmet) of different

type of customer in different area of Saurashtra. To study the various factor affecting the customer buying pattern in case of helmet and to search out new prospects for helmet industry. It will assist the government in creating or establishing helmet regulations.

<b>Table 4</b>				
<b>H03: Reasons for buying a helmet is independent of educational level of consumer.</b>				
<b>Ha3: Reasons for buying a helmet is dependent on educational level of consumer.</b>				
<b>Reasons for buying a helmet</b>	<b>Chi-Square</b>	<b>P Value</b>	<b>Significance</b>	<b>Hypothesis</b>
Helmet only use for safety purpose	17.147 <sup>a</sup>	0.046	Yes	Null Hypothesis Rejected
due to legal requirement	8.866 <sup>a</sup>	0.450	No	Fail to reject null hypothesis
After being influencing by friends or family member	4.384 <sup>a</sup>	0.884	No	Fail to reject null hypothesis
Health benefits	11.804 <sup>a</sup>	0.225	No	Fail to reject null hypothesis
Escape yourself from paying penalty or fines	8.422 <sup>a</sup>	0.492	No	Fail to reject null hypothesis
To ensure better control of your vehicle while driving	23.963 <sup>a</sup>	0.004	Yes	Null Hypothesis Rejected

Demographic variables reveal ongoing trends such as shifts in age and income distribution; that signals business opportunity to alert marketers. In view of such situation, the researcher is wanted to find out which factors possibly influence the buying behaviour of customers with purchasing helmet.

Marketers are interested in the number of household that own or buy a certain product and who the customer or buyer is. They then try to aim the marketing strategy at the buyer so as to influence consumer decision making.

#### **LIMITATIONS OF THE STUDY:**

1. Consumer behavior is very difficult to predict.
2. This study was successfully carried out but not without limitations. The first limitation was that, the sampling could not cover most of the consumer who are actually using helmet.
3. Secondly, the questions in the questionnaire could be designed more skilfully.
4. The majority of the participants were youth and high level of education (college education). Thus, the results may not generalize to the other populations.
5. The sample size was relatively low, which may reduce the power of conducted analysis.

6. Geographical concentration is limited to Saurashtra REGION of Gujarat so may not be representative of the whole population of India.
7. Scope for future studies, it is recommended that the behaviour be determined by a score of few questions.
8. There is no guarantee of your life after meeting with an accident despite using helmet.

## CONCLUSION

By using a sample of 180 respondents, this study sought to determine how consumers in the Saurashtra region purchased helmets. This research basically examines why people wear or buy helmets: for safety reasons, to comply with legal requirements, because friends or family persuaded them to, for health reasons, to avoid fines or other consequences, or to enhance vehicle control while driving. Results shows that when buying a helmet, the majority of buyers prioritise comfort. They then look at the ISI mark on the helmet, durability, the helmet's ejection process, warranty or guarantee, availability on the market, price, brand name, gender-specific colour schemes, and finally the helmet's design. The rate of helmet use among motorcycle riders was quite low, with 43.30% of the general public in Gujrat's Saurashtra region reporting a tendency of wearing it while driving. The majority of graduates, postgraduates, and professionals opted to wear helmets. Lastly, the researcher wants to draw the conclusion that consumer behaviour while purchasing a helmet is unaffected by age, gender, and education levels.

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## **The Review of Literature on Job Satisfaction of the Educators in Higher Education Institutions**

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### **Abstract**

The premier of this article is to audit the examination have previously done by different analysts on the area of Job Satisfaction of the educators in advanced education establishments. Here the researchers have evaluated various books, research diaries, proposals, and writing accessible on internet-based stage for this reason. This article centres and talk about around various aspects connected with work fulfilment of instructors of advanced education foundations. From different review of writing, it has been secured that position fulfilment of employees is exceptionally vital perspective for every one of the greater instructive foundations and its influences execution of workers and nature of training in all the connected advanced education establishments. To formulating this article, more effective we have described work of total 40 research papers into 12 categories i.e. Educators and their gender, Educators and the type of employer, Educators and their job satisfaction factors, Educators and their satisfaction and dissatisfaction, Educators and their academic profession, Educators and their relationship with age, Educators and their correlation between satisfaction commitment and performance, Educators and their relationship with their ethnicity, Educators and their superiors, Educators and their motivator and hygiene factors, Educators and its impact on performance and commitment, Educators and Organizational Culture impact on Job Satisfaction.

### **Keywords:**

*Job Satisfaction, Higher Education institutes, Work Performance and Job Satisfaction, Academics, university, comparison, Educators.*

### **INTRODUCTION**

The Teachers are the vibrant force in an institute. The future of children and the future citizens of the nation are in the hands of teachers. It is related to attitude, motivation, and perception of people, who are engaged with the profession. According to Gilmer 1966, "Job satisfaction or dissatisfaction is the result of various attitudes the person holds towards his job, towards related factors and towards life in general ". Job satisfaction can be defined as the extent to which, a teacher is content with the rewards he or she gets out of his or her job. It is the attitude and feeling a person has, about their work. These are various factors that affect job satisfaction, including personal factors. Job factors like type of work, skill status, etc., fringe benefits, pay, security, etc. This study is conducted in the Review of literature. It is the foremost task for any



research work. It may be sources from different books, research papers, related articles, theses, and literature available on internet etc. This article includes the review of literature from more than 40 research papers related to job satisfaction of Educators of higher education institutes. The category of research papers included in this article are Educators and their gender, Educators and the type of employer, Educators and their job satisfaction factors, Educators and their satisfaction and dissatisfaction, Educators and their academic profession, Educators and their relationship with age, Educators and their correlation between satisfaction commitment and performance, Educators and their relationship with their ethnicity, Educators and their superiors, Educators and their motivator and hygiene factors, Educators and its impact on performance and commitment, Educators and Organizational Culture impact on Job Satisfaction.

This research paper is useful for analysing different factors affecting job satisfaction and it will need to use further research work.

## **REVIEWED ARTICLES**

“Job Satisfaction” is a very popular and dynamic area of study in Education sector as well as in corporate sector and so there is lot of research work done into it. To formulating this article, more effective we have described work of total 40 research papers into 12 categories. These categories are as under.

1. Educators and their gender.
2. Educators and the type of employer i.e., Public and Private Institutes.
3. Educators and their job satisfaction factors.
4. Educators and their satisfaction and dissatisfaction.
5. Educators and their academic profession.
6. Educators and their relationship with age.
7. Educators and their correlation between satisfaction commitment and performance.
8. Educators and their relationship with their ethnicity.
9. Educators and their superiors.
10. Educators and their motivator and hygiene factors.
11. Educators and its impact on performance and commitment
12. Educators and Organizational Culture impact on Job Satisfaction

### **Educators and their gender.**

In their review Mehboob, F., Sarwar, M. A. furthermore, Bhutto, N. A. (2012) have observed that female employees were regularly less happy with their occupation than male employees. All the "Occupation Hygiene" and "Occupation inspiration" credits were essentially or noticeably connected with work happiness. The variables "Strategy" and "Working condition" were the most un-fulfilling attributes while "work itself" was the most fulfilling factor secured in the position in this focus article. The administration of "SALU" need to focus on those

variables which makes disappointment among employees' generally the scholarly procedure execution; they ought to likewise organize specific preparation and advancement meetings with a view to not just improve the information, abilities, and Abilities of employees yet in addition to connect the somewhere in the range of happiness and discontent. There were likewise a few different variables which makes happiness and nervousness was the "Working Condition" of the association.

Shahanasbeegam P.P and Sneha E.S (2017) This study is led to look at the specific employment fulfilment of female educators considering changing position profile. To satisfy these points, 90 female educators from 10 universities in Malappuram locale have been chosen. A poll was the device utilized with the end goal of information assortment and utilize the Descriptive exploration plan. For examination Weighted normal, Chi-square test, Percentage, one way ANOVA, t test was utilized. Mainly researcher likewise uncovers that, there is no tremendous contrast in the normal degree of mentality of female educators, towards showing calling and changing position profiles with the variable age bunch. The significant persuasive perspectives that basically impact the educators are employer stability, economic wellbeing and administrations and pay. Subsequently, the general fulfilment level of female educators towards this calling is acceptable.

#### **Educators and the type of employer i.e., Public and Private Institutes.**

Ayesha Tabassum (2012) took the concentrate on Interrelations between Quality of Work Life Dimensions and Faculty Member Job Satisfaction in the Private Universities of Bangladesh here the analyst is analysing nature of work life aspect and occupation fulfilment variable are positive relationship demonstrates that endeavour to work on the elements of QWL can essentially upgrade Job Satisfaction of the personnel members. Playing a critical job for financial development by contributing their insight, abilities, and endeavours. In this way, the ultimate suggestion to changing the working environment proactively utilizing a blend of all around planned QWL drives for the employees will yield upper hand as it will build the Job Satisfaction.

Om Raj Katoch (2012) a review was attempted to recognize the variables which influence the degree of satisfactions of school educators in Jammu and Kashmir. The information utilized in the research is essential in nature and gathered through private meetings as poll from an example of 98 school educators chose from the five Government Colleges of Jammu. This study is an experimental exploration and in view of the overview strategy. Overall research can focus Two kinds of measurable devices are utilized in their review for examination 1) rate investigation 2) chi-square examination. Research shows that female school educators are happier with their occupation than male instructors and pay per annum is a significant variable affecting the degree of job satisfactions.

Salman Khalid et al., (2012) The motivation behind this study was to research the connection between different features of job satisfactions among college academicians in Punjab Area,

Pakistan, and what these distinctions mean for generally job satisfactions of academicians in chose colleges of Area of Punjab. The example for this review involves full-time academic staff including speakers, collaborator teacher, academic partners. The information was gathered from four colleges; two have a place with the private area (The University of Faisalabad, and The University of Central Punjab), other two having a place with the public area. One of public area college (University of Engineering and Technology) was commonly (Punjab) contracted while other (National Textile University) was governmentally sanctioned college. To accomplish the goals of the review 150 overviews were sent in four colleges (2 public and 2 private). Taking all things together, 122 returned (a reaction pace of 81.3 percent) which is very tremendous for their research work. So, we observe and commented to the educators in private area colleges were happier with their compensation, management, and special open doors than the academicians of state funded college. Then again, academicians in open area colleges were seen as happier with collaborator's way of behaving and professional stability. Concentrate on presents reasonable ideas to the educational institutions and human man power on the most proficient method to pay, advance, hold and keep up with value in the associations.

Dr G. Yoganandan, Ms. M. Sowndarya (2015) concentrate on the fulfilment of the employees working in self-funding and government expressions and science schools in Namakkal region. The investigation likewise discovered that working condition and employer stability are the main two variables adding to the employees' job satisfaction whereas the acknowledgment and pay/addition are the most un-affecting elements of occupation fulfilments. The primary driver for that is the suspicion that employees happy with their positions are more useful, successful, and in a superior methodology about their positions compared and the people who are not happy with their positions (Man, Modrak, Dima, and Pachura, 2011)

Shadi Hijazi, Abdul Latif Kasim, Yaakob Daud (2016) the reason for the review drive research was to inspect the connections between authority styles and occupation fulfilment among the private college representatives in the UAE. Study was effective in making a huge commitment to the current research by further investigating the effect of initiative styles and correspondence capability on job satisfaction through an exact examination.

Adenike, Oluwaseun, Ogundipe and Sunday (2017) paper focused on the distinction that exists in the degree of job satisfaction between academic staff in private and public tertiary foundations in Nigeria. A compensation differential exists among private and state funded colleges in Nigeria. Teachers in state funded college were happier with their compensation, advancements, and the instructors of private college. In this manner, suggestion the executives must to attempt to diminish responsibility to upgrade the efficiency of teacher and they must to likewise attempt to give a helpful climate to support research.

### **Educators and their job satisfaction factors.**

Annierah Maulana Usop et al., (2013) This study endeavoured to figure out the relationship of work execution and occupation fulfilments among instructors of Division of Cotabato City.

The review utilized the graphic relationship plan. The elucidating part introduced the segment qualities of the educators as well as their Job Satisfaction rating on the different work aspects. The connection was utilized to figure out the relationship of instructor profile, and work execution to Job Satisfaction. concentrate on utilized the review poll. There were two arrangements of polls comprising of two sections. The initial segment is on the individual data of the respondents. The second piece of the instrument is hands on Satisfaction survey, with its nine aspects to be specific, school strategies, management, pay, interpersonal relations, open doors for advancement and development, working conditions, work itself, accomplishment, acknowledgment, and obligation. The specialist utilized graphic insights like gathering recurrence dissemination, percentile, mean and standard deviation. The analyst additionally utilized Pearson Product Moment Correlation Coefficient  $r$  to decide the relationship between job satisfactions and work condition.

Choi Sang Long, Wan Mardhia, Tan Owee, Low Hock (2014) a study of significant writing uncovers different connections academics have created from their own explores of ground-breaking administration style and job satisfaction. This ongoing review International Journal of Polis Science and inspected the employees' insight on initiative qualities and connection between ground-breaking authority style and job satisfaction.

Muhammad Saqib Khan et al., (2014) Current examination is an academic work to explore and divide a few determined causes those which are reliably working behind the fulfilments level of the Teachers in regards to his/her job in the College. Factors those which organized with the individuality of job satisfaction completely which incorporates; work, pay, advancement, oversight, associates, and workplace. Under this study can inspect the Teacher's demography can be expounded concerning his/her age, capability, orientation, marital status, length of administration and the assignment.

Marwan Saleh, Al-Smadi, Yahya Mohammed Qblan (2015) Study intended to recognize the effect of certain factors (orientation, Teaching experience and school type) on surveying the degree of occupation satisfaction among staff of Najran University. The outcomes showed a moderate level of occupation satisfactions a general rule, and there are measurably massive contrasts because of (orientation, showing experience and school type), where the distinctions for guys, logical academics and more experienced. Concentrate on results showed that there are genuinely massive contrasts in the degree of occupation satisfaction of staff because of orientation variable for people for all areas of occupation satisfaction aside from the space of "pay rates and monetary help" that showed no measurably tremendous contrasts - that may because of the college's relying upon a pre-decided trading stool of compensations for all personnel arranged by the Ministry of Higher Education in Saudi Arabia.

Mohammed Abdul-Aziz Ahmad (2018) This examination to recognize the variables that effect to work satisfaction among academic staff in two private colleges. The example was led in two private colleges China\Erbil University and Knowledge University. Information gathered from

189 answered full time instructors of having no less than three years working involvement with their ongoing position. Investigated utilizing illustrative examination Reliability test and Pearson Correlation and reversion test the connection between factors. Shown that there was a positive connection between Job security, Financial Rewards, Empowerment, and occupation satisfaction along these lines sustained the theory, employer stability observed the most remarkable component impact on work satisfaction during this exploration, monetary rewards second most noteworthy impact on Job Satisfaction. College's must to consider that academic staff assumes a significant part, but college must to give a decent climate and work conditions at colleges to let the academic staff persistent and fulfil that will prompt colleges achievement.

### **Educators and their satisfaction and dissatisfaction.**

Saifuddin Khan Saif et al., (2012) Analysis on Job-Satisfaction among the Academicians of Universities in Kpk, Pakistan. Estimation of occupation satisfaction or in any case is a typical practice in every one of the associations to comprehend the attitudinal components of the workers and plan the treatments as per the findings of these examinations irregularly. In dividing the outcomes, forecast of job satisfaction (attachment and responsibility) as well as job disappointment (absence and turnover) is for the most part established on the 'Variables of job satisfaction mentality like compensation, work, oversight, advancement, collaborators, and climate. This concentrate additionally involves the information on the elements for decline on the representative perspectives of both positive and unsuccessful results.

Ijaz Ahmad Tatlah (2013) Study investigate the exchange between authority styles (ground-breaking, conditional, and free enterprise) and staff work satisfaction (instinctive, external, and mostly teacher) in a state funded college of Pakistan. Leary et al observed that a more grounded relationship exists between administration styles and the staff's extraneous work satisfaction and generally work fulfilment. The connection between administration styles and the employees' natural work satisfaction is openly critical, however this relationship is not areas of strength for so the connections between initiative styles and the personnel's extraneous and in general Job Satisfaction. The current review, where the three authority styles (ground-breaking, value-based, and free enterprise) are autonomous (indicator) factors and the personnel work satisfaction (extraneous, natural, and by and large) is a dependent (model) variable. This feature that to fulfil the employees inside their work topmost need to review suitable authority style/s in various circumstances and even at various phases of a similar circumstance.

Sujit Kumar Basak (2014) The point of this study is to think about college educators work factors regarding what variables incorporate college academic job satisfaction and job dissatisfaction. This point is accomplished through the targets to distinguish which variables are more effect with regards to work satisfaction and dissatisfaction for college academic. Mehrabian et al. (2013) led a concentrate on 139 staffs at the Guilan University of Medical Sciences utilizing a poll-based review and their examination results shows that the professional stability ( $4.14 \pm 0.96$ ), cordial relationship with associates ( $4.01 \pm 0.81$ ) lastly the innovation

and specialized information ( $3.99 \pm 0.87$ ) are factors for college scholastics regarding position fulfilment. concentrate anyway uncovered that academic work satisfaction component and academic work disappointment factor are pretty much effect by the college teachers. This study has likewise shown that the satisfaction factors are more than disappointment factors. In conclusion, the review has shown that the college scholastics are more fulfilled than disappointed.

#### **Educators and their academic profession.**

A lot of exploration has been completed by specialists on the element of academic as a profession. In their concentrate on the academic profession in Europe - A view according to the status viewpoint Enders, J. (1997) has observed that the scholarly experts in Europe is happier with their work than the earlier open discussion recommended. Particularly college teachers are moderately happy with their occupation overall with the business conditions and assets for work. There are regions anyway which scholastics are very basic. The assets on their work are more often seen as a snag than as good. Numerous academics consider their it is extremely high to show related responsibility. The association organization as well as the inclusion of researchers in course plotting is convicted as being uncreative. what is more, junior academic staff in different nations showed issues of employer stability and absence of chance for occupation advancement. As a rule, but the review does not depict the academic profession as normally discouraged and irritated.

#### **Educators and their relationship with age.**

A lot of exploration has been completed by analysts on the element old enough. In their concentrate on work satisfaction of employees of veterinary sciences: an examination did by Gautam, M., Mandal, K., & Dalal, R. S. (2006) to decide the degree of job happiness of the employees of personnel of veterinary sciences and creature cultivation, sher-e-Kashmir college of agricultural sciences and innovation of Jammu to examine the variety in the show satisfaction level. It was found that mainly it very well might be expressed that work satisfaction is a complex event with various boundaries working at the same time. In general work satisfaction of the employees of staff of veterinary science and creature agricultural, SKUAST-J is suitable and reasonable. The younger staffs are more satisfied when contrasted with those with a long residency of work though the affiliation is not direct. There is insignificant separation between those holding graduate degree and the individuals who have accomplished Ph D. Degree functions as major areas of strength for an and probability of burnout cannot be lined out. On the other hand, the analyst had prescribed extra investigations to see the value in the elements of job satisfaction.

Tulen Saner, serife Zihni Eyupoglu (2012) This study reviewed the age-work satisfaction relationship in advanced education for the review comprised of academics in North Cyprus. concentrate on instrument utilized was the short structure Minnesota Satisfaction Questionnaire (MSQ) which estimates position satisfactions, characteristic satisfaction, and outward

satisfaction utilizing 20 aspects of the performance every feature addressed with only one satisfaction thing. The short-structure MSQ estimates three satisfaction scales, to be specific natural satisfaction, extraneous satisfaction, and generally work satisfaction. Instinctive satisfaction refers to expression related conditions (how individuals feel about the idea of the performance's errands), and outward satisfaction refers to environmental circumstances (how individuals feel about elements of the performance that are outside to the work). results show that the work satisfaction levels of the more experienced age gatherings of academic are in general higher than the younger age gatherings. Generally, work satisfaction and external satisfaction do not appear to show a conventional relationship with age, with by and large work satisfaction and extraneous satisfaction levels changing for various age gatherings.

### **Educators and their correlation between satisfaction commitment and performance.**

Thorndike referred to by Labadia (2010) began the most common way of characterizing work execution by articulating a definitive model. This extreme rule is a determination of all that characterizes work accomplishment across the full space of explicit work. He further makes sense of that a definitive standard is calculated in nature and cannot be estimated. In this way, specialists and experts utilize a final basis as a manual for picking signs of work execution, with the information that they will not ever completely catch the whole performance space.

Khalid Rehman et al., (2013) Objective of this paper is to pinpoint a 'reasonable model' to make sense of these mentalities for fulfil the teachers at Higher Educational foundations in creating states like, Pakistan. This paper offers a hypothetical model of the complexity of connections between these perspectives and other related factors or factors which make sense of the entire story of their interdependencies between the performance satisfaction and hierarchical responsibility of teachers in advanced education establishments. Assuming specialists believe that they are dealt with unfairly, get less compensations, they are more likely to have a low feeling toward their work, boss, or associates (Luthans, 2005:212; Manzoor et al., 2011). The institutional responsibility is somewhat the impact of natural individual qualities and to some degree the outcome of how people groups comprehend the organization and their moment work (Daneshfard and Ekvaniyan, 2012).

Maeda L Kadtong et al., (2013) This study to figure out the relationship of work execution work satisfaction among educators of Cotabato City, Philippines. An aggregate of 200 educators instructing in basic state funded schools were chosen and educational correlational plan was utilized to see connections of the factors remembered for the review. Overview surveys were circulated to the instructor respondents in twelve example primary schools in Cotabato City Philippines. The review yielded that the instructor respondents are female, married, attained an advanced education with expert's unit, 11 to 15 years in help and has a place with 31-40 years age section. Concerning execution rating it was appraised adequately.

**Educators and their relationship with their ethnicity.**

Gharaibeh and Albdareen (2015) This study intended to distinguish the hierarchical equity and its effect on the responsibility of staff to "hard working attitudes" at private colleges in Jordan. It is realized that the adequacy and proficiency of the remarkable representative are connected and essentially impacted by the profound confidence and deep feeling of genuine qualities and high moral goals that actuate him/her to work on his/her insight, and upgrade direct and science abilities, which will prompt work on his/her degree of execution. Hypothetical beginnings for this idea of hard-working attitudes came out first in quite a while of German researcher Max Weber (1905-1904) in his book named "Protestant morals and the soul of private enterprise".

**Educators and their superiors.**

Oshagbemi, T. (1999) concentrated on Academics and their supervisors a relative report in job satisfaction. The motivation behind this study was to analyse the work satisfaction of academics and their administrators, and to see if teacher that stand firm on administrative stabilities are by and large more satisfied with their positions than academics that do not hold comparable authoritative posts. The study likewise discovered that college employees are rationally satisfied with their positions, even though there are parts of their positions from which they get some discontent. With the utilization of a factual trial of contrasts, it was seen that college and their main differ extensively on the degrees of happiness which they get from most parts of occupations performed by them. Wellsprings of these distinctions are laid out, and the overall viewpoint is that administration position, classified by status in rank, age, and length of administration, and so on hopefully affects the degree of job satisfaction of college teacher.

**Educators and their motivator and hygiene factors.**

Foor and Cano (2011) The ongoing review was directed to discover the degree of job satisfaction of employees gaining practical experience in rural correspondence, agricultural authority, farming educator instruction, and expansion training and to figure out which occupation factors are the best indicators of a singular's general job satisfaction. Study research plans were used to gather information from individuals from the American Association for Agricultural Education with specializations in the previously mentioned disciplines. The Three Factor Job Satisfaction Scale was utilized to quantify employees' degree of satisfaction with the strategy and organization, self-awareness and satisfaction, and monetary assets work factors as well as the degree of by and large work satisfaction. Distinctive and social measurements were utilized to investigate the information. By and large, employees were decently happy with their positions, with the self-improvement and satisfaction work factor making sense of the best extent of change in generally work satisfaction scores. Also, chairmen and division seats ought to return to the need levels that connect with the inspiration and cleanliness factors connected to the variable's strategy and organization and monetary assets to know employees' requirements more readily for further developing satisfaction around there.



Maria de Lourdes Machado et al., (2011) Paper examines a concentrate on academic satisfaction and inspiration, whose primary goal is to recognize factors and their collaborations influencing the aspects related with work satisfaction and inspiration of the educational staff inside Portuguese advanced education organizations. paper presents results from a public study applied to all universe of employees including all subgroups (teacher, specialist, parttime, full-time, and so on), and institutional kinds of Portuguese advanced education organizations (public-private, college polytechnic, and so on.). Assessment of Academic Job Satisfaction and Motivation in Portuguese Higher Education - involved a quantitative non-exploratory plan that used a study (survey). polytechnic establishments are happier with the social esteem of their work (implies are 7.0 and 6.9 individually). Academic staff in state funded colleges and in open polytechnic foundations is less happy with this viewpoint (implies are 6.1 and 6.2 separately). Regarding by and large satisfaction with showing action, educators working in private advanced education organizations are the most fulfilled (mean is 7.2 both for private colleges and for private polytechnic foundations). Less fulfilled are the educators who educate in state funded colleges (mean=6.4) and in open polytechnic foundations (mean=6.7). The discoveries from this study must to raise mindfulness, responsiveness, and exchange in regards to the significant issues that should be addressed to advance and keep up with job satisfaction and inspiration inside the positions of the scholarly staff.

Anum Siddique et al., (2011) The theoretical system created in this paper has investigated the connection among Academic Leadership, Motivation of Faculty Members, and Organizational Effectiveness in advanced education setting. The model has been created actuating linkage among Academic Leadership, Motivation of Faculty Members and Organizational Effectiveness. model additionally portrays that on the off chance that valid academic authority will not be set up and inventors are not giving money related and non-financial advantages to branch their employees, then they may truly or mentally leave their association which will create hostile results on establishment.

Noraani Mustapha (2013) The target of this study is to decide the impact of monetary prize on work satisfaction among teachers in four state funded colleges in Kelantan, Malaysia. Then, at that point, the resolve cycle was finished through orderly arbitrary method. The estimation for monetary award was created by Zainuddin (2010) to gauge the compensation/pay as one of the determinants of job satisfaction. In this review, the Pearson Correlation Coefficient was used to break down the information. As indicated by Heathfield, S.M. (2012), pay is a decent measure of cash or remuneration paid to a representative by a business in return for a useful work performed. Compensation framework assumes a significant part in deciding a representative's degree of occupation satisfaction. This finding is valuable particularly in deciding position satisfaction among instructors. Thus, the association ought to consider monetary compensation as one of the elements in advancing position satisfaction among representatives.

Madhu Gupta and Manju Gehlawat (2013) specialists expected to look at the specific employment satisfaction and work inspiration of auxiliary teachers as for a few segment factors. job satisfaction and work inspiration were treated as reliant factors. The autonomous factors contained orientation, sort of schools, showing experience and instructive capabilities. With the end goal of examination, distinct overview technique was utilized. The example included 400 auxiliary teachers working in schools situated in Rohtak Division associated to HBSE and was chosen by Multi-Stage Random Sampling method. Individual Data Sheet ready by the specialists, Job Satisfaction Scale (JSS) by Dixit (1993) and Employees Motivation Schedule (EMS) by Srivastava (1988) were utilized for the assortment of information. The acquired information was dissected utilizing implies, S. D's and t-test. The discoveries of the review uncovered: I) No massive contrast was secured in the position satisfaction and work inspiration of male and female instructors ii) There were tremendous contrasts among educators working in government and tuition-based schools; more experienced and less experienced instructors regarding position satisfaction and work inspiration iii) Significant distinction was described for in the work inspiration of teachers having graduate and post-graduate capabilities.

Gordana Stankovska et al., (2017) The primary reason for this exploration was to examine the possible connection between work inspiration and occupation satisfaction among academic staff. The Job Satisfaction Review (JSS) and Job Motivation Questionnaire (JMQ) were managed to an example of 100 (50 male and 50 females) college staffs. To explore the effect of inspiration, pay, advancement, oversight, incidental advantages, contingent prizes, working methodology, associates, nature of work and correspondence on work satisfaction of academics in the Republic of Macedonia. The example for this review involved 100 full-time academic staff including aides, right hand teachers, academic partners, and full teachers. All representatives are matured between 28 to 60 years. Windows bundle program was applied. Repetitive measurements were utilized to divide the information. Pearson connection and one way Analysis of Variance (ANOVA) were done to observe the p esteem and measurable contrasts among gatherings. In this review, the importance levels were acknowledged as .01 or .05. The aftereffects of this study demonstrated that work inspiration has direct impact to the show satisfaction. The work inspiration can influence work satisfaction of scholastic staff either straightforwardly or by implication.

### **Educators and its impact on performance and commitment**

Sobia Ali and Yasir Aftab Farooqi (2014) This study is to distinguish the impact of work overburden on Job Satisfaction and impact of occupation satisfaction on worker execution and representative commitment A Case of Public Sector University of Gujranwala Division Pakistan. Review strategy has been utilized for information assortment technique in which survey was utilized as instrument of study strategy and survey has been appropriated to test of the objective public. This study uncovered the relationship of work over-burden on work

satisfaction of the staff which is most significant thing of any association. Consistent evaluation projects and appreciation ought to be given to re-establish and inspire the representatives. Other than this, a portion of the actions can be taken up by the work force to adapt to the work over-burden incorporate. Undesirable work over-burden among individuals mindful in helping what is to come age's administration will at last influence their academic and social capacities. The extent of examination was confined because target populace was restricted to "Staff of one Public Sector University of Gujranwala Division. This examination is a contextual analysis, so results could not be summed up to entire just on Public Sector University.

Monica M. McGill and Amber Settle (2012) study is to Identifying Effects of Institutional Resources and Support on Computing Faculty Research Productivity, Tenure, and Promotion in US and Canadian establishments. One investigation discovered that administration researchers with higher status were bound to be distributed in records with higher effect factors, in any event, when their original duplicates were not of better calibre (Amo et al., 2012). This Study picked a quantitative report and made a cross-sectional overview to gather information expected to investigate the inquiries. The overview, was done in three segments were made: socioeconomics, institutional help and assets, and staff judgements. One more significant element revealed while investigating this examination question is that both refereed diaries and meetings are significant variables in accomplishing residency and advancement.

Maha Ahmed, Zaki Dajani (2015), Study review uncovered execution benefits accumulated from expanded worker responsibility like expanded work satisfaction; expanded work execution; diminished representative turnover, diminished non-appearance. Responsibility exists as a multi-layered build that incorporates three kinds of authoritative responsibility for example emotional responsibility, duration responsibility and standardizing responsibility.

Castro et al., (2016) Information and correspondence advancements (ICT) like PCs, sight and sound frameworks, efficiency programming, and the Internet have extraordinarily worked on the exhibition of various associations and impacted higher learning establishments like Sorsogon State College (SSC) to create and carry out resourceful instructing and learning strategies. Unmistakable correlational strategy was utilized to decide the connection between the profile of the staff and their preparation to instruct with ICT. It was directed during the scholarly year 2012-2013. There is no critical connection among age and human-asset availability, and field of specialization with their status to instruct with ICT. Among the most recognized factors why some employees do not utilize ICT assets were inaccessibility of ICT assets, absence of information and absence of harmony to ICT ideas and applications.

### **Educators and Organizational Culture impact on Job Satisfaction**

Sabri, Ilyas, Amjad (2011) Present review intends to decide the impact of authoritative culture on work satisfaction level of teachers of public and private area advanced education foundations and colleges of Lahore which is second biggest city of Pakistan and a centre of advanced education. Information was gathered from an example of 347 educators through

organized survey. Relapse investigation was run to decide the impact of imposing culture on work satisfaction of teachers. Head Components Analysis (PCA) has been utilized in this review to foster variables from various things on each build for example authoritative culture and occupation satisfaction into their individual dependable scales. The impact of these the two sorts of culture is positive and huge on work satisfaction of instructors of advanced education foundations and colleges of Lahore. However, hierarchical culture connected with workers assumes more grounded part in making position satisfaction of educators of advanced education establishments and colleges than authoritative culture connected with administrators and pioneers. Based on discoveries of this study we suggest that approach producers ought to make steady hierarchical culture in advanced education establishments and colleges to raise the work satisfaction level of educators of these organizations.

Muhammad Ilyas, Tamrin Abdullah (2016) This exploration intended to concentrate because of Leadership, Organizational Culture, Emotional Quotation, and Job Satisfaction to Teacher Performance of Senior High School at Palopo Municipality South Sulawesi, Indonesia from August 2011 to December 2011. While the objective populace are instructors of 6 (six) state secondary school Palopo upwards of 351 individuals, and is utilized as a testing outline. This examination utilizes a quantitative methodology with overview technique. This study was to research the impact of exogenous factors (initiative, hierarchical culture, the ability to understand people on a profound level, and occupation satisfaction) of the endogenous variable (execution). The outcomes were: (1) Leadership straightforwardly influences educator execution; (2) Emotional citation straightforwardly impacts instructor execution; (3) Job Satisfaction straightforwardly impacts instructor execution; (4) Leadership straightforwardly impacts work satisfaction; (5) Organizational Culture straightforwardly impacts work satisfaction; (6) Emotional Quotations straightforwardly impacts work satisfaction.

Meithiana Indrasari (2017) This study aims to survey the impact of institute culture, workplace, administration style on job satisfaction teachers as well as to investigate the impact of hierarchical culture, workplace, initiative style to the exhibition of teachers Buongiorno State Community College. decline investigation of this only is done individually between the factors of authoritative culture (X1) to work satisfaction instructor (Z), workplace (X2) on work satisfaction speaker (Z), administration style variable (X3) on work satisfaction teacher ( Z), and between the factors of hierarchical culture (X1) on the presentation of teachers (Y), workplace (X2) on the exhibition of teachers (Y), initiative style variable (X3) on the presentation of speakers (Y), variable work satisfaction on (Z ) to variable instructor's exhibition (Y). additionally do the different co-relations and relapse in an equivalent element. In view of the examination results got that, there are overall certain and critical relationship between hierarchical culture, workplace, administration style on work satisfaction and execution of Community State Academy speaker Buongiorno.

## KEY FINDINGS

A lot of learned researchers have contributed immensely to this area of study and have made this area very rich and informative for any new researcher. The methodology is also very varied and conclusions are very logical. Job satisfaction or contentment is a popular area of research work and varied results have obtained by different researchers due to change in methodology and type of teachers. It is an accepted truth that satisfied employees can only keep customers happy; academics is no exception to this rule. Although, students have not been accepted universally as students for educational institutions, but faculty members or teachers are employees and they have their own specific characteristics as knowledge workers. It is also very important to improve organizational productivity, to improve employee performance, to attain, retain and sustain employees in the organization for the sheer reason of, rapid growth and development of the organization and for many more organizational benefits.

## CONCLUSION

This paper includes the perspectives of various researchers regarding job satisfaction. They found that job satisfaction of faculty members is very critical aspect for all the higher educational institutes and it affects performance of employees and quality of education in all the higher education institutes. By keeping this importance of employee job satisfaction or contentment in mind every institution is checking employee satisfaction by using various tools like job satisfaction surveys, employee's group discussions and meetings and focus group interviews. Though, a massive amount of work has been carried out globally, more contemporary research adding local constraints and conditions can provide more actionable findings. Rather than directly acting upon the finding of such a satisfaction survey, it is indeed important to examine the psychological aspects of employees, type of sector of their work and other relevant factors. Thus, this area of job satisfaction among faculty members is a well-researched and well discussed topic all over the world.

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## **An Analysis of Corporate Governance of selected Indian Banks**

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### **ABSTRACT**

Corporate governance plays very important role in the development of economy. It provides path for leading success in the organisation. It is one of the parameter along with Financial Statements that helps investors to judge the performance of the entity. Banks are the base of the economy of any country. It helps people in circulating money in the economy. There is need of strong corporate governance compliance culture in Bank. This paper analyses the status of corporate governance variables of selected Indian Bank during five years period commencing from FY2016-17 to FY2020-21. It reviews Corporate Governance variables like Board Diversity, efficiency of directors through their participation in the Board Meetings, CSR Compliance, Sexual Harassment Complaints, Fraud reported, Penalty and Stricture imposed by regulators, Investor Complaints, Customer Complaints, etc. This paper will help in understanding the compliance culture of Banks specifically in above areas of corporate governance. There is further scope of detailed study in compliance area like CSR Policy of the entity, Preventions of Sexual Harassment policy, Fraud detection and prevention strategy of Bank, etc.

**Keywords:** *Corporate Governance, Banks, Diversity, Board of Directors, Compliance Culture, CSR Compliance, Fraud, Sexual Harassment, Penalty*

### **INTRODUCTION**

Corporate governance is the system, procedure, guidelines and framework for governing the organization. It starts even before formation of the company i.e. at the stage of planning and setting up of the unit, in the form of Management decision and developing strategy / plan for the company. It lasts beyond the company cease to exist as it leaves long impact on the society for its deed. It involves various factors like Management, Financial, Transparency, Accountability, etc. to judge whether company is well governed and where the company is stand.

Bank are playing crucial role in running our economy. They are the base for circulating money in financial system. Banking in India is majorly run by Public Sector and Private Sector Banks. They are governed under various regulations like Companies Act, 2013, Banking Companies (Acquisition and Transfer of Undertakings) Act, 1970, Banking Regulation Act. Government of India controls the Public Sector Bank due to their major stake holding in PSB while RBI monitors Banks in India.

Corporate Governance in Bank is utmost important due to their nature of business. Bank requires diverse and talented pool of management to run it smoothly. It is people's money which is handled by Bank. Hence, corporate governance plays very important role in Banks.

## RESEARCH METHODOLOGY

For the purpose of study, we have taken limited corporate governance variables i.e. Board Diversity, Status of shareholders complaints, position of physical shareholders, sexual harassment, CSR spending, Gender diversity, customer complaint, fraud reporting, penalty and strictures imposed and attendance of directors in board meeting. We have analyzed five years data from FY2016-17 to FY2020-21 of top 10 Banks based on market capitalization as of 31.03.2021 from Annual Report / Business Responsibility Report of the Bank and Website of Stock Exchanges. These Banks include five public sector banks and five private sector Bank. Public sector banks covered are State Bank of India (SBI), Punjab National Bank (PNB), Bank of Baroda (BOB), Indian Overseas Bank (IOB) and Canara Bank (Canara). Five private sector banks include HDFC Bank (HDFC), ICICI Bank (ICICI), Kotak Mahindra Bank (Kotak), Axis Bank (Axis) and IndusInd Bank (IndusInd). We have taken historical data based on facts and figures available to find out the present level of corporate governance compliance culture of the Bank.

## OBJECTIVE

To assess the corporate governance compliance culture of Banks in the area of Board Diversity, Status of shareholders complaints, position of physical shareholders, sexual harassment, CSR spending, Gender diversity, customer complaint, fraud reporting, penalty and strictures imposed and attendance of directors in board meeting.

## ANALYSIS OF CORPORATE GOVERNANCE:

### 1. Board Diversity:

Board Diversity refers to the involvement of different category of directors in composition of Board of Directors. There are various categories of directors that plays an important role in decision making of an entity, it includes Executive / Whole Time Directors, Non-Executive Directors, Independent Directors, Women Directors, Nominee Directors.

While SEBI and Companies Act emphasize on role of Independent Director in composition of Board of Directors of the entity, it also emphasize the role of Women Director in diversity of Board.

### Role of Board Diversity in Corporate Governance:

Corporate Governance is the governance of the organization through their stakeholders and management. Stakeholders indirectly holds interest in the Company while Board Member directly execute the plan for achieving success for the company. Having diverse Board Members help the company to achieve desired result with care and efficiency. Independent Directors are the core in decision making in Board Meeting. It represents interest of stakeholders. Women Director are also important as they represent gender diversity which is also a part of sustainable development. Hence, Board diversity helps in climbing success ladder to the organization with mindful decision and expertise knowledge.

Based on the analysis of top 5 Public Sector Bank and top 5 Private Sector Bank, it is found as follows:

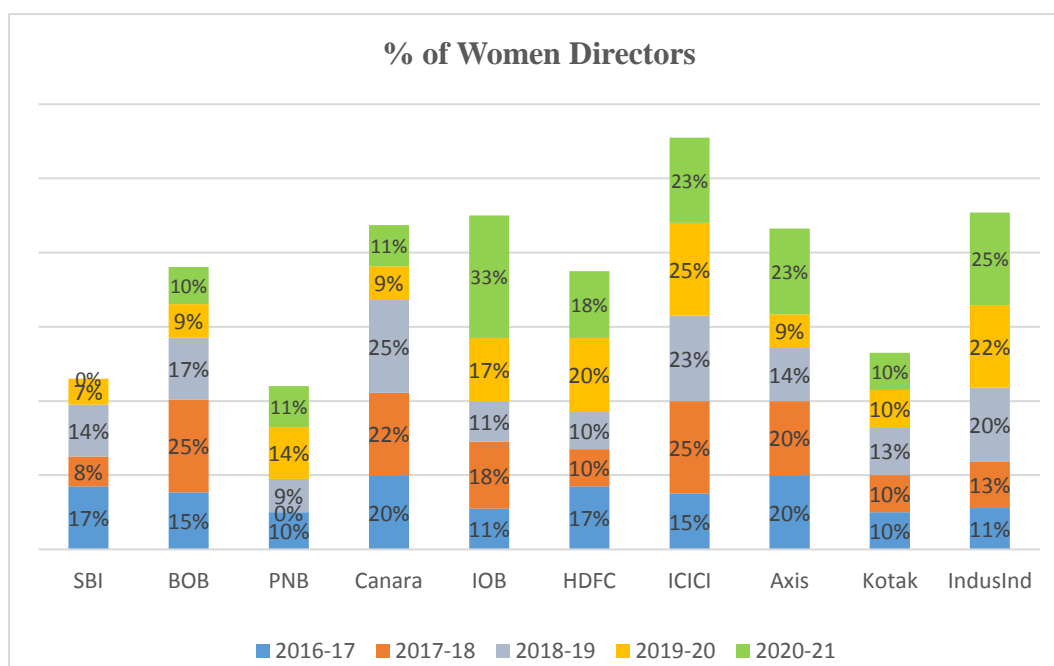
**a) Women Directors:**

Women Director on the Board represents Gender Diversity at Top Management of the Bank. It is observed that Banking Sector is not very much to Women Director at the Top Level as majority of the Bank had only 1-2 Women Directors on the Board in total Board of Directors strength. SEBI (LODR) Regulations, prescribes minimum one woman director on the Board.

It was also found that-

- ICICI Bank has the highest ratio of Women Directors on the Board during FY2017 to FY2021 compared to other peers.
- PNB has the lowest percentage of Women Director on the Board.
- SBI and PNB had no Women Director on the Board during FY2020-21 and FY2017-18 respectively.

**Chart – 1**

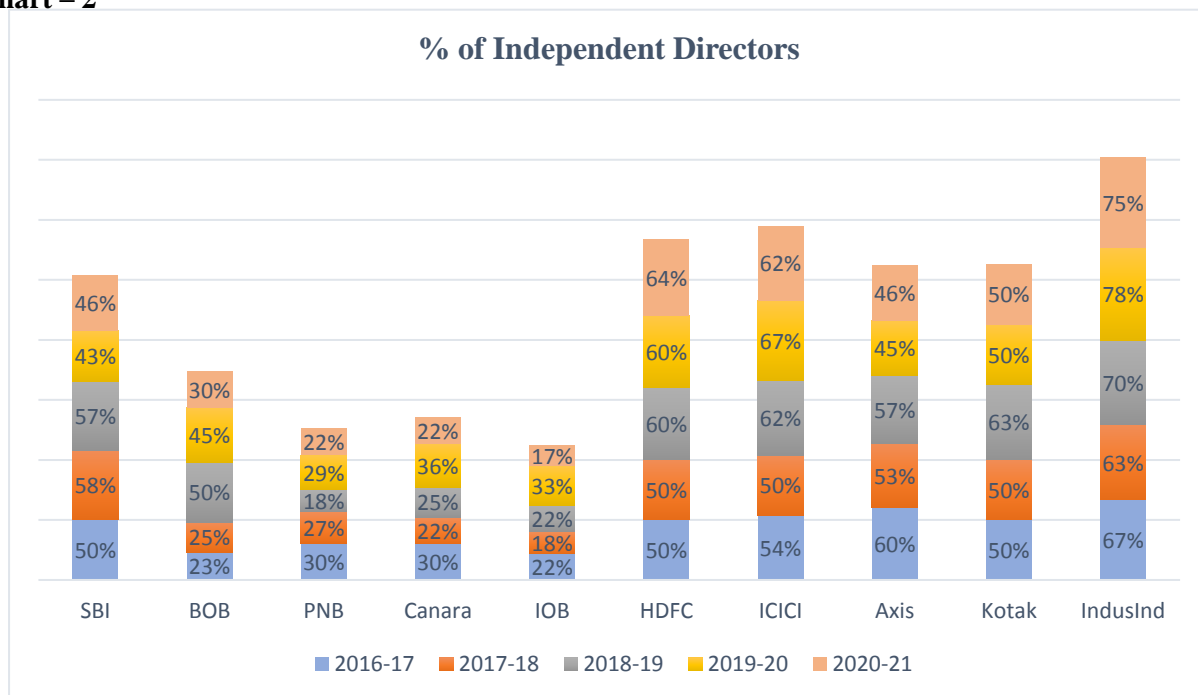


**b) Independent Directors:**

Independent Director on the Board is appointed for the purpose of Independent decision making and providing expert knowledge to the organization. They helps in smooth decision making and providing valuable inputs to the Board of Directors. SEBI (LODR) Regulations, prescribes that at least one-third of the board of directors should comprise of independent directors. It was also found that

- IndusInd Bank has the highest percentage of Independent Directors during FY2017 to FY2021 on the Board compare to other peers.
- IOB has the lowest percentage of Women Director on the Board.
- Public Sector Bank is having low number of Independent Director compared to their Private Peer.

Chart – 2

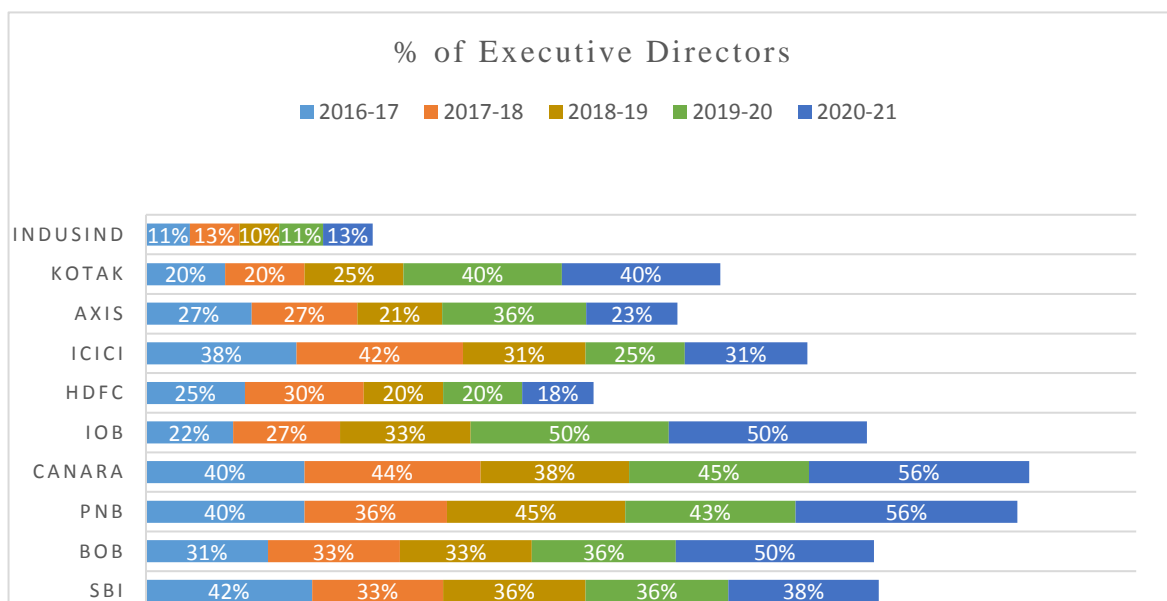


**c) Executive Directors:**

Executive Director are responsible for managing day to day function of the Board. They are full time member of the Board. All Imported decision are routed through them for placing with Board of Directors. Larger the organization, more number of Executive Directors are required to manage the routine and important business. It was also found that

- Canara Bank has the highest percentage of Executive Directors during FY2017 to FY2021 on the Board compare to other peers.
- IndusInd Bank has the lowest percentage of Executive Directors on the Board.
- Private Sector Bank is having low number of Executive Directors compared to their Public Peer.

Chart – 3



**Issues observed:**

- Government of India appoints Directors on Board of Public Sector Bank. Every Public Sector Banks are required to appoint at least 12-16 directors on the Board depending on their eligibility criteria for number of directors appointment. However, many positions like workmen director, employee director, CA director are vacant in major PSBs.
- Private Sector Bank are more open to attract the talent pool from the market due to attractive benefits and perks compared to their public sector peer.
- Due to less no. of directors on Board, other directors in PSB may face
- Based on data, it shows that all Banks are very less open to Women Directors in top position. Major Banks have appointed women director at regulatory level only and not beyond that.

**Suggestions:**

- Uniform rule for all listed entity related to appointment and selection of directors may help to have a common structure of Board and will reduce decision burden on small no. of directors.
- Government should provide flexibility to Bank for deciding remuneration of director for appointment talented pool from the market.
- Regulator should raise the ceiling of minimum women director from one to three to have gender diversity on board.

**Table -1: Position of Directors during FY2017-FY2021 in Banks**

**SBI**

Year	2016-17	2017-18	2018-19	2019-20	2020-21
Total Directors	12	12	14	14	13
Executive Directors	5	4	5	5	5
% of Executive Directors	42%	33%	36%	36%	38%
Non - Executive Directors	7	8	9	9	8
% of Non - Executive Directors	58%	67%	64%	64%	62%
Independent Directors (Non – Executive Directors)	6	7	8	6	6
% of Independent Directors (Non – Executive Directors)	50%	58%	57%	43%	46%
No. of Women Director	2	1	2	1	0
% of Women Director	17%	8%	14%	7%	0%

**BOB**

Year	2016-17	2017-18	2018-19	2019-20	2020-21
Total Directors	13	12	12	11	10
Executive Directors	4	4	4	4	5
% of Executive Directors	30.77%	33.33%	33.33%	36.36%	50.00%

Non - Executive Directors	9	8	8	7	5
% of Non - Executive Directors	69.23%	66.67%	66.67%	63.64%	50.00%
Independent Directors (Non – Executive Directors)	3	3	6	5	3
% of Independent Directors (Non – Executive Directors)	23.08%	25.00%	50.00%	45.45%	30.00%
No. of Women Director	2	3	2	1	1
% of Women Director	15.38%	25.00%	16.67%	9.09%	10.00%

**PNB**

<b>Year</b>	<b>2016-17</b>	<b>2017-18</b>	<b>2018-19</b>	<b>2019-20</b>	<b>2020-21</b>
Total Directors	10	11	11	7	9
Executive Directors	4	4	5	3	5
% of Executive Directors	40%	36%	45%	43%	56%
Non - Executive Directors	6	7	5	4	4
% of Non - Executive Directors	60%	64%	45%	57%	44%
Independent Directors (Non – Executive Directors)	3	3	2	2	2
% of Independent Directors (Non – Executive Directors)	30%	27%	18%	29%	22%
No. of Women Director	1	0	1	1	1
% of Women Director	10%	0%	9%	14%	11%

**Canara**

<b>Year</b>	<b>2016-17</b>	<b>2017-18</b>	<b>2018-19</b>	<b>2019-20</b>	<b>2020-21</b>
Total Directors	10	9	8	11	9
Executive Directors	4	4	3	5	5
% of Executive Directors	40.00%	44.44%	37.50%	45.45%	55.56%
Non - Executive Directors	6	5	5	6	4
% of Non - Executive Directors	60.00%	55.56%	62.50%	54.55%	44.44%
Independent Directors (Non – Executive Directors)	3	2	2	4	2
% of Independent Directors (Non – Executive Directors)	30.00%	22.22%	25.00%	36.36%	22.22%
No. of Women Director	2	2	2	1	1
% of Women Director	20.00%	22.22%	25.00%	9.09%	11.11%

**IOB**

<b>Year</b>	<b>2016-17</b>	<b>2017-18</b>	<b>2018-19</b>	<b>2019-20</b>	<b>2020-21</b>
Total Directors	9	11	9	6	6
Executive Directors	2	3	3	3	3
% of Executive Directors	22%	27%	33%	50%	50%
Non - Executive Directors	7	8	6	3	3
% of Non - Executive Directors	78%	73%	67%	50%	50%
Independent Directors (Non – Executive Directors)	2	2	2	2	1
% of Independent Directors (Non – Executive Directors)	22%	18%	22%	33%	17%
No. of Women Director	1	2	1	1	2
% of Women Director	11%	18%	11%	17%	33%

**HDFC**

<b>Year</b>	<b>2016-17</b>	<b>2017-18</b>	<b>2018-19</b>	<b>2019-20</b>	<b>2020-21</b>
Total Directors	12	10	10	10	11
Executive Directors	3	3	2	2	2
% of Executive Directors	25%	30%	20%	20%	18%
Non - Executive Directors	9	7	8	8	9
% of Non - Executive Directors	75%	70%	80%	80%	82%
Independent Directors (Non – Executive Directors)	6	5	6	6	7
% of Independent Directors (Non – Executive Directors)	50%	50%	60%	60%	64%
No. of Women Director	2	1	1	2	2
% of Women Director	17%	10%	10%	20%	18%

**ICICI**

<b>Year</b>	<b>2016-17</b>	<b>2017-18</b>	<b>2018-19</b>	<b>2019-20</b>	<b>2020-21</b>
Total Directors	13	12	13	12	13
Executive Directors	5	5	4	3	4
% of Executive Directors	38%	42%	31%	25%	31%
Non - Executive Directors	8	7	9	9	9
% of Non - Executive Directors	62%	58%	69%	75%	69%
Independent Directors (Non – Executive Directors)	7	6	8	8	8



%Independent Directors (Non – Executive Directors)	54%	50%	62%	67%	62%
No. of Women Director	2	3	3	3	3
% of Women Director	15%	25%	23%	25%	23%

**AXIS**

<b>Year</b>	<b>2016-17</b>	<b>2017-18</b>	<b>2018-19</b>	<b>2019-20</b>	<b>2020-21</b>
Total Directors	15	15	14	11	13
Executive Directors	4	4	3	4	3
% of Executive Directors	26.67%	26.67%	21.43%	36.36%	23.08%
Non - Executive Directors	11	11	11	7	10
% of Non - Executive Directors	73.33%	73.33%	78.57%	63.64%	76.92%
Independent Directors (Non – Executive Directors)	9	8	8	5	6
%Independent Directors (Non – Executive Directors)	60.00%	53.33%	57.14%	45.45%	46.15%
No. of Women Director	3	3	2	1	3
% of Women Director	20.00%	20.00%	14.29%	9.09%	23.08%

**KOTAK**

<b>Year</b>	<b>2016-17</b>	<b>2017-18</b>	<b>2018-19</b>	<b>2019-20</b>	<b>2020-21</b>
Total Directors	10	10	8	10	10
Executive Directors	2	2	2	4	4
% of Executive Directors	20%	20%	25%	40%	40%
Non - Executive Directors	8	8	6	6	6
% of Non - Executive Directors	80%	80%	75%	60%	60%
Independent Directors (Non – Executive Directors)	5	5	5	5	5
%Independent Directors (Non – Executive Directors)	50%	50%	63%	50%	50%
No. of Women Director	1	1	1	1	1
% of Women Director	10%	10%	13%	10%	10%

**INDUSIND**

<b>Year</b>	<b>2016-17</b>	<b>2017-18</b>	<b>2018-19</b>	<b>2019-20</b>	<b>2020-21</b>
Total Directors	9	8	10	9	8
Executive Directors	1	1	1	1	1

% of Executive Directors	11.11%	12.50%	10.00%	11.11%	12.50%
Non - Executive Directors	8	7	9	8	7
% of Non - Executive Directors	88.89%	87.50%	90.00%	88.89%	87.50%
Independent Directors (Non – Executive Directors)	6	5	7	7	6
%Independent Directors (Non – Executive Directors)	66.67%	62.50%	70.00%	77.78%	75.00%
No. of Women Director	1	1	2	2	2
% of Women Director	11.11%	12.50%	20.00%	22.22%	25.00%

## **2. Shareholders Complaints:**

Shareholders are the main stakeholders of the Company. They are the real owner of the Company who invests their money in form of capital in the business. Board of Directors are responsible to the Shareholders for Company’ management. There are various types of shareholders i.e. Corporates, FII, FPI, Resident Individuals, Non Resident, Institutional Investors, etc. Mechanism and disclosure of Shareholders complaints are governed under SEBI (LODR) Regulations.

### Role of Shareholders Complaints in Corporate Governance:

Shareholders are the capital investor of the Company. They invest capital in the form of equity, which helps company to run the business smoothly and achieve its targets. Governance of the organization is possible if it has enough Man (i.e. Management / Employee), Fund (i.e. Capital) and End user (i.e. Customers). Shareholder’s view / complaints should be addressed / redressed by management in time. Non redressal of grievances may also attract the penalty from the regulators and may create negative image of the company in the market. Shareholder’s complaint can be reduced by developing as system for providing timely and effective support to them for their query.

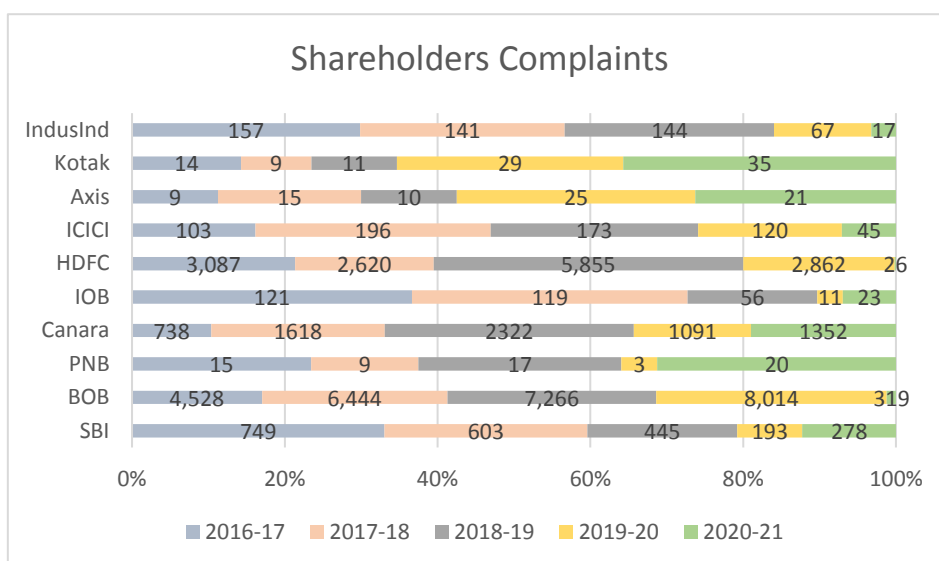
Shareholders complaints includes majorly complaints from physical shareholders for transmission, deletion of name, demat request, dividend related queries. However, Banks are not disclosing details of these complaints in Annual Report.

On analyzing the shareholders grievances reported by the Bank, it was found following-

- BOB has the highest number of shareholders grievances compares to other Banks followed by HDFC Bank and Canara Bank.
- Highest number of complaints received during a period is 8,014 complaints in Bank of Baroda during FY2018-19.
- PNB had the lowest no. of shareholders grievances followed by Axis Bank and Kotak Mahindra Bank.

- SBI is having highest number of shareholders amongst all Banks in India followed by HDFC Bank and PNB.

Chart - 4



**Issues observed:**

- What consist of shareholders complaints are not defined and disclosed in Annual Report of the Bank.
- It is observed that shareholder’s request takes form of complaint when it is not properly resolved by Bank. It shows lack of proper system / mechanism for resolution of shareholders complaint.
- Bank usually resolve complaints of shareholders through their Registrar and Share Transfer Agent (RTA). We have very few RTAs in the market for large no. shareholders of all listed entities. Thus, RTAs are overburden by shareholder’s complaints which may also result in timely attending and resolution of the complaints.
- There is lack of disclosure of proper escalation matrix in case of non-resolution of the complaints.

**Suggestions:**

- Listed entity should disclose types of shareholder’s complaints they are receiving in Annual Report.
- Shareholders Complaint redressal policy should be framed incorporating mechanism / system / escalation matrix for timely complaint redressal.
- Proper awareness / disclosure in newspaper / website / stock exchanges should be made to shareholders for approaching their complaint to the entity.

Table -2: Position of Shareholders Complaints during FY2017-FY2021 in Banks

**SBI**

Year	2016-17	2017-18	2018-19	2019-20	2020-21
No. of Shareholders Complaint received	749	603	445	193	278

<b>% Increase / Decrease in Complaints</b>	-	-19.49%	-26.20%	-56.63%	44.04%
Total Share holders	15,63,380	16,18,856	15,04,373	25,25,912	27,87,479

#### BOB

Year	2016-17	2017-18	2018-19	2019-20	2020-21
No. of Shareholders Complaint received	4,528	6,444	7,266	8,014	319
<b>% Increase / Decrease in Complaints</b>	-	42.31%	12.76%	10.29%	-96.02%
Total Share holders	3,06,622	3,39,586	3,80,199	9,11,089	11,97,154

#### PNB

Year	2016-17	2017-18	2018-19	2019-20	2020-21
No. of Shareholders Complaint received	15	9	17	3	20
<b>% Increase / Decrease in Complaints</b>	-	-40.00%	88.89%	-82.35%	566.67%
Total Share holders	3,67,730	4,80,078	6,66,124	7,98,224	14,20,721

#### Canara

Year	2016-17	2017-18	2018-19	2019-20	2020-21
No. of Shareholders Complaint received	738	1618	2322	1091	1352
<b>% Increase / Decrease in Complaints</b>	-	119.24%	43.51%	-53.01%	23.92%
Total Share holders	1,64,670	1,53,150	1,92,937	2,30,595	5,76,072

#### IOB

Year	2016-17	2017-18	2018-19	2019-20	2020-21
No. of Shareholders Complaint received	121	119	56	11	23
<b>% Increase / Decrease in Complaints</b>	-	-1.65%	-52.94%	-80.36%	109.09%
Total Share holders	2,54,396	2,55,541	2,77,982	2,77,955	3,86,162

#### HDFC

Year	2016-17	2017-18	2018-19	2019-20	2020-21
No. of Shareholders Complaint received	3,087	2,620	5,855	2,862	26
<b>% Increase / Decrease in Complaints</b>	-	-15.13%	123.47%	-51.12%	-99.09%
Total Share holders	4,81,983	5,32,368	6,18,595	13,49,474	14,43,193

#### ICICI

Year	2016-17	2017-18	2018-19	2019-20	2020-21
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No. of Shareholders Complaint received	103	196	173	120	45
<b>% Increase / Decrease in Complaints</b>	-	<b>90.29%</b>	<b>-11.73%</b>	<b>-30.64%</b>	<b>-62.50%</b>

#### AXIS

Year	2016-17	2017-18	2018-19	2019-20	2020-21
No. of Shareholders Complaint received	9	15	10	25	21
<b>% Increase / Decrease in Complaints</b>	-	<b>66.67%</b>	<b>-33.33%</b>	<b>150.00%</b>	<b>-16.00%</b>
Total Share holders	4,48,287	3,53,122	3,46,042	5,77,426	6,39,051

#### KOTAK

Year	2016-17	2017-18	2018-19	2019-20	2020-21
No. of Shareholders Complaint received	14	9	11	29	35
<b>% Increase / Decrease in Complaints</b>	-	<b>-35.71%</b>	<b>22.22%</b>	<b>163.64%</b>	<b>20.69%</b>

#### INDUSIND

Year	2016-17	2017-18	2018-19	2019-20	2020-21
No. of Shareholders Complaint received	157	141	144	67	17
<b>% Increase / Decrease in Complaints</b>	-	<b>-10.19%</b>	<b>2.13%</b>	<b>-53.47%</b>	<b>-74.63%</b>

### 3. Physical Shareholders:

Physical shareholders are shareholders who holds company's shares in physical form instead of holding the same in demat account. Earlier shares were issued in physical form to the investors. However, with the implementation of Demat Accounts, now a days shares are issued in demat form only. Regulators are also emphasizing on conversion of physical securities to demat. Physical shareholding may create following major problems to the company and shareholder:

1. Major Physical shareholders do not have their PAN/Address/Email ID / Bank accounts are registered in their folio. Because of this they do not get dividend / company's benefit / company's communication on time.
2. Major addresses are even not traceable as they are NRI / moved. Hence, they do not get any physical letter / correspondence also.
3. Company sends physical bulky annual report to these shareholders, which create negative environmental impact due to usage of paper in large quantity.
4. Shareholder are prohibited in selling of their physical shares until they dematerialise it. Hence, they could not be able to sell their physical shares.

#### Role of Physical Shareholders in Corporate Governance:

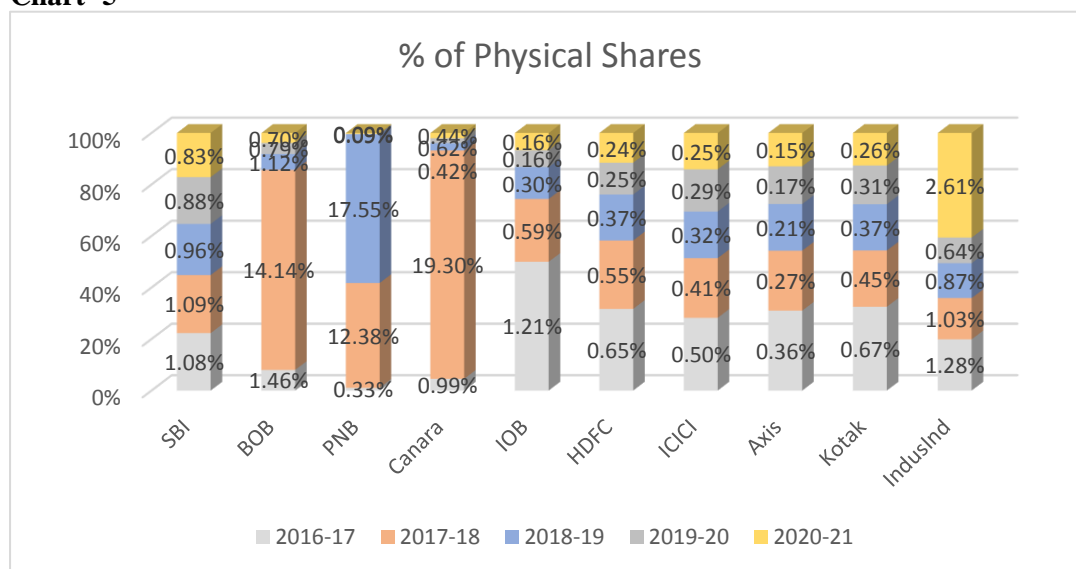
Physical shareholders are also important to the company. However, they may increase compliance cost

and grievances of shareholders. As company has to send physical documents to them, it is required to spend large sum of money in preparation and printing of physical annual report. Further, majority of the shareholders grievances to the company are from Physical shareholders as it involves complaints related to transmission of shares, deletion of name, KYC updating, etc. Hence, physical shareholders role in corporate governance is significant.

On analyzing the ration of physical shares in company's total outstanding shares, it was found following:

- Canara Bank, PNB and BOB had highest number of physical shares during FY2017-18. However, it was for a year due to capital infusion by Government of India, for which shares temporarily allotted in physical form.
- SBI has the highest number of physical shares amongst all Bank followed by BOB and IOB.
- In Private Sector, ICICI has the higher number of physical shares followed by HDFC.

Chart -5



**Issued observed:**

- Lack of proper awareness / education about benefit of conversion of physical shareholding to demat.
- Non traceability of shareholders who have shifted to out of country or moved to other location.
- Non availability of PAN and other KYC details in folio of physical shareholders.

**Suggestions:**

- Physical Shareholder should be traced through their dividend payee banks.
- Regulator should made it mandatory to convert physical holding to demat and freezing of folio in case of non-conversion.
- Awareness / education programmer should be conducted region / city wise for making aware shareholders about benefits of demat conversion.

**Table -3: Position of Physical Shares and Shareholders during FY2017-FY2021 in Banks****SBI**

<b>Year</b>	<b>2016-17</b>	<b>2017-18</b>	<b>2018-19</b>	<b>2019-20</b>	<b>2020-21</b>
Physical Shares (in crores)	8.59	9.74	8.59	7.69	7.41
Demat Shares (in crores)	788.76	882.72	883.88	884.77	885.05
Total Shares (in crores)	797.35	892.46	892.46	892.46	892.46
<b>% of Physical Shares</b>	<b>1.08%</b>	<b>1.09%</b>	<b>0.96%</b>	<b>0.88%</b>	<b>0.83%</b>
Physical Share holders	1,72,637	2,29,120	2,05,721	1,87,094	1,81,057
Demat Share holders	13,90,743	13,89,736	12,98,652	23,38,818	26,06,422
Total Share holders	15,63,380	16,18,856	15,04,373	25,25,912	27,87,479
<b>% of Physical Shareholders</b>	<b>11.04%</b>	<b>14.15%</b>	<b>13.67%</b>	<b>7.41%</b>	<b>6.50%</b>

**BOB**

<b>Year</b>	<b>2016-17</b>	<b>2017-18</b>	<b>2018-19</b>	<b>2019-20</b>	<b>2020-21</b>
Physical Shares (in crores)	3.37	37.40	2.97	3.64	3.60
Demat Shares (in crores)	227.04	227.15	261.58	458.41	513.54
Total Shares (in crores)	230.42	264.55	264.55	462.06	517.14
<b>% of Physical Shares</b>	<b>1.46%</b>	<b>14.14%</b>	<b>1.12%</b>	<b>0.79%</b>	<b>0.70%</b>
Physical Share holders	43,678	42,242	38,616	1,26,677	1,26,001
Demat Share holders	2,62,944	2,97,344	3,41,583	7,84,412	10,71,153
Total Share holders	3,06,622	3,39,586	3,80,199	9,11,089	11,97,154
<b>% of Physical Shareholders</b>	<b>14.24%</b>	<b>12.44%</b>	<b>10.16%</b>	<b>13.90%</b>	<b>10.53%</b>

**PNB**

<b>Year</b>	<b>2016-17</b>	<b>2017-18</b>	<b>2018-19</b>	<b>2019-20</b>	<b>2020-21</b>
Physical Share holders	8,724	8,329	7,665	7,246	33,926
Demat Share holders	3,59,006	4,71,749	6,58,459	7,90,978	13,86,759
Total Share holders	3,67,730	4,80,078	6,66,124	7,98,224	14,20,721
<b>% of Physical Shareholders</b>	<b>2.37%</b>	<b>1.73%</b>	<b>1.15%</b>	<b>0.91%</b>	<b>2.39%</b>
Physical Shares (in crores)	0.70	34.17	80.82	0.58	0.92
Demat Shares (in crores)	212.10	241.89	379.58	673.17	1,046.85
Total Shares (in crores)	212.80	276.06	460.40	673.76	1,047.77
<b>% of Physical Shares</b>	<b>0.33%</b>	<b>12.38%</b>	<b>17.55%</b>	<b>0.09%</b>	<b>0.09%</b>

**Canara**

<b>Year</b>	<b>2016-17</b>	<b>2017-18</b>	<b>2018-19</b>	<b>2019-20</b>	<b>2020-21</b>
Physical Shares (in crores)	0.59	14.15	0.47	0.43	0.72

Demat Shares (in crores)	59.14	59.18	74.86	102.59	163.96
Total Shares (in crores)	<b>59.73</b>	<b>73.32</b>	<b>75.32</b>	<b>103.02</b>	<b>164.67</b>
<b>% of Physical Shares</b>	0.99%	19.30%	0.62%	0.42%	0.44%
Physical Share holders	25,480	24,201	20,627	19,121	1,14,387
Demat Share holders	1,39,190	1,28,949	1,72,310	2,11,474	4,61,685
Total Share holders	<b>1,64,670</b>	<b>1,53,150</b>	<b>1,92,937</b>	<b>2,30,595</b>	<b>5,76,072</b>
<b>% of Physical Shareholders</b>	15.47%	15.80%	10.69%	8.29%	19.86%

### IOB

Year	2016-17	2017-18	2018-19	2019-20	2020-21
Physical Shares (in crores)	2.96	2.90	2.74	2.66	2.65
Demat Shares (in crores)	242.50	486.18	911.42	1,641.03	1,641.10
Total Shares (in crores)	245.46	489.08	914.16	1,643.69	1,643.70
<b>% of Physical Shares</b>	1.21%	0.59%	0.30%	0.16%	0.16%
Physical Share holders	88,515	86,934	82,929	80,924	80,654
Demat Share holders	1,65,881	1,68,607	1,95,053	1,97,031	3,05,508
Total Share holders	2,54,396	2,55,541	2,77,982	2,77,955	3,86,162
<b>% of Physical Shareholders</b>	34.79%	34.02%	29.83%	29.11%	20.89%

### HDFC

Year	2016-17	2017-18	2018-19	2019-20	2020-21
Physical Share holders	61,081	51,109	39,112	26,133	24,621
Demat Share holders	4,20,902	4,81,259	5,79,483	13,23,341	14,18,572
Total Share holders	4,81,983	5,32,368	6,18,595	13,49,474	14,43,193
<b>% of Physical Shareholders</b>	12.67%	9.60%	6.32%	1.94%	1.71%
Physical Shares (in crores)	1.67	1.42	1.00	1.39	1.31
Demat Shares (in crores)	254.58	258.09	271.33	546.93	549.97
Total Shares (in crores)	256.25	259.51	272.33	548.33	551.28
<b>% of Physical Shares</b>	0.65%	0.55%	0.37%	0.25%	0.24%

### ICICI

Year	2016-17	2017-18	2018-19	2019-20	2020-21
Physical Shares (in crores)	2.91	2.61	2.08	1.89	1.76
Demat Shares (in crores)	579.54	640.19	642.54	645.39	689.84
Total Shares (in crores)	582.45	642.80	644.62	647.28	691.60
<b>% of Physical Shares</b>	0.50%	0.41%	0.32%	0.29%	0.25%



**AXIS**

Year	2016-17	2017-18	2018-19	2019-20	2020-21
Physical Shares (in crores)	0.85	0.69	0.55	0.48	0.45
Demat Shares (in crores)	238.65	255.97	256.61	281.69	305.92
Total Shares (in crores)	239.50	256.65	257.16	282.17	306.37
<b>% of Physical Shares</b>	0.36%	0.27%	0.21%	0.17%	0.15%
Physical Share holders	8,946	7,515	6,045	5,168	4,928
Demat Share holders	4,39,341	3,45,607	3,39,997	5,72,258	6,34,123
Total Share holders	4,48,287	3,53,122	3,46,042	5,77,426	6,39,051
<b>% of Physical Shareholders</b>	2.00%	2.13%	1.75%	0.90%	0.77%

**KOTAK**

Year	2016-17	2017-18	2018-19	2019-20	2020-21
Physical Shares (in crores)	1.22	0.87	0.71	0.59	0.52
Demat Shares (in crores)	182.86	189.70	190.17	190.72	197.67
Total Shares (in crores)	184.09	190.56	190.88	191.30	198.18
<b>% of Physical Shares</b>	0.67%	0.45%	0.37%	0.31%	0.26%

**INDUSIND**

Year	2016-17	2017-18	2018-19	2019-20	2020-21
Physical Shares (in crores)	0.76	0.62	0.53	0.44	2.02
Demat Shares (in crores)	59.05	59.41	59.74	68.91	75.32
Total Shares (in crores)	59.81	60.02	60.27	69.35	77.34
<b>% of Physical Shares</b>	1.28%	1.03%	0.87%	0.64%	2.61%

**4. Sexual Harassment:**

Companies Act and SEBI has made mandatory to disclosure sexual harassment related complaints in Annual Report of the listed entity. Every company should have policy for prevention of sexual harassment at workplace and every employee should made aware about this policy. Work environment should be safe for women. As more and more women are rising at top level of the organization, management should provide more concern to women safety.

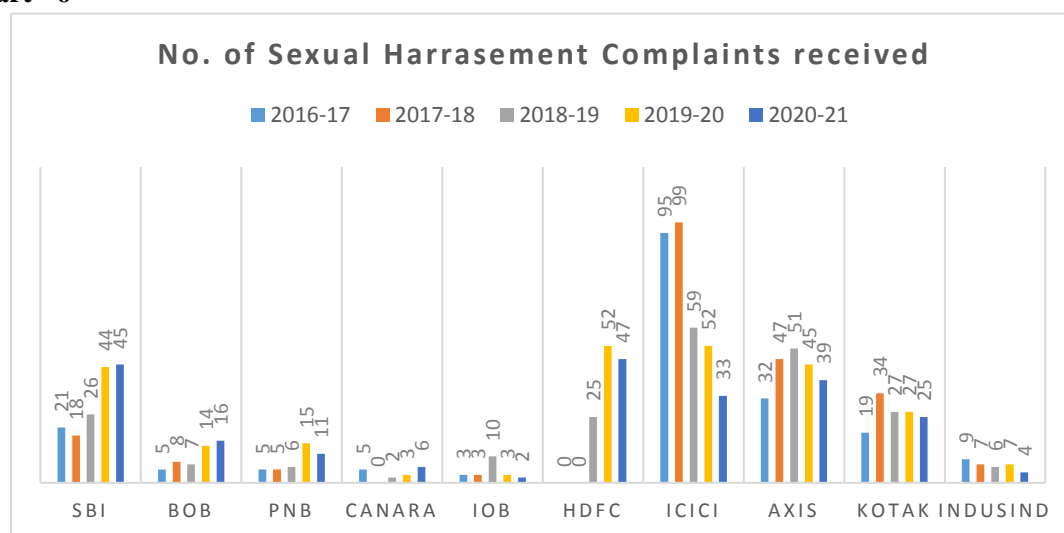
**Role of Sexual Harassment in Corporate Governance:**

Women have equal role to play in organization compared to Men. While working in organization they should be protected against any unfavorable conduct from their peer / supervisor. Women are human capital of the company who provides important contribution in decision making based on their intellectual skills. Regulator also mandated role of women in top management. More women friendly the organization is, the better sustainable and governed it is.

On analyzing the sexual harassment complaint, it was found following:

- ICICI Bank has the highest number of sexual harassment related complaints. It was 99 during FY2017-18.
- Canara Bank has the lowest sexual harassment related complaints followed by IOB.
- Private Banks have higher number of sexual related complaints than public sector banks.
- In public sector bank, SBI has the highest no. of sexual harassment complaints.

**Chart - 6**



**Suggestions:**

- Bank should adopt Prevention of Sexual Harassment policy and awareness about it should be provided to staff on regular basis.
- Prevention of Sexual Harassment committee should be formed and punitive action should be taken who violate POSH guidelines.

**Table -4: Position of Sexual Harassment Complaints during FY2017-FY2021 in Banks**

(No. of Complaints received during the year)

Bank	2016-17	2017-18	2018-19	2019-20	2020-21
SBI	21	18	26	44	45
BOB	5	8	7	14	16
PNB	5	5	6	15	11
Canara	5	0	2	3	6
IOB	3	3	10	3	2
HDFC	Not Disclosed	Not Disclosed	25	52	47
ICICI	95	99	59	52	33
AXIS	32	47	51	45	39
KOTAK	19	34	27	27	25
INDUSIND	9	7	6	7	4

## 5. Corporate Social Responsibility (CSR):

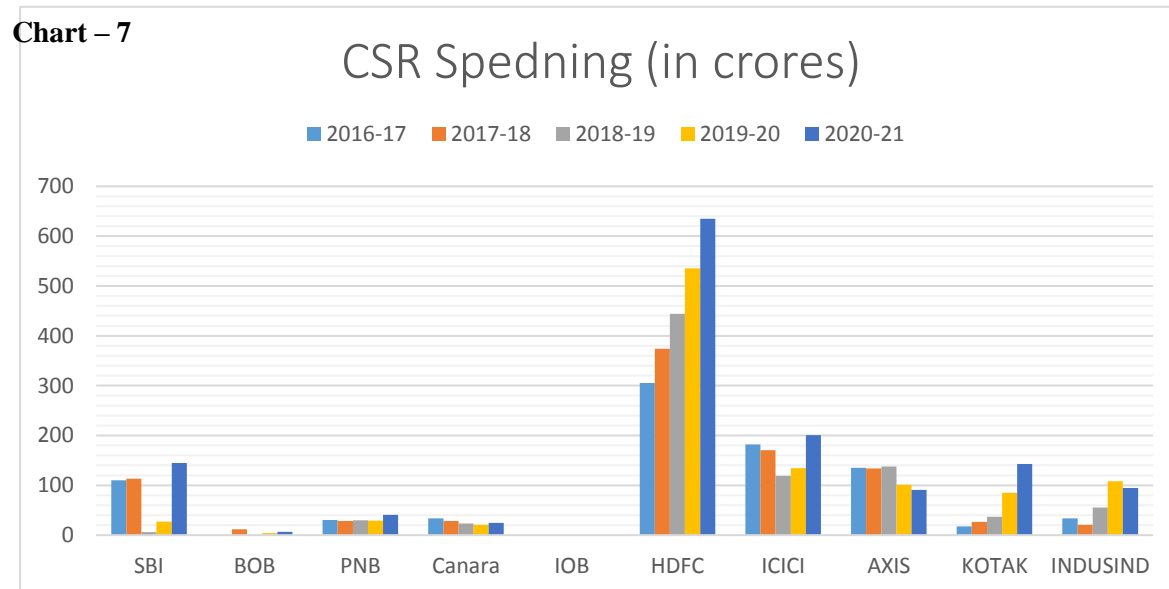
Corporate Social Responsibility is accountability of the company towards society and environment. Company generates profit from the society using resources, CSR is the giving back to the society from company's earning. Companies Act mandated company to spend 2% of their average profit during last three years on every year for CSR purpose. Public Sector Banks are required to spend 1% of their last year profit on every year for CSR purpose.

### Role of Corporate Social Responsibility in Corporate Governance:

Corporate Social Responsibility is part of governance. It is the responsibility of the Company towards society. Society includes People and Environment. It is older version of Environment, Social and Governance (ESG) Framework. Society helps company to achieve their goal and objectives, in turn company spends some amount of their profit for good cause of the society.

On analyzing the CSR spending, it was found following:

- HDFC Bank is spending highest amount for CSR compared to other peer Banks.
- IOB has not spent any amount on CSR during FY2017-FY2021. It was due to loss during five years.
- Private Sector Banks are spending more amount on CSR than Public Sector Bank.
- Majority of the Banks stick around to the regulatory limit for CSR spending.
- Public Sector Banks are not covered under Companies Act Rule and hence spending very few / nil amount on CSR.



### **Issued observed:**

- Both private sector bank and public sector bank have different guidelines for spending of amount on CSR and CSR disclosure. There is no uniform guidelines issued by regulator that brings all listed entity under a roof.

- Bank’s CSR spending amount is stick to the regulatory cut off i.e. 2%/1% and not above that. It means corporates are spending on CSR to meet the regulatory guidelines only.
- Detailed CSR spending disclosures are missing in Annual Report.

**Suggestions:**

- Uniform Regulation should be framed for CSR spending by listed entity.
- Detailed CSR spending disclosure including amount spent on each CSR activity should be made for awareness of the stakeholders.
- Amount of CSR spending should be raised to 5% of average last three years of annual turnover, to increase the scope of CSR activity.
- Government may increase reporting and monitoring of CSR activities by company.

**Table -4: Position of CSR Spending by Banks during FY2017-FY2021**

(Rs. In crore)

<b>Year</b>	<b>2016-17</b>	<b>2017-18</b>	<b>2018-19</b>	<b>2019-20</b>	<b>2020-21</b>
SBI	109.82	112.96	6.24	27.47	144.88
BOB	0	11.91	0.05	4.33	6.90
PNB	30.41	28.62	29.54	29.21	40.38
Canara	33.68	28.53	23.62	20.49	24.70
IOB	0	0	0	0	0
HDFC	305.42	374	444	535	634.91
ICICI	182	170.38	118.96	134.35	200.50
AXIS	135.39	133.77	137.89	100.96	90.93
KOTAK	17.33	26.40	36.55	85.20	142.99
INDUSIND	33.81	20.47	55.46	108.15	94.72

**6. Gender Diversity**

Gender Diversity refers to space available to women in working culture. Equal opportunity for Men and Women is the motto of Gender Diversity. Gender diversity is one of the goal of sustainability given by United Nations.

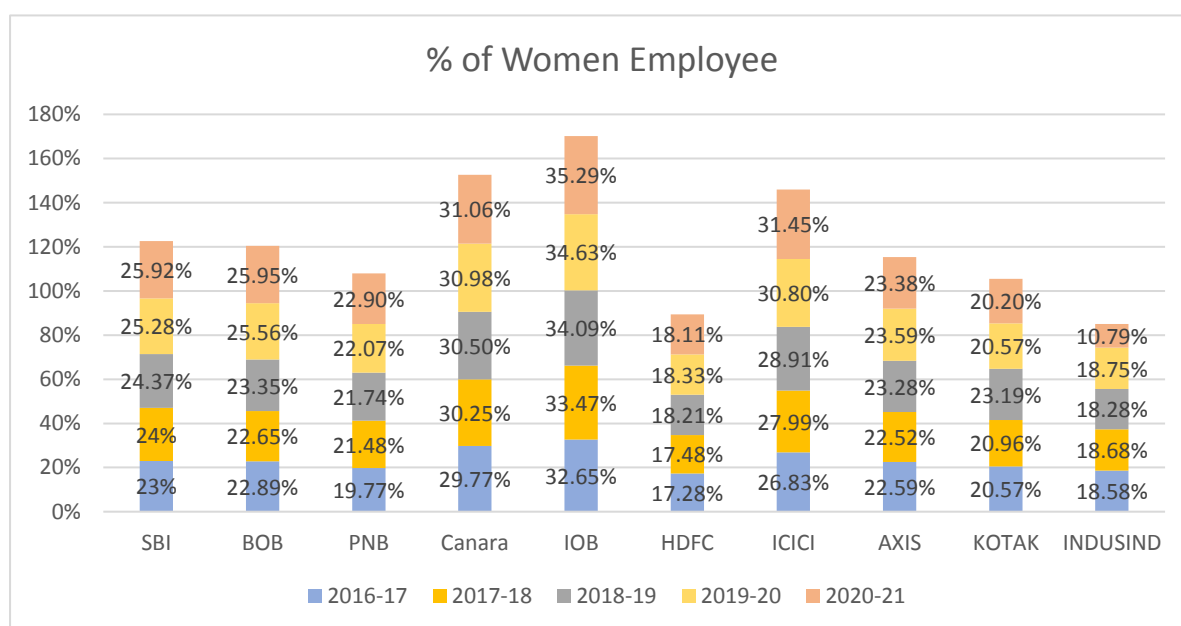
Role of Gender Diversity in Corporate Governance:

Women also plays important role in driving forces of the organization. Their role is growing day by day in organization from employee to director. They play important role for policy making, objective achievement, business decision. Thus, women are part of the good corporate governance culture.

On analyzing the ratio of women employee in Bank, it was found following:

- IOB has the highest no. of women employees followed by Canara Bank.
- IndusInd Bank has the lowest no. of women employees compare to other Banks followed by HDFC Bank.
- More women are employed by Pubic Sector Bank than Private Sector Bank.

Chart - 8



### Suggestions:

- Currently women employment in Banks are around 20-25%. It should be increased to around 30-35% as more women talent are available in the market with increase in higher education level among girl students.
- Government should formulate policy for women employment prescribing minimum percentage of their presence in total workforce.

Table -5 : Percentage of Women Employees in Banks during FY2017-FY2021

Year	2016-17	2017-18	2018-19	2019-20	2020-21
SBI	23%	24%	24.37%	25.28%	25.92%
BOB	22.89%	22.65%	23.35%	25.56%	25.95%
PNB	19.77%	21.48%	21.74%	22.07%	22.90%
Canara	29.77%	30.25%	30.50%	30.98%	31.06%
IOB	32.65%	33.47%	34.09%	34.63%	35.29%
HDFC	17.28%	17.48%	18.21%	18.33%	18.11%
ICICI	26.83%	27.99%	28.91%	30.80%	31.45%
AXIS	22.59%	22.52%	23.28%	23.59%	23.38%
KOTAK	20.57%	20.96%	23.19%	20.57%	20.20%
INDUSIND	18.58%	18.68%	18.28%	18.75%	10.79%

### 7. Customer Complaints

Customers are the user of the company's products / services. They drive the growth of the company.

Customer satisfaction results through providing better / good quality service / products by the Bank. In Banking service, due to huge presence of customers, it is important for Bank to provide their product and service to the customer that match their need / demand. When customer is not satisfied with Bank's service, it results into complaints from the customers.

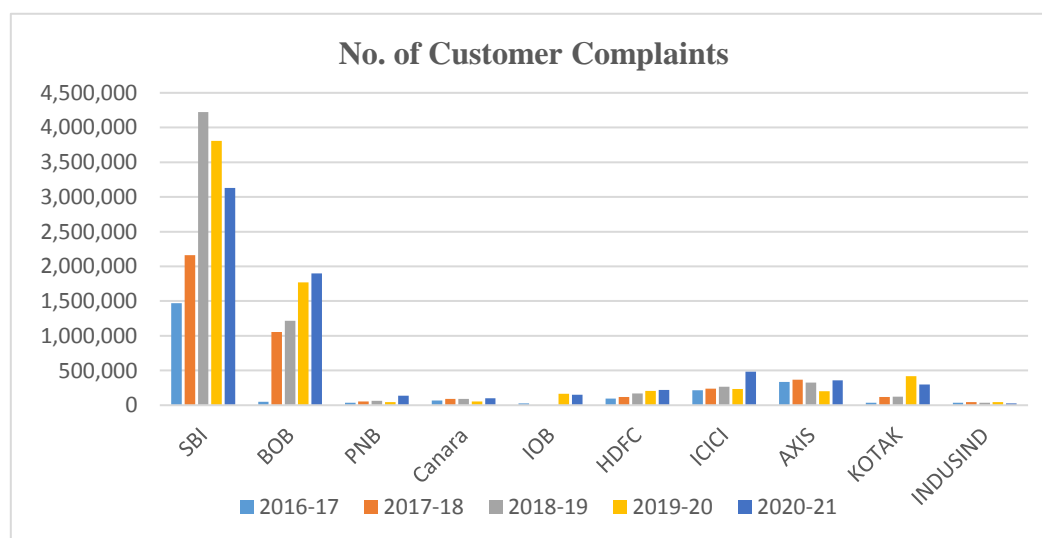
Role of Gender Diversity in Corporate Governance:

Customer is one of the pillar of the governance structure of the company. Management frames policy and takes important decision, shareholders invest in company while customer uses the services provided by the Bank and helps shareholders and company to get return and function it smoothly. Customer complaints reflects the service satisfactory ratio of the entity. Higher the complaints, higher the chance that there is lack of satisfactory service by the Bank.

On analyzing the number of customer complaints in Bank, it was found following:

- SBI has the highest number of customer complaints amongst all 10 Banks followed by Bank of Baroda.
- Private Sector Banks are having less number of customer complaints compared to their peer Public Sector Banks.
- IOB is having lowest number of customer complaints.

**Chart – 9**



**Suggestions:**

- Bank should develop efficient systems and procedures for handling and resolution of Customer Complaints.
- Major complaints are related to services. Bank should organise customer meet at branch level on fortnight basis to address the issues faced by the customers.
- Proper customer contact point and complaint escalation matrix should be displayed at Branch and on website of the Bank.

**Table -6: Position of Customer Complaints in Banks during FY2017-FY2021**

Year	2016-17	2017-18	2018-19	2019-20	2020-21
SBI	14,68,471	21,59,700	42,21,491	38,08,400	31,31,509
BOB	48,504	10,56,041	12,14,864	17,71,923	18,99,415
PNB	35,474	53,016	62,539	44,399	1,37,262
Canara	66,977	93,276	93,100	53,873	1,01,944
IOB	27,357	5,603	5,441	1,66,745	1,51,084
HDFC	96,454	1,20,439	1,69,846	2,05,458	2,20,565
ICICI	217,473	237,343	264,726	234,812	482,213
AXIS	3,37,673	3,68,424	3,25,172	2,00,484	3,60,342
KOTAK	36,273	117,678	125,514	4,17,114	297,272
INDUSIND	36,978	46,223	35,314	46,248	26,642

## 8. Fraud Reported

Bank is required to report all frauds to Reserve Bank of India. Fraud cases reporting involves any fraud related to Misappropriation and criminal breach of trust, Fraudulent encashment through forged instruments, manipulation of books of account or through fictitious accounts and conversion of property, unauthorized credit facilities extended for reward or for illegal gratification, Cash shortages, Cheating and forgery, Fraudulent transactions involving foreign exchange, any other type of fraud (Source: RBI Website)

### Role of Banking Fraud in Corporate Governance:

Basic reasons for any fraud are lack of compliance by Banks, intention of the customer, ineffective monitoring of the accounts, misuse of authority, etc. Bank having weak compliance / governance framework, have higher chances of fraud happening than Bank having strong and effective compliance framework. Fraud eradicate Bank's capital and create negative reputation of the Bank in the market with penal action from regulators. Thus, it impact negatively to the Bank's governance system.

On analyzing the no. of fraud and amount of fraud reported to RBI Bank, it was found following:

- HDFC Bank has the highest number of fraud cases.
- SBI has the most amount of fraud amount reported.
- Canara Bank has not disclosed fraud related information in their Annual Report.
- Amount of frauds reported are higher in Public Sector Bank than Private Sector Bank.
- No. of frauds reported are higher in Private Sector Bank compare to Public Sector Bank

Chart - 10

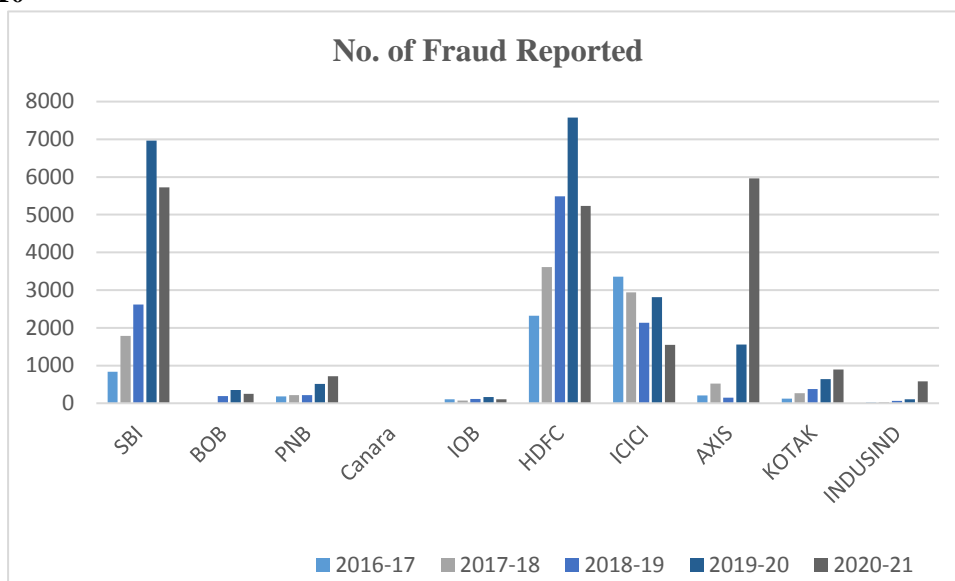
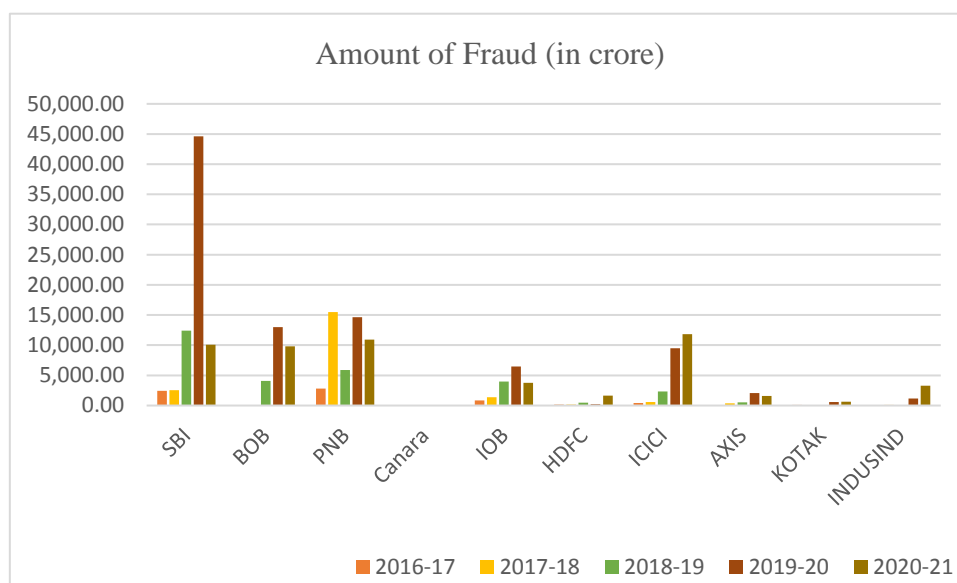


Chart -11



**Suggestions:**

- Bank may develop effective check and approve mechanism in the system to prevent any unauthorised entry.
- Training and Education should be provided to staff for detecting any suspicious activities leading to fraud in the account.
- Bank should have strong IT system in place that prevent any Data breach / fraud related incidents.



**Table -7: Fraud Reporting by Banks during FY2017-FY2021**

Year	2016-17		2017-18		2018-19		2019-20		2020-21	
	No. of frauds reported	Amount involved in fraud (Rs. in crore)	No. of frauds reported	Amount involved in fraud (Rs. in crore)	No. of frauds reported	Amount involved in fraud (Rs. in crore)	No. of frauds reported	Amount involved in fraud (Rs. in crore)	No. of frauds reported	Amount involved in fraud (Rs. in crore)
SBI	837	2,424.74	1,789	2,532.24	2,616	12,387.13	6,964	44,622.45	5,724	10,085.92
BOB	Not Disclosed				191	4,099.66	350	12,971.14	248	9,796.31
PNB	185	2,809.31	213	15,501.65	216	5,903.19	509	14,633.27	714	10,947.51
Canara	Not Disclosed									
IOB	106	850.45	74	1,372.90	115	3,957.08	165	6,492.53	105	3,738.90
HDFC	2,319	165.20	3,612	146.55	5,484	498.44	7,580	222.60	5,232	1,640.80
ICICI	3,359	421.07	2,938	589.57	2,131	2,316.52	2,817	9,472.87	1,549	11,838.64
AXIS	205	72.92	521	353.97	145	529.04	1,554	2,055.62	5,959	1,579.67
KOTAK	126	111.54	268	56.73	376	14.10	643	579.60	894	656.44
INDUSIND	24	1.90	32	118.19	66	14.33	103	1,158.61	583	3,307.77

### **9. Penalty and Strictures imposed by RBI and SEBI**

Serious Non-compliance of regulatory provisions attract the legal action / penalty by RBI/SEBI/Stock Exchanges on the Bank. Regulators are being more vigilant with the time. Major non-compliance observed were related to non-adherence to KYC AML / SWIFT / Currency chest guidelines, non-compliance of provision of SEBI (LODR) Regulations. There are instance where foreign regulators have also imposed fine on the Bank for Banks like SBI, BOB. Stock Exchanges / RBI have also issued warning letter / strictures to certain banks where Bank have violated important provisions of guidelines issued by them.

#### **Role of Regulatory action in Corporate Governance:**

Any Regulatory action like penalty / caution notice / strictures results in reputational as well as financial loss to the Bank. Bank not adhering to the prescribed guidelines have to face scrutiny from the regulators. Hence, again this issue is related to strong compliance and governance culture. It is better to prevent any non-compliance rather than to face its impact on the Bank.

#### **Suggestions:**

- Bank should adopt system driven compliance structure to avoid any penalty by regulators.
- Compliance framework should be strengthened.
- Vertical Head should be assigned responsibility to effectively monitoring and reporting compliance confirmation to higher authorities.

**Summary of penalties / strictures FY2017-FY2021:**

Sr. No.	Bank	Total penalty paid during FY2017-2021 (Rs in crore)	Total No. of incidents – Penalty (FY2017-2021)	Total No. of incidents - Strictures / warning letter issued (FY2017-2021)
1	SBI	15.94	9	-
2	BOB	45.34	11	-
3	PNB	31.42	10	2
4	Canara	12.43	4	-
5	IOB	9.15	7	-
6	HDFC	15.3	7	2
7	ICICI	63.82	4	-
8	Axis	5.25	4	8
9	Kotak	2.25	3	-
10	IndusInd	10.5	4	-

Following are the details of Penalty and Strictures imposed on the Banks during FY2017-FY2021:

**SBI**

1. Central Bank of Oman levied penalty of **Rs. 0.13 crore (Omani Riyal 8000)** on Muscat branch for non compliance to some of the provisions of Banking Law 2000 & circulars of Central Bank of Oman. **(FY2016-17)**
2. Monetary Authority of Singapore (MAS) levied a penalty of **Rs. 2.99 crore (Singapore Dollar 6,00,000)** on Singapore branch for breach of section 27 B (2) of the MAS Act. **(FY2017-18)**
3. Reserve Bank of India levied a penalty of **Rs. 0.40 crore** on the Bank for non-compliance with the directions issued by RBI on detection and impounding of counterfeit notes. The Enforcement Directorate (ED) had served two show cause notices during the year 2011 to Ashok Nagar Branch of erstwhile State Bank of Travancore (e-SBT) (now merged with the Bank) with respect to alleged irregularities committed in respect of forex remittances made during the period March, 2009 and August, 2010. During the period under review, the Adjudicating Authority had imposed a penalty of Rs. 7,00,00,000/- (Rupees Seven crore Only) on the Bank for alleged irregularity in terms of Section 13(1) of the FEMA Act, 1999. **(FY2018-19)**
4. Reserve Bank of India has imposed a penalty of **Rs. 1.00 crore** on the Bank for not monitoring the end use of funds in respect of one of its borrowers. **(FY2018-19)**
5. Reserve Bank of India has imposed a penalty of **Rs. 1.00 crore** on the Bank for non-compliance with the directions issued by RBI on the SWIFT related operational controls. **(FY2018-19)**
6. The Central Bank of Bahrain (CBB) has imposed a penalty of **Rs. 0.92 crore (BHD 50,000)** on Bahrain Branches for non-compliance of USD Parity stipulations in 5 deals. The Bank has filed an

appeal before Central Bank of Bahrain and the final decision from CBB is still awaited. **(FY2018-19)**

7. Reserve Bank of India has imposed an aggregate penalty of **Rs. 7.00 crore** on the Bank for non-compliance of directions issued by RBI on Income Recognition and Asset Classification (IRAC) norms etc. **(FY2019-20)**
8. Reserve Bank of India has imposed a penalty of **Rs. 0.50 crore** on the Bank for non-compliance with its directions relating to reporting of frauds. **(FY2019-20)**
9. Reserve Bank of India has imposed an aggregate penalty of **Rs. 2.00 crore** on the Bank on payment of remuneration to employees in the form of commission. **(FY2020-21)**

#### **BOB**

1. Penalty of **Rs 5.00 crore** was levied by Reserve Bank of India for FEMA violations related to Import of Goods & Services. **(FY2016-17)**
2. Penalty of **Rs, 0.41 crore** was levied by RBI for forged/soiled notes in currency chest. **(FY2016-17)**
3. Total penalties of **Rs. 0.72 crore** were levied on overseas territories by their respective regulator for various non-compliances. **(FY2016-17)**
4. Penalties of **Rs. 7.12 crore** (93 cases) were imposed by RBI on account of irregularities in currency chest. **(FY2017-18)**
5. Total penalties of **Rs. 5.87 crore** were levied on overseas territories by their respective regulator for various non-compliances. **(FY2017-18)**
6. Penalties of **Rs. 5.25 crore** (125 cases) were imposed by RBI on account of irregularities in currency chest. **(FY2018-19)**
7. Total penalties of **Rs. 0.49 crore** were levied on overseas territories by their respective regulator for various non-compliances. **(FY2018-19)**
8. Penalties of **Rs. 5.92 crore** (127 cases) were imposed by RBI on account of irregularities in currency chest. **(FY2019-20)**
9. Total penalties of **Rs. 0.18 crore** were levied on overseas territories by their respective regulator for various non-compliances. **(FY2019-20)**
10. Penalties of **Rs. 1.40 crore** (222 cases) were imposed by RBI on account of irregularities in currency chest. **(FY2020-21)**
11. Total penalties of **Rs. 13.70 crore** were levied on overseas territories by their respective regulator for various non-compliances. **(FY2020-21)**

#### **PNB**

1. RBI has imposed a penalty of **Rs. 3.00 crore** on Bank in exercise of powers conferred under Section 47(1) (c) read with Section 46(4) (i) of the Banking Regulation Act 1949. **(FY2016-17)**
2. RBI has imposed a penalty of **Rs. 0.01 crore** on Bank for bouncing SGL Securities. **(FY2016-17)**

3. RBI has imposed a penalty of **Rs. 1.00 crore** on Bank for observance of noncompliance with various directions issued by RBI on monitoring of end use of funds, exchange of information with other banks and on restructuring of accounts. **(FY2018-19)**
4. RBI has imposed a penalty of **Rs. 2.00 crore** on Bank for observance of non-compliances with directions related to implementation of SWIFT related operational controls. **(FY2018-19)**
5. A warning letter on the subject: Warning letter- Violation of certain provisions of SEBI (LODR) Regulations, 2015 (SEBI LODR Regulations) was issued by SEBI regarding disclosures made in respect of Nirav Modi Group, Gitanjali Group and others. In the letter SEBI had warned and advised to be cautious in future in respect of compliances of SEBI LODR Regulations. **(FY2018-19)**
6. NSE had requested the Bank to take abundant precaution in future with respect to any intimation required under Regulation 30 of SEBI (LODR) Regulations 2015. **(FY2018-19)**
7. NSE and BSE had imposed a fine of **Rs. 10,000** on Bank under Regulation 29(2) and (3) of SEBI (LODR) Regulations, 2015 for not giving prior intimation to stock exchange regarding the meeting of the Board of Directors held to consider the proposal of raising of fund by the Bank. The same has been duly paid by the Bank. **(FY2019-20)**
8. RBI has imposed a Penalty of **Rs. 0.50 crore** on Bank for observance of noncompliance with various directions issued by RBI on “Know Your Customer (KYC) norms / Anti Money Laundering (AML) Standards” and Opening of Current Account” by the Bank. **(FY2019-20)**
9. RBI has imposed a penalty of **Rs. 0.50 crore** on Bank for non-compliance with certain provisions of “Reserve bank of India (Frauds classification and reporting by commercial banks and select FIs) directions 2016”. **(FY2019-20)**
10. Financial Intelligence Unit, Ministry of Finance has levied penalty of **Rs. 15.62 crore** on the Bank for violations of Prevention of Money- Laundering Act, 2002 read with PMLA Rules, 2005. The Bank has filed an appeal against the order in Appellate Tribunal (PMLA at Delhi) for seeking stay on the order. **(FY2019-20)**
11. RBI has imposed a penalty of **Rs. 1.00 crore** on Bank for operating a bilateral ATM sharing arrangement with Druk PNB Bank Ltd. (DPNBL), Bhutan since April, 2010 without approval / authorization from RBI, in violation of RBI instructions issued vide letter DPSS.CO. PD.No. 74/ 02.10.002/ 2010-11 dated July 8, 2010, wherein bank was advised seek uthorization before implementing this payment system. **(FY2020-21)**
12. Bank has paid a total amount of **Rs. 7.79 crore** towards Regulatory and other operational penalties (including Banking Ombudsman Advisories / Awards, Currency Chest Penalties, orders of Consumer Courts / Lok Adalats etc.). **(FY2020-21)**

### Canara

1. During the financial year 2016-17, RBI has imposed of **Rs. 2.00 Crore** in terms of Section 47 (A) (1) (c) read with section 46 (4) (i) of the Banking Regulation Act, 1949 on non – compliance of certain guidelines of the Reserve Bank of India instructions. **(FY2016-17)**

2. Financial Intelligence Unit, India (FIU-IND) has imposed a penalty of **Rs. 0.03 crore** under Section 12 (Rule 2, 3, 5 & 7) & 13 (2) of PML Act, 2002 for failure of internal mechanism of the bank in detecting and reporting attempted suspicious transactions. **(FY2016-17)**
3. RBI has imposed a monetary penalty of **Rs. 2.00 Crore** (Rupees Two Crore Only) on our Bank for non-compliance of RBI's directive regarding "Time bound Implementation and Strengthening of SWIFT - related to operational controls" under Section 46(4) of the Banking Regulation Act, 1949. **(FY2018-19)**
4. Financial Conduct Authority, United Kingdom regulator has imposed penalty on Canara Bank United Kingdom (CБУK) an amount of GBP 896,100 (approx **Rs. 8.40 Crore**) on account of Draft Warning Notice issued on the Bank. Our London Branch has made the payment of GBP 896100 to FCA on 06.06.2018. **(FY2018-19)**

#### **IOB**

1. SEBI had imposed a penalty of **Rs.0.02 crore** on Bank under Section 15HB of the SEBI Act 1992. The penalty was imposed due to certain non-compliance and the penalty amount was paid on 12.03.2018. **(FY2017-18)**
2. RBI has imposed penalty of **Rs. 2.00 crore** (Reason not specified) **(FY2017-18)**
3. During the year BSE & NSE have imposed penalty of **Rs.10,000** (Rupees Ten Thousand only) each plus GST for delay in intimating date of Board Meeting. **(FY2018-19)**
4. RBI Penalty has imposed penalty of **Rs. 4.50 crore** (Reason not specified) **(FY2018-19)**
5. The Reserve Bank of India had levied a penalty of **Rs. 2.50 crore** on account of non-compliance of the RBI Master Directions on Frauds – Classification and Reporting by commercial banks and select FIs. **(FY2019-20)**
6. The Financial Intelligence Unit of India, Department of Revenue, Ministry of Finance, Government of India had levied penalty on the Bank of **Rs.0.10 crore** on account of various non-compliances of Section 12 (1)(a) and (b), and Section 12(3) of the Prevention of Money Laundering Act, 2002 read with the Rules made thereunder pertaining to delay in filing of various reports. **(FY2019-20)**
7. Reserve Bank of India on had levied a penalty of **Rs. 0.03 crore** on the Bank on account of contravention of Section 11(3) of The Foreign Exchange Management Act, 1999 pertaining to forward contracts undertaken by the Bank with M/s. Suryadev Alloys & Power Private Limited. **(FY2019-20)**

#### **HDFC**

1. RBI has imposed a penalty of **Rs. 2.00 crore** on bank for pendency in receipt of bill of entry relating to advance import remittances made and lapses in adhering to KYC / AML guidelines. **(FY2016-17)**
2. SEBI has issued directions to the Bank ("SEBI Directions") in relation to leakage of unpublished price sensitive information ("UPSI") pertaining to the financial results of the Bank for the quarter

ended December 31, 2015 and the quarter ended June 30, 2017 in various private WhatsApp groups ahead of Bank's official announcement to the relevant stock exchanges. **(FY2017-18)**

3. RBI has imposed a penalty of **Rs. 0.20 crore** on bank for non-compliance with various directions issued by RBI on Know Your Customer (KYC) / Anti-Money Laundering (AML) standards. **(FY2018-19)**
4. RBI has imposed a penalty of **Rs. 1.00 crore** on bank for non-compliance with directions issued by RBI on Know Your Customer (KYC)/ Anti-Money Laundering (AML) Norms and on reporting of frauds. **(FY2019-20)**
5. RBI has imposed a penalty of **Rs. 1.00 crore** on bank for failure to undertake ongoing due diligence in case of 39 current accounts opened for bidding in Initial Public Offer (IPO). **(FY2019-20)**
6. RBI has imposed a penalty of **Rs. 10.00 crore** on bank for marketing and sale of third-party non-financial products to the Bank's auto loan customers, arising from a whistle blower complaint. **(FY2020-21)**
7. RBI has imposed a penalty of **Rs. 0.10 crore** on bank for bouncing of SGL, which lead to shortage of balance in certain securities in the Bank's CSGL account. **(FY2020-21)**
8. SEBI has imposed a penalty of **Rs. 1.00 crore** on the Bank, in the matter of invocation of securities pledged by a corporate entity for availing credit facilities. **(FY2020-21)**
9. Reserve Bank of India (RBI) has issued an Order to HDFC Bank Limited (the "Bank") with regard to certain incidents of outages in the internet banking/ mobile banking/ payment utilities of the Bank over the past 2 years, including the outages in the Bank's internet banking and payment system on November 21, 2020 due to a power failure in the primary data centre. RBI, vide above order, advised the Bank (a) to stop all digital business generating activities planned under its 'Digital 2.0' and proposed Business generating applications digital also imposed restrictions and (b) to stop sourcing of new credit card customers. **(FY2020-21)**

#### ICICI

1. RBI has imposed a monetary penalty of Rs. 589.0 million (**Rs. 58.90 crore**) on the Bank for non-compliance with directions/guidelines issued by RBI. This penalty has been imposed in exercise of powers vested in RBI under the provisions of Section 47A(1) (c) read with Section 46(4)(i) of the Banking Regulation Act, 1949. **(FY2017-18)**
2. During the year ended March 31, 2018, an overseas regulator imposed a composition sum of Rs. 38.2 million (**Rs. 3.82 crore**) for non-adherence of rules under AML regulations at one of the Bank's overseas branches, resulting from regulatory inspection conducted in 2013 and subsequently, pursuant to consultant's review of records, relating to the period of May 2012 to April 2014. **(FY2017-18)**
3. RBI through an order dated February 25, 2019, imposed a monetary penalty of Rs. 10.0 million (**Rs. 1.00 crore**) on the Bank for delay in compliance with RBI's directives on "Time-bound implementation & strengthening of SWIFT related controls". **(FY2018-19)**

4. SEBI issued an Adjudication Order on September 12, 2019, imposing a penalty of **Rs. 500,000 each** (totalling to Rs. 1.0 million) under Section 15HB of the Securities and Exchange Board of India Act, 1992 and Section 23E of the Securities Contracts (Regulation) Act, 1956 on the Bank for delayed disclosure of an agreement made on May 18, 2010 relating to merger of erstwhile Bank of Rajasthan with the Bank. The Bank has filed an appeal against SEBI's Order with the Securities Appellate Tribunal on October 24, 2019. The matter is still under progress. **(FY2019-20)**

#### **AXIS**

1. Warning issued by RBI on 27 July, 2016 for certain lapses in adherence to KYC/AML guidelines on monitoring of transactions in customer accounts and FEMA provisions. **(FY2016-17)**
2. Non-compliance of RBI guidelines on income Recognition and Asset Classification (IRAC) norms. Penalty of **Rs. 3.00 crore** was imposed in terms of Section 47A(1)(c) read with Section 46(4)(i) of the Banking Regulation Act, 1949. **(FY2017-18)**
3. Non-compliance of RBI guidelines related to 'Collection of Account Payee Cheques – Prohibition on Crediting proceeds to Third Party Account' and Master Directions on 'Frauds- Classification and Reporting by commercial banks and select FIs'. Penalty of **Rs. 2.00 crore** was imposed in terms of Section 47A(1)(c) read with Section 46(4)(i) of the Banking Regulation Act, 1949. **(FY2018-19)**
4. Non-compliance of RBI guidelines related to 'Detection and Impounding of Counterfeit Notes' and 'Sorting of Notes – Installation of Note Sorting Machines'. Penalty of **Rs. 0.20 crore** was imposed in terms of Section 47A(1)(c) read with Section 46(4)(i) of the Banking Regulation Act, 1949. **(FY2018-19)**
5. Caution letter issued by RBI on 25 February, 2019 for non-compliance of RBI directives on time bound implementation and strengthening of SWIFT related operational controls. **(FY2018-19)**
6. Penalty of **Rs. 0.05 crore** for bouncing of SGL due to shortage of balance of GOI security in SGL account at the time of settlement at CCIL on 20 November, 2020. **(FY2020-21)**
7. SEBI vide its letter dated 28 April, 2020 issued an administrative warning for not intimating it on appointment of Compliance Officer (Merchant Banking) and that the Compliance Officer did not have the required NISM certification, as observed during the inspection of the Bank as 'Merchant Banker'. The Bank has appointed new Compliance Officer (Merchant Banking) who has the required NISM certification. The same has been informed to SEBI. **(FY2020-21)**
8. SEBI vide its letter dated 28 December, 2020, observed delay in making disclosures by the Bank under the SEBI (Prohibition of Insider Trading) Regulations, 2015 and in this regard has informed the Bank that the matter has been viewed seriously and has warned the Bank to be careful in future to avoid recurrence of such instances and to be more cautious in filing disclosures, failing which action may be initiated in accordance with the provisions of the SEBI Act, 1992 and Rules and Regulations framed thereunder. **(FY2020-21)**
9. SEBI issued a Summary Settlement Notice dated 28 December, 2020 in relation to an alleged default under Regulation 7(2)(b) of the SEBI (Prohibition of Insider Trading), Regulations, 2015.

The Bank without admitting or denying the findings of facts and conclusions of law submitted a settlement application on 29 January, 2021 to SEBI, in accordance with the provisions of the SEBI (Settlement Proceedings) Regulations, 2018 and paid the settlement amount of Rs. 41.43 lacs. Thereafter, SEBI passed a Settlement Order dated 15 February, 2021 (the Settlement Order), consequent to which the proceedings to be initiated for the alleged default was disposed- off and the matter stands settled. **(FY2020-21)**

10. SEBI carried out inspection of the DDP activities of the Bank for the financial year 2018-19 and issued Administrative Warning and Deficiency Letter for contravention with Regulation 31(2)(a), 32(1) of SEBI (FPI) Regulations 2019 and for contravention with para 2.3 of SEBI Circular CIR/IMD/FIIC/09/2014 dated 28 April, 2014. The Bank has submitted its response on 25 February, 2021. **(FY2020-21)**
11. The Bank received a Show Cause Notice from SEBI vide E-mail dated 3 March, 2021, issued under Rule 4 of the SEBI (Procedure for Holding inquiry and imposing penalties) Rules, 1995. As per the Regulation 27 of SEBI (Merchant Bankers) Regulations, 1992, the Merchant Banker is required to submit to SEBI complete particulars of any transaction for acquisition of securities of any body corporate whose issue is being managed by that merchant banker within fifteen days from the date of entering into such transaction. During the review of Debt Capital Market business of the Bank in December, 2019, it was observed that the Bank had inadvertently failed to report transactions as required under Regulation 27 of SEBI (Merchant Bankers) Regulations, 1992. The Bank had submitted response to SCN vide E-mail dated 16 March, 2021. Further, the Bank was granted time till 4 May, 2021 to make additional submissions in the matter at the hearing conducted on 26 April, 2021, through video conference with respect to the Adjudication Proceedings in the above matter. **(FY2020-21)**
12. SEBI carried out inspection of the Custodian activities of the Bank for the financial year 2018-19 and issued Administrative Warning and Deficiency Letter for contravention with clauses 1, 2, 3 and 10 of the Code of Conduct prescribed at Regulation 12 of the SEBI (Custodian) Regulations, 1996. The Bank has submitted its response on 6 April, 2021. **(FY2020-21)**

#### **KOTAK**

1. During the year penalty of **Rs. 0.05 Crore** had been imposed by the Reserve Bank of India in terms of the Section 47 A (1) read with Section 46(4)(i) of the Banking Regulation Act, 1949 for non-compliance of certain RBI instructions. **(FY2016-17)**
2. During the year penalty of **Rs. 0.20 crore** had been imposed by the Reserve Bank of India in terms of the Section 47 A (1) read with Section 46(4)(i) of the Banking Regulation Act, 1949 for non-compliance of RBI instructions. **(FY2018-19)**
3. During the year, the Reserve Bank of India has levied a penalty of **Rs. 2.00 crore** on the Bank. The penalty is for failure to comply with the RBI's directions to submit details of the promoter shareholding and the proposed course of action/ plans/strategy by the Bank, and not conveying the



commitment of the Bank for achieving promoter dilution as per the timelines stipulated and Facility for Exchange of Notes and coins at two branches.

## **INDUSIND**

1. RBI has imposed a penalty of **Rs. 2.00 crore** for violation of regulatory directions / instructions / guidelines, among other things on KYC norms, in exercise of powers vested under Section 47(A)(1)(c) read with Section 46(4) of the Banking Regulation Act, 1949. **(FY2016-17)**
2. During the year ended March 31, 2018, RBI imposed a penalty of **Rs. 3.00 crore** for non-adherence to Income Recognition and Asset Classification norms and regulatory restriction pertaining to non-fund based facilities in exercise of powers vested under Section 47(A)(1)(c) read with section 46(4) of the Banking Regulation Act, 1949. **(FY2017-18)**
3. During the year ended March 31, 2019, RBI imposed a penalty of **Rs. 1.00 crore** for non-compliance with direction issued in respect of time-bound implementation and strengthening of SWIFT-related operational controls in exercise of powers vested under Section 47(A)(1)(c) read with section 46(4)(i) of the Banking Regulation Act, 1949. **(FY2018-19)**
4. Reserve Bank of India (RBI) imposed a monetary penalty of **Rs. 4.50 crore** on the Bank in exercise of powers vested under the provisions of section 47A(1)(c) read with section 46(4)(i) of the Banking Regulation Act, 1949, for non-compliance with certain provisions of directions issued by RBI on Exposure Norms, Prudential Norms on Income Recognition, Asset Classification and Provisioning pertaining to Advances, Supervisory Programme on Assessment of Risk and Capital – Monitoring of Information Submission by Banks, Creation of a Central Repository of Large Common Exposures Across Banks, and Disclosure in Financial Statements- Notes to Accounts. **(FY2020-21)**

## **10. Participation of Directors in Board Meeting:**

Board of Directors comprises of various mix of directors with different expertise / knowledge / skills. Their presence in the Board helps passing of any agenda items with due care and in compliance of regulatory guidelines. They represent interest of stakeholders at large. Composition of Board of Directors consist of Executive Directors, Non-Executive Directors, Independent Directors and Nominee Directors.

### **Role of Directors Participation in Corporate Governance:**

Efficiency of directors in a company are judged by their participation and contribution in the company's meeting. Any critical decisions required output of all the Board members. Hence, their presence in the meeting is equally important. In fact, corporate governance starts with the decision making as board member are the persons who approve the policies / governance structure / risk management framework, etc. of the Company.

On analyzing the attendance details of directors in Board Meeting of Banks during FY2017-2021, it was found following:

- Executive / Independent Directors participations are more in Board Meeting compared to participation by Nominee Directors (GOI / RBI).
- Nominee Directors are appointed by GOI / RBI for participation in decision making as a representative of GOI / RBI. However, their absence in Board Meeting is question on active role of regulators in monitoring and implementation of important Board agenda.
- Absenteeism of directors in Board Meeting prevails both in Public Sector and Private Sector Bank.

**Suggestions:**

- Government / RBI should mandate their representative on Bank's Board to attend all the meetings except official exigencies, to increase the participation of their nominee in decision making.
- If directors continue to be remained absent in meeting, chairman of the bank should seek justification / clarification from such directors. This practise will help Bank to increase the involvement of directors in decision making.
- Advance notice of Board Meeting should be issued and advance confirmation of attendance in meeting should be received from directors.

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**SBI**

<b>Sr. no.</b>	<b>Name of Member</b>	<b>Designation</b>	<b>2016-17</b>	<b>2017-18</b>	<b>2018-19</b>	<b>2019-20</b>	<b>2020-21</b>
1.	Smt.Arundhati Bhattacharya, Chairman	Executive Director, Chairperson	100%	100%	-	-	-
2.	Shri Rajnish Kumar, Chairman	Executive Director, Chairperson	-	100%	100%	100%	100%
3.	Shri Dinesh Kumar Khara, Chairman	Executive Director, Chairperson	-	-	-	-	100%
4.	Shri B. Sriram, MD – CBG	Executive Director, MD	93%	100%	100%	-	-
5.	Shri Rajnish Kumar, MD –NBG	Executive Director, MD	86.7%	100%	-	-	-
6.	Shri P.K.Gupta, MD-C&R	Executive Director, MD	100%	100%	100%	100%	-
7.	Shri V.G. Kannan, MD – A&S	Executive Director, MD	100%	-	-	-	-
8.	Shri Dinesh K. Khara, MD – A&S	Executive Director, MD	100%	92%	93%	100%	100%
9.	Shri Sanjiv Malhotra	Non-Executive - Independent Director	93%	77%	73%	100%	100%
10.	Shri M.D. Mallya	Non-Executive - Independent Director	87%	100%	-	-	-
11.	Shri Sunil Mehta	Non-Executive - Independent Director	100%		-	-	-
12.	Shri Deepak I. Amin	Non-Executive - Independent Director	67%	100%	-	-	-
13.	Shri Tribhuvan Nath Chaturvedi	Non-Executive - Independent Director	50%	-	-	-	-
14.	Dr. Girish K. Ahuja	Non-Executive - Independent Director	53%	54%	40%	77%	-
15.	Dr.Pushendra Rai	Non-Executive - Independent Director	100%	92%	87%	100%	100%
16.	Ms. Anjuly Chib Duggal	Non-Executive - Nominee Director	13.33%	20%	-	-	-
17.	Dr. Urjit R. Patel	Non-Executive - Independent Director	50%		-	-	-
18.	Shri Chandan Sinha	Non-Executive - Independent Director	67%	54%	93%	81%	93%
19.	Shri Bhaskar Pramanik	Non-Executive - Independent Director	-	91%	87%	81%	100%
20.	Shri Basant Seth	Non-Executive - Independent Director	-	91%	93%	100%	100%
21.	Shri Pravin Kutumbe	Non-Executive - Independent Director	-	70%	-	-	-
22.	Dr. Purnima Gupta	Non-Executive - Independent Director	-	100%	80%	100%	100%

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23.	Shri Rajiv Kumar	Non-Executive - Nominee Director	-	0%	7%	0%	
24.	Shri Arijit Basu, MD - CCG&IT	Executive Director, MD	-	-	92%	94%	100%
25.	Smt Anshula Kant - MD - SARC	Executive Director, MD	-	-	100%	86%	-
26.	Shri B. Venugopal	Non-Executive - Independent Director	-	-	38%	75%	100%
27.	Shri Challa Sreenivasulu Setty	Executive Director, MD	-	-	-	100%	100%
28.	Shri Sanjeev Maheshwari	Non-Executive - Independent Director	-	-	-	100%	93%
29.	Shri Ravi Mital	Non-Executive - Nominee Director	-	-	-	20%	-
30.	Shri Debasish Panda	Non-Executive - Nominee Director	-	-	-	25%	57%
31.	Shri Ashwani Bhatia, MD	Executive Director, MD	-	-	-	-	75%
32.	Shri Swaminathan J, MD	Executive Director, MD	-	-	-	-	100%
33.	Shri Ashwini Kumar Tewari, MD	Executive Director, MD	-	-	-	-	100%
34.	Dr. Ganesh Natarajan	Non-Executive - Independent Director, Shareholder Director	-	-	-	-	100%
35.	Shri Ketan S. Vikamsey	Non-Executive - Independent Director, Shareholder Director	-	-	-	-	100%
36.	Shri Mrugank M. Paranjape	Non-Executive - Independent Director, Shareholder Director	-	-	-	-	100%

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**BOB:**

Sr. no.	Name of Member	Designation	2016-17	2017-18	2018-19	2019-20	2020-21
1.	Ajay Kumar	Non-Executive - Nominee Director	100%	100%	88%	82%	100%
2.	Ashok Kumar Garg	Executive Director	82%	92%	100%	-	-
3.	Bharat Kumar Dangar	Non-Executive - Independent Director, Shareholder Director	100%	100%	94%	100%	100%
4.	Biju Varkkey	Non-Executive - Nominee Director	93%	92%	94%	100%	100%
5.	Gopal Krishan Agarwal	Non-Executive - Non Independent Director	100%	92%	94%	71%	-
6.	Mayank K. Mehta	Executive Director	87%	92%	100%	-	-
7.	Mohammad Mustafa	Non-Executive - Nominee Director	20%	0%	-	-	-
8.	P. S. Jayakumar	Executive Director, CEO-MD	100%	92%	100%	100%	-
9.	Prem Kumar Makkar	Non-Executive - Non Independent Director, Employee Director	93%	100%	-	-	-
10.	R. Narayanaswamy	Non-Executive - Independent Director, Shareholder Director	100%	70%	-	-	-
11.	Ravi Venkatesan	Non-Executive - Non Independent Director, Chairperson	100%	100%	100%	-	-
12.	Papia Sengupta	Executive Director	100%	100%	94%	100%	-
13.	Usha A. Narayanan	Non-Executive - Independent Director, Shareholder Director	100%	100%	92%	-	-
14.	Lok Ranjan	Non-Executive - Nominee Director	-	57%	-	-	-
15.	Soundara Kumar	Non-Executive - Independent Director, Shareholder Director	-	100%	82%	94%	100%
16.	Hasmukh Adhia	Non-Executive - Independent Director, Chairperson	-	-	100%	100%	100%
17.	Shanti Lal Jain	Executive Director	-	-	100%	100%	100%
18.	Vikramaditya Singh Khichi	Executive Director	-	-	100%	100%	93%
19.	Debasish Panda	Non-Executive - Nominee Director	-	-	35%	53%	-
20.	Srinivasan Sridhar	Non-Executive - Independent Director, Shareholder Director	-	-	80%	94%	100%
21.	Sanjiv Chadha	Executive Director, CEO-MD	-	-	-	100%	100%

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22.	Murali Ramaswami	Executive Director	-	-	-	100%	100%
23.	Amit Agrawal	Non-Executive - Nominee Director	-	-	-	100%	67%
24.	Ajay K. Khurana	Executive Director	-	-	-	-	100%
25.	Debadatta Chand	Executive Director	-	-	-	-	100%

**PNB**

Sr. no.	Name of Member	Designation	2016-17	2017-18	2018-19	2019-20	2020-21
1	Sh. Sunil Mehta	Non-Executive Chairman	100%	95%	100%	-	-
2	Ms. Usha Ananthasubramanian	MD & CEO	100%	-	-	-	-
3	Sh. K. V. Brahmaji Rao	ED	88%	95%	-	-	-
4	Dr. Ram S. Sangapure	ED	94%	-	-	-	-
5	Sh. Sanjiv Sharan	ED	100%	89%	-	-	-
6	Sh. Anil Kumar Khachi	Non-Executive (Govt. official Director)	85%	-	-	-	-
7	Dr. Rabi N. Mishra	Non-Executive (RBI official Director)	100%	95%	94%	-	-
8	Sh. Mahesh Baboo Gupta	Non-Executive (CA Director)	91%	100%	94%	-	-
9	Ms. Hiroo Mirchandani	Shareholder Director	100%	95%	-	-	-
10	Sh. Sudhir Nayar	Shareholder Director	100%	100%	-	-	-
11	Sh. Sunil Mehta	MD & CEO	-	100%	100%	-	-
12	Sh. L. V. Prabhakar	ED	-	100%	100%	-	-
13	Sh. Ravi Mital	Non-Executive (Govt. official Director)	-	85%	44%	-	-
14	Sh. Sanjay Verma	Shareholder Director	-	100%	94%	86%	-
15	Sh. Agyey Kumar Azad	ED	-	-	100%	100%	100%
16	Dr. Asha Bhandarker	Shareholder Director	-	-	75%	91%	94%
17	Sh. CH. S. S. Mallikarjuna Rao	MD & CEO	-	-	-	100%	100%

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18	Dr. R. K. Yaduvanshi	ED	-	-	-	86%	
19	Sh. Pankaj Jain	Non-Executive (Govt. Nominee Director)	-	-	-	83%	100%
20	Sh. Vivek Aggarwal	Non- Executive (RBI Nominee Director)	-	-	-	82%	100%
21	Sanjay Kumar	ED	-	-	-	-	100%
22	Vijay Dube	ED	-	-	-	-	100%
23	Gautam Guha	Non-Executive Independent (Shareholder Director)	-	-	-	-	100%
24	Swarup Kumar Saha	ED	-	-	-	-	100%

**Canara**

Sr. no.	Name of Member	Designation	2016-17	2017-18	2018-19	2019-20	2020-21
1.	Dinabandhu Mohapatra	Executive Director	94%	-	-	-	-
2.	Harideesh Kumar B	Executive Director	94%	-	-	-	-
3.	Krishnamurthy H	Non-Executive - Independent Director, Shareholder Director	100%	100%	100%	-	-
4.	Mahadev Nagendra Rao	Non-Executive - Independent Director, Shareholder Director	100%	-	-	-	-
5.	Rakesh Sharma	Executive Director, CEO-M	100%	100%	-	-	-
6.	Suchindra Misra	Non-Executive - Nominee Director	29%	87%	100%	60%	90%
7.	T N Manoharan	Non-Executive - Nominee Director, Chairperson	100%	100%	100%	100%	-
8.	Venkatachalam Ramakrishna Iyer	Non-Executive - Independent Director, Shareholder Director	91%	100%	100%	100%	100%
9.	P V Bharathi	Executive Director	100%	100%	-	-	-
10.	Uma Shankar	Non-Executive - Nominee Director	71%	47%	0%	-	-
11.	Matam Venkata Rao	Executive Director	-	100%	100%	100%	-
12.	Debashish Mukherjee	Executive Director	-	100%	88%	100%	100%

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13.	A. Manimekhalai	Executive Director	-	-	100%	100%	100%
14.	L V Prabhakar	Executive Director,CEO-MD	-	-	-	100%	100%
15.	R Kesavan	Non-Executive - Nominee Director	-	-	-	79%	100%
16.	S Raghunath	Non-Executive - Independent Director	-	-	-	100%	
17.	Bimal Prasad Sharma	Non-Executive - Independent Director, Shareholder Director	-	-	-	100%	100%
18.	K Satyanarayana Raju	Executive Director	-	-	-	-	100%

**IOB**

Sr. no.	Name of Member	Designation	2016-17	2017-18	2018-19	2019-20	2020-21
1	K Raghu	Non-Executive - Non Independent Director	82%	92%	100%	100%	-
2	K Swaminathan	Executive Director	100%	100%	100%	100%	-
3	Niranjana Kumar Agarwal	Non-Executive - Independent Director	73%	100%	-	-	-
4	Nirmal Chand	Non-Executive - Nominee Director - RBI	100%	92%	77%	75%	-
5	R Sampath Kumar	Non-Executive - Non Independent Director	100%	-	-	-	-
6	R Subramaniakumar	Executive Director	100%	100%	100%	100%	-
7	Sanjay Rungta	Non-Executive - Independent Director	87%	100%	92%	100%	100%
8	T C A Ranganathan	Non-Executive - Non Independent Director, Chairperson	100%	100%	100%	100%	-
9	Vishnukumar Bansal	Non-Executive - Non Independent Director	60%	83%	80%	-	-
10	Annie George Mathew	Non-Executive - Nominee Director - GOI	60%	50%	38%	67%	100%
11	Ajay Kumar Srivastava	Executive Director	-	100%	100%	100%	100%
12	Navin Prakash Sinha	Non-Executive - Independent Director, Shareholder Director	-	100%	46%	50%	67%
13	Sivaraman Anant Narayan	Non-Executive - Non Independent Director	-	100%	75%	-	-



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14	Karnam Sekar	Executive Director, Chairperson, CEO-MD	-	-	-	100%	100%
15	Deepak Kumar	Executive - Nominee Director - RBI	-	-	-	100%	100%
16	Partha Pratim Sengupta	Executive Director, Chairperson, CEO-MD	-	-	-	-	100%
17	S Srimathy	Executive Director	-	-	-	-	100%

**HDFC**

Sr. no.	Name of Member	2016-17	2017-18	2018-19	2019-20	2020-21
1.	Mr. Aditya Puri (Managing Director)	100%	100%	100%	100%	88%
2.	Mr. Paresh Sukthankar (Deputy Managing Director)	100%	88%	-	-	-
3.	Mr. Kaizad Bharucha (Executive Director)	71%	100%	100%	89%	94%
4.	Mr. Keki Mistry – NED	100%	75%	89%	88%	-
5.	Mrs. Renu Karnad - NED	86%	100%	-	100%	100%
6.	Mrs. Shyamala Gopinath (Part-time Non Executive Chairperson) - ID	100%	88%	100%	100%	100%
7.	Mr. Partho Datta - ID	86%	88%	80%	-	-
8.	Mr. Bobby Parikh - ID	100%	88%	100%	-	-
9.	Mr. A. N. Roy - ID	100%	100%	-	-	-
10.	Mr. Malay Patel – ID	100%	100%	100%	100%	100%
11.	Mr. Umesh Chandra Sarangi - ID	100%	100%	100%	100%	100%
12.	Mr. Srikanth Nadhamuni - NED	-	100%	78%	78%	100%
13.	Mr. Sanjiv Sachar - ID*	-	-	100%	100%	100%
14.	Mr. Sandeep Parekh - ID*	-	-	100%	89%	100%
15.	Mr. M. D. Ranganath - ID*	-	-	100%	100%	100%
16.	Mr. Paresh Sukthankar (Deputy Managing Director)*	-	-	86%	-	-
17.	Mr. Sashidhar Jagdishan (Managing Director)	-	-	-	-	100%

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**ICICI**

<b>Sr. no.</b>	<b>Name of Member</b>	<b>Designation</b>	<b>2016-17</b>	<b>2017-18</b>	<b>2018-19</b>	<b>2019-20</b>	<b>2020-21</b>
1.	M. K. Sharma	Chairman & Independent Director	100%	100%	100%	-	-
2.	G. C. Chaturvedi	Chairman & Independent Director			100%	100%	100%
3.	Uday Chitale	Independent Director	-	100%	100%	100%	100%
4.	Dileep Choksi	Independent Director	89%	100%	94%	-	-
5.	Hari L. Mundra	Independent Director	-	-	67%	88%	100%
6.	M. D. Mallya	Independent Director	-	-	0%	-	-
7.	Neelam Dhawan	Independent Director	-	67%	78%	100%	100%
8.	Radhakrishnan Nair	Independent Director	-	-	100%	100%	100%
9.	Rama Bijapurkar	Independent Director	-	-	100%	100%	100%
10.	B. Sriram	Independent Director	-	-	100%	100%	100%
11.	S. Madhavan	Independent Director	-	-	-	100%	100%
12.	Homi Khusrookhan	Independent Director	89%	100%	-	-	-
13.	M. S. Ramachandran	Independent Director	100%	100%	-	-	-
14.	Tushaar Shah	Independent Director	67%	46%	50%	-	-
15.	V. K. Sharma	Independent Director	44%	31%	44%	-	-
16.	V. Sridar	Independent Director	89%	91%	-	-	-
17.	Alok Tandon	Government Nominee Director	0%	-	-	-	-
18.	Amit Agrawal	Government Nominee Director	0%	15%	0%	-	-
19.	Lalit Kumar Chandel	Government Nominee Director	-	-	0%	38%	33%
20.	Lok Ranjan	Government Nominee Director	-	-	0%	-	-
21.	Chanda Kochhar	Wholetime / Executive Directors	100%	92%	57%	-	-
22.	N. S. Kannan	Wholetime / Executive Directors	100%	92%	89%	-	-

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23.	K. Ramkumar	Wholetime / Executive Directors	100%	-	-	-	-
24.	Rajiv Sabharwal	Wholetime / Executive Directors	89%	-	-	-	-
25.	Vishakha Mulye	Wholetime / Executive Directors	100%	100%	83%	100%	92%
26.	Vijay Chandok	Wholetime / Executive Directors	100%	92%	94%	100%	-
27.	Anup Bagchi	Wholetime / Executive Directors	-	69%	94%	100%	100%
28.	Sandeep Bakhshi	Wholetime / Executive Directors	-	-	100%	100%	100%
29.	Sandeep Batra	Wholetime / Executive Directors	-	-	-	-	100%

**AXIS**

Sr. no.	Name of Member	Designation	2016-17	2017-18	2018-19	2019-20	2020-21
1.	Dr. Sanjiv Misra	Non-Executive - Independent Director, Chairperson	100%	100%	100%	100%	-
2.	Shri B. Babu Rao	Non-Executive - Nominee Director	86%	100%	83%	100%	100%
3.	Smt. Usha Sangwan	Non-Executive - Nominee Director	57%	67%	58%	50%	-
4.	V.R. Kaundinya	Non-Executive - Independent Director	100%	67%	-	-	-
5.	Prasad Menon	Non-Executive - Independent Director	100%	100%	100%	-	-
6.	Samir Barua	Non-Executive - Independent Director	100%	100%	100%	100%	-
7.	Som Mittal	Non-Executive - Independent Director	100%	78%	92%	83%	-
8.	Rohit Bhagat	Non-Executive - Independent Director	86%	100%	75%	90%	100%
9.	S. Vishvanathan	Non-Executive - Independent Director	100%	89%	100%	100%	100%
10.	Rakesh Makhija	Non-Executive - Independent Director	100%	100%	100%	100%	100%
11.	Ketaki Bhagwati	Non-Executive - Independent Director	100%	100%	83%	100%	100%
12.	Shikha Sharma	Executive Director	100%	100%	89%	-	-
13.	V. Srinivasan	Executive Director	100%	100%	78%	-	-

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14.	Rajiv Anand	Executive Director	100%	100%	83%	90%	100%
15.	Rajesh Dahiya	Executive Director	100%	100%	92%	90%	100%
16.	Stephen Pagliuca	Non-Executive - Nominee Director	-	100%	83%	90%	100%
17.	Amitabh Chaudhry	Executive Director,CEO-MD	-	-	100%	100%	100%
18.	Girish Paranjpe	Non-Executive - Independent Director	-	-	100%	100%	100%
19.	Pralay Mondal	Executive Director	-	-	-	100%	100%
20.	Ashish Kotecha	Non-Executive - Nominee Director	-	-	-	-	100%
21.	Vasantha Govindan	Non-Executive - Nominee Director	-	-	-	-	100%
22.	Tharavanat Chandrasekharan Suseelkumar	Non-Executive - Nominee Director	-	-	-	-	86%
23.	Meena Ganesh	Non-Executive - Independent Director	-	-	-	-	100%
24.	Gopalaraman Padmanabhan	Non-Executive - Independent Director	-	-	-	-	100%

**KOTAK**

Sr. no.	Name of Member	Designation	2016-17	2017-18	2018-19	2019-20	2020-21
1.	Dr. Shankar Acharya	Non-Executive - Non Independent Director, Chairperson	100%	88%	100%	-	-
2.	Mr. Uday Kotak	Executive Director	100%	100%	100%	100%	100%
3.	Mr. C. Jayaram	Non-Executive - Non Independent Director	100%	75%	88%	83%	100%
4.	Mr. Dipak Gupta	Executive Director	100%	100%	88%	100%	100%
5.	Mr. Asim Ghosh	Non - Executive Director,Independent Director	0.0%	-	-	-	-
6.	Mr. Prakash Apte	Non-Executive - Independent Director	100%	100%	88%	100%	100%
7.	Mr. Amit Desai	Non-Executive - Independent Director	57%	63%	100%	-	-
8.	Mr. N. P. Sarda	Non-Executive - Non Independent Director	100%	-	-	-	-
9.	Prof. S. Mahendra Dev	Non-Executive - Independent Director	100%	88%	100%	100%	100%

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10.	Ms. Farida Khambata	Non-Executive - Independent Director	86%	63%	88%	92%	100%
11.	Mr. Mark Newman	Non-Executive - Non Independent Director	86%	63%	71%	-	-
12.	Mr. Uday Khanna	Non-Executive - Non Independent Director	100%	88%	75%	100%	100%
13.	Mr. K.V.S Manian	Executive Director	-	-	-	100%	100%
14.	Mr. Gaurang Shah	Executive Director	-	-	-	100%	100%
15.	Mr. Uday Shankar	Non-Executive - Independent Director	-	-	-	75%	79%
16.	Dr. Ashok Gulati	Non-Executive - Independent Director	-	-	-	-	100%

**INUDSIND**

Sr. no.	Name of Member	Designation	2016-17	2017-18	2018-19	2019-20	2020-21
1.	R. Seshasayee	Non-Executive - Independent Director, Chairperson, Shareholder Director	89%	90%	92%	100%	-
2.	Kanchan Chitale	Non-Executive - Independent Director, Shareholder Director	100%	100%	100%	100%	-
3.	Vijay Vaid	Non-Executive - Independent Director, Shareholder Director	100%	89%		-	-
4.	Ranbir S. Butola	Non-Executive - Independent Director, Shareholder Director	100%	90%	22%	-	-
5.	T. Anantha Narayanan	Non-Executive - Independent Director, Shareholder Director	100%	90%	100%	-	-
6.	Yashodhan Kale	Non-Executive - Non Independent Director, Shareholder Director	100%	100%	100%	-	-
7.	Shanker Annaswamy	Non-Executive - Independent Director, Shareholder Director	100%	100%	100%	100%	100%
8.	T.T. Ram Mohan	Non-Executive - Independent Director, Shareholder Director	100%	100%	92%	78%	100%
9.	Romesh Sobti	Executive Director, CEO-MD	100%	100%	92%	100%	
10.	Akila Krishnakumar	Non-Executive - Independent Director	-	-	83%	89%	95%
11.	Arun Tiwari	Non-Executive - Independent Director	-	-	83%	100%	100%
12.	Siraj Chaudhry	Non-Executive - Independent Director	-	-	100%	100%	
13.	Rajiv Agarwal	Non-Executive - Independent Director	-	-	100%	89%	100%

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14.	Sanjay Asher	Non-Executive - Independent Director	-	-	-	75%	74%
15.	Sanjeev Asthana	Non-Executive - Independent Director	-	-	-	0%	100%
16.	Bhavna Doshi	Non-Executive - Independent Director	-	-	-	-	89%
17.	Sumant Kathpalia	Executive Director	-	-	-	-	95%

## LIMITATION

Study is conducted based on the historical data available on respective Bank's Website, Stock Exchange's Website, Bank's Annual Report, Bank's Business Responsibility Report and other trusted sources. Researcher explored all the possible trusted public documents available about the Bank to find out correct conclusion about any figure / facts. However, due to limitation of availability the source of data, some data which are private and confidential to Bank could not be collected, which may add value to the current research.

## CONCLUSION

From the analysis of corporate governance variables i.e. Board Diversity, efficiency of directors through their participation in the Board Meetings, CSR Compliance, Sexual Harassment Complaints, Fraud reported, Penalty and Stricture imposed by regulators, Investor Complaints, Customer Complaints, etc., it can be concluded that present compliance culture of the Banks need improvement. Instead of having multiple compliance and regulators, there is need of uniform compliance policy and guidelines and single regulator for Banking Industry. Banks need to develop system and procedures for dealing with shareholders grievances and large number of customer complaints. Bank also need to develop strong compliance culture to be more preventive rather than facing the negative action by regulators in form of penalty/stricture. There is need of attention by regulators for increasing women strength in top management and in employment of the Bank. Banks are losing very large amount of capital in frauds by customers. Banks have to pay special attention to effective customer due diligence and monitoring of credit facility. Banks need to zero tolerance for Sexual harassment related complaints. Corporate governance is very vast subject. Variables taken above represents brief representation of the compliance culture of Banks. There is further scope of detailed study in compliance area like CSR Policy of the entity, Preventions of Sexual Harassment policy, Fraud detection and prevention strategy of Bank, etc.

## SOURCE OF DATA:

- Annual Report
- Bank's Website
- BSE Website - <https://www.bseindia.com/index.html>
- NSE Website - <https://www.nseindia.com/>
- Bank's Business Responsibility Report

## ABBREVIATIONS:

Sr. No.	Abbreviations	Full Name
1	SBI	State Bank of India
2	PNB	Punjab National Bank
3	BOB	Bank of Baroda

4	IOB	Indian Overseas Bank
5	Canara	Canara Bank
6	HDFC	HDFC Bank Limited
7	ICICI	ICICI Bank Limited
8	Kotak	Kotak Mahindra Bank Limited
9	Axis	Axis Bank Limited
10	IndusInd	IndusInd Bank Limited
11	PSB	Public Sector Bank
12	RBI	Reserve Bank of India
13	RTA	Registrar and Share Transfer Agent
14	GOI	Government of India



## **An Exploratory Study on awareness of different online tools and technologies used in Recruitment and Selection Process among Recruiters in IT Companies**

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### **Abstract**

Recruitment is the method of searching and hiring the best-qualified aspirant from inside or outside of a business for a job opening, in a timely and cost effective manner. The recruitment and selection method includes analyzing the necessities of a work, attracting employees to that job, screening and selecting applicants, hiring, and integrating the new employee to the organization. So far since its opening, online recruitment has come a long way and has become the latest inclination in HR processes. Human resource is the most important resource for any organization in any sector. The use of internet has altered the overall process of Recruitment and Selection. Many organizations have already employed different online tools and technologies in different stages of their recruitment and selection process. In current paper an attempt has been made to examine the awareness of different tools and technologies related to recruitment and selection process and their usage in IT companies of Gujarat. Primary data was collected from Recruiters of various IT companies through structured questionnaire and further data was analyzed using various statistical tools to derive meaningful conclusion. The result/outcome of this study will be useful in strategies to effectively implement various online tools and technologies in their recruitment and selection process.

**Keywords:** *Recruitment, Selection, Process, Online Tools, Online Technologies, IT.*

### **Introduction**

Recruitment is the process of drawing a group of applicants to a certain post, and selection comes next. They make up the Recruitment and Selection process, one of the oldest intervention and research areas in organizational psychology. Due to the necessity of having access to the most qualified personnel and the growing organizational competitiveness in today's complicated environment, modifications have been made to the recruitment process, making it more crucial than ever. The work market has changed as a result of growing globalization, the use of new technology, and other occurrences. Online Recruitment and Selection is a significant source of hiring in a constantly evolving environment where new technologies develop quickly. Online employment portals and social networking websites are expanding significantly, and the number of job seekers employing this recruitment strategy is

rising steadily in accordance with this trend. This makes it even more crucial for recruiters to learn about the many internet tools that can improve the selection and recruitment process as a whole. Thus, this study assesses the knowledge of various web technologies used in the recruitment and selection process among recruiters, specifically in the IT industry.

**Online Recruitment and Selection evolution and design** Recruitment function occupies an important role in the organization because companies are always looking to attract the most talented employees on a job that can generate competitive advantage. As the psychologist and physician George Crane said "There is no future in any job. The future lies in the man who holds the job ". Deillon (2014) explain very simple that e-recruitment "is a new technological mean for selecting one of the companies' most crucial resources, i.e. human resource ". Deillon (2014) quotes also Malinowski, Keim, & Weitzel when he is describing the four different phases of e-recruitment evolution. They found two dimensions “degree of process integration” and “time” to determine the four phases (Figure 1).

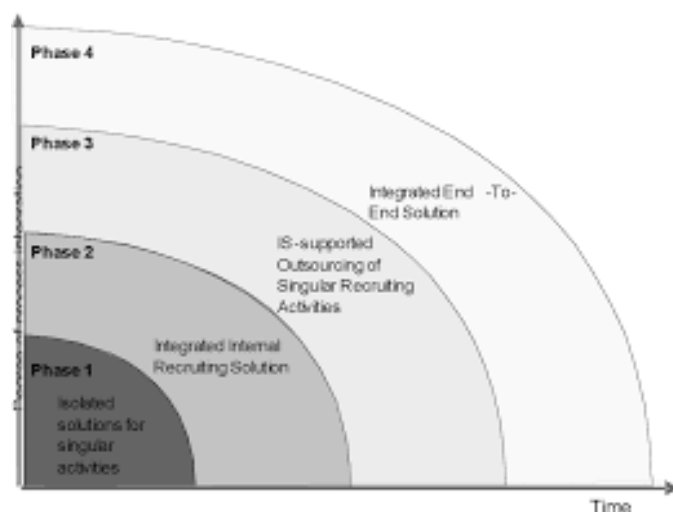
Phase 1: The introduction of isolated solutions in the e-recruitment process for single activities such as the applicant data storage in computer systems. With the using of Internet appeared the possibility to post vacancies on the company's website or on the job portals, but also the possibility to search of a job and CV databases of these portals.

Phase 2: In this phase appears the integrated applicant management system. This system wants to attract potential candidates, post vacancies, and receive applications from those who are looking for a job and even the final selection.

Phase 3: The information systems ensure compatibility of external service providers with company information systems providing a continuous flow in the recruitment process.

Phase 4: It involves a final solution that covers the entire recruitment process, integrating computer systems but also web-based tools that allow data transfer between the company and other external parties.

**Figure 1: The Recruitment Phase Model**



Source: Malinowski, Keim, & Weitzel, 2005 quoted by Deillon Céline, 2014

### **Recruitment and Selection Tools**

Recruitment and Selection tools help in automating and streamlining the process of hiring. This is by generating interest, screening resumes, conducting interviews, and hiring employees.

Due to their significant assistance in the hiring process, these tools or recruitment software are actually the ideal helpers for any HR staff. They facilitate the hiring process from start to finish, maximizing efficiency with the least amount of work.

This paper has taken following Recruitment and Selection tools into consideration:

- Recruitment Tools
  - Glassdoor: Glassdoor is a website whereby current or former employee of the company can post reviews about the company. They can also view and submit their salaries on it. It is also used for searching and applying for jobs
  - LinkedIn: LinkedIn is a career development and professional networking site whereby users as a Job Seeker can post their resumes and as an employer can post jobs.
  - Social Media: Social Media such as Facebook, Twitter, Instagram helps to bring qualified job seekers to your postings and also cultivates interest among passive job seekers in your company.
  - Job Portals: These are the services that promote open positions on a company's hiring policy. Many companies post vacancies on a single platform in order to get maximum reach of job seekers. Naukri, Monster, Careerbuilder, Indeed are some of the examples of Job Portals.
- Selection Tools
  - Video Interview Tools: These technologies make it possible to conduct video interviews while accounting for many factors. Aside from tone of speech and word choice, other factors include facial expressions. Examples of these are Skype, HireVue, VidCruiter, Wepow, and others.
  - Applicant Tracking Systems: An Applicant Tracking System or ATS is another helpful automated recruitment system because of its database assistance to recruiters in talent acquisition. Examples of these tools are Greenhouse, Naukri RMS, Zoho Recruit, Talent Recruit, etc. In many cases they are also used for filtering resumes based on given criteria and keywords such as skills, schools attended, former employee etc.
  - Learning Tools: These tools help in on boarding and conducting induction programs for new employees. For example Lessonly is a learning tool which helps the teams to learn and practice at their own pace and time.
  - Candidate Satisfaction Surveys: Candidates who have been part of recruitment and selection process are asked for their opinion regarding different stages of

the process with the help of Google Forms or Survey Monkey. Based on the surveys and polls the company can evaluate their recruitment and selection process.

- Background Check Tools: Background check tools are criminal or other public records searches, verifications of previous employments and references, identity, education and motor vehicle records.
- Reference Check Tools: Checkster is an automated reference checking system. It provides organizations the ability to best assess future employees in order to deliver the best services. It is a best practice way to move away from a paper and phone process to an electronic process.
- Skill Testing Tools: These tools enable employers to identify potential hires by evaluating working skills and their job readiness. Examples of this are eSkill and iMocha
- Programming Challenges: HackerRank is an online platform where programmers from all over the world come together to solve problems in a wide range of Computer Science domains such as algorithms, machine learning, or artificial intelligence, as well as to practice different programming paradigms like functional programming.
- Psychometric Tools: Psychometric tools outline the entire personality profile, behavior, flexibility, aptitude, creativity, communication, and problem-solving skills that are necessary to perform in a given position, they can serve as your reference model for any given position. Examples of Psychometric tools are Mindtools and Peoplogica.

### **Literature Reviews**

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- ◎ Blacksmith N. (2014) in her research on Three Ways Social Media and Technology have changed the world concluded that 83% of the organizations are using social media as a part of the recruitment process. She also concluded that LinkedIn is the top choice for most recruiters but Facebook and Twitter are used as well.
- ◎ Khillare P. and Shirsale S.(2017) in their research on A Conceptual Framework of E-Recruitment in Current Business Scenario concluded that a very little research has been done on the entire field of e-recruitment due to vast amount of gap to apply the current knowledge. The research mainly focused on applicant's desirability, reflection and awareness of organizations' corporate career websites
- ◎ Alghamdi B. and Alhardy F. (2019) in their research on An Intelligent Model for Online Recruitment Fraud Detection used two data mining algorithms Support Vector Machine for feature selections and Random Forest for classification. The research

concluded that major online recruitment frauds consist of email spam phishing and Cyber Bullying

- ◎ Faliagka E., Ramantas K. and Tsakalidis A. (2012) in their research on Application of Machine Learning Algorithms to an online Recruitment system developed an algorithm which extracted information from Candidate's LinkedIn Profile and also their social media presence and scores were assigned based on their personality traits. The approach was effective in online recruitment system application
- ◎ Ramkumar A. (2018) in his article E-Recruitment through Job Portals and Social Media Network: Challenges and Opportunities listed various pros and cons of E-recruitment and concluded that recruitment system should be able to attract right candidate, selection process should be based on eligible and sound criteria and tracking process should be integrated with the existing system.
- ◎ Derous E. and Fruyt F. (2016) in their article Developments in Recruitment and Selection Research said that technological advancements reshape the recruitment and selection practices with the help of multimedia tools (like mobile testing, video resume, use of LinkedIn etc.) and the use of online applicant tracking systems (as part of human resource information systems) that might increase the efficiency of the recruitment and assessment process to both recruiters and applicants. Although some multimedia applications like social networking websites, unproctored/mobile testing, and video resumes are increasingly used by applicants and practitioners, research is somewhat lagging behind as still not that much is known about the properties and efficacy of several technology- enhanced assessments compared to the more traditional recruitment and assessment tools.
- ◎ Frampton G., Shepherd J., Pickett K., Giffiths G. (2020) in their research Digital Tools for the recruitment and retention of participants in randomized controlled trials: a systematic map concluded that digital tools such as social media, data mining, email or text messaging could improve recruitment but an overview of this research is lacking. Most frequently studied digital tools are social media, internet sites, email and tv/radio for recruitment. Most of the studies measured efficiency (cost per recruited) but few studies have evaluated people's attitudes towards the use of digital tools

### **Need for the Study**

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The role of the recruiter is to get the best talent with minimal cost and in an efficient way. Main aim of the study is to grow curiosity among recruiters of different online tools available in the market for recruitment and selection process and trying to adopt them in their system, which in turn will help in smoothening and streamlining the process.

## Research Methodology

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### Research Objectives:

- To know the level of awareness of IT Recruiters about online Recruitment and Selection
- To identify the key online tools and technologies used by recruiters for hiring.
- To check the level of satisfaction of recruiters with online recruitment and selection
- To analyze relationship between awareness about online tools and technologies for selection and years of experience of the recruiter.

Research Design: Analytical and Exploratory Research

Type of Data: Primary Data

Data Collection Tool: Structured Questionnaire

Population: Small, Medium and Large IT Companies' Recruiters of Gujarat Region

Sample: All Recruiters of IT companies in Urban cities of Gujarat

Sample Size: 40 Recruiters IT Companies

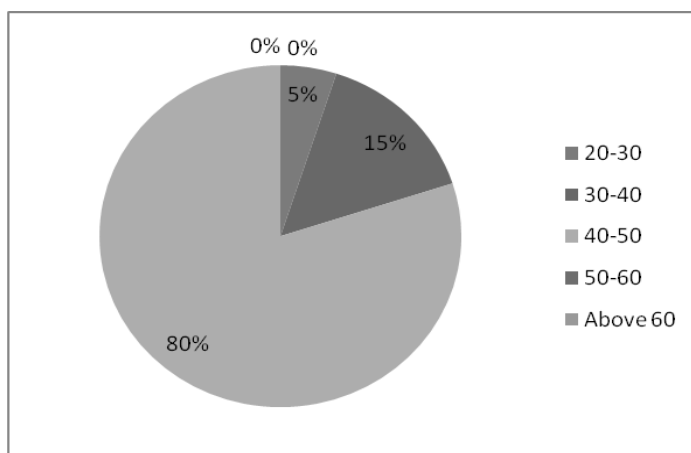
Sampling Methods: Convenience and Judgement Sampling Method

Analytical Tools: Chi-Square Hypothesis Test, Graphs and Tables

## Findings

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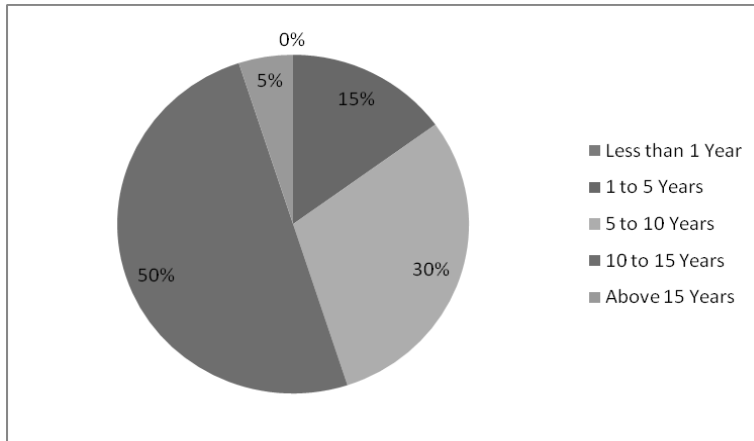
### Chart 1: Age Wise Distribution



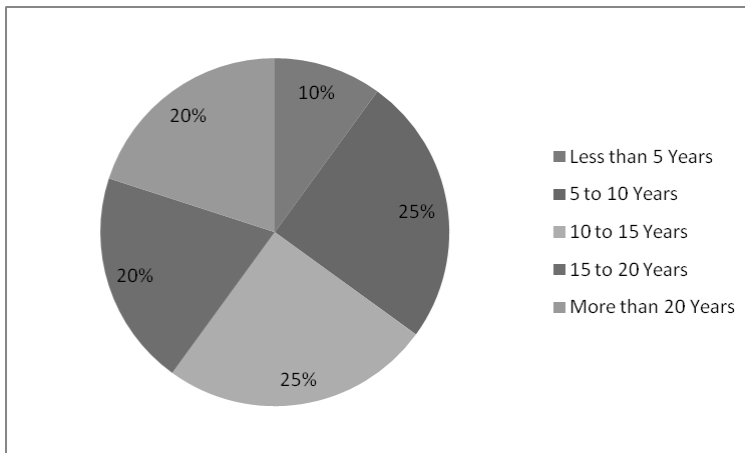
From chart 1 we can analyze that 80% of respondents are of 30-40 years age group whereas 15 % of respondents are of age group 40-50 years; 5% respondents of the age group 50-60 years. There were no respondents for the age group 20-30 years and above 60 years.

### Chart 2: Analysis of Number of years of experience of a Recruiter

From chart 2 we can analyze that 50% of respondents are the ones having Experience of 10-15 years; 30% are having experience of 5 to 10 years; 15% are having experience of 1 to 5 years; 5% are having experience of above 15 years and there were no respondent with less than 1 year of experience.

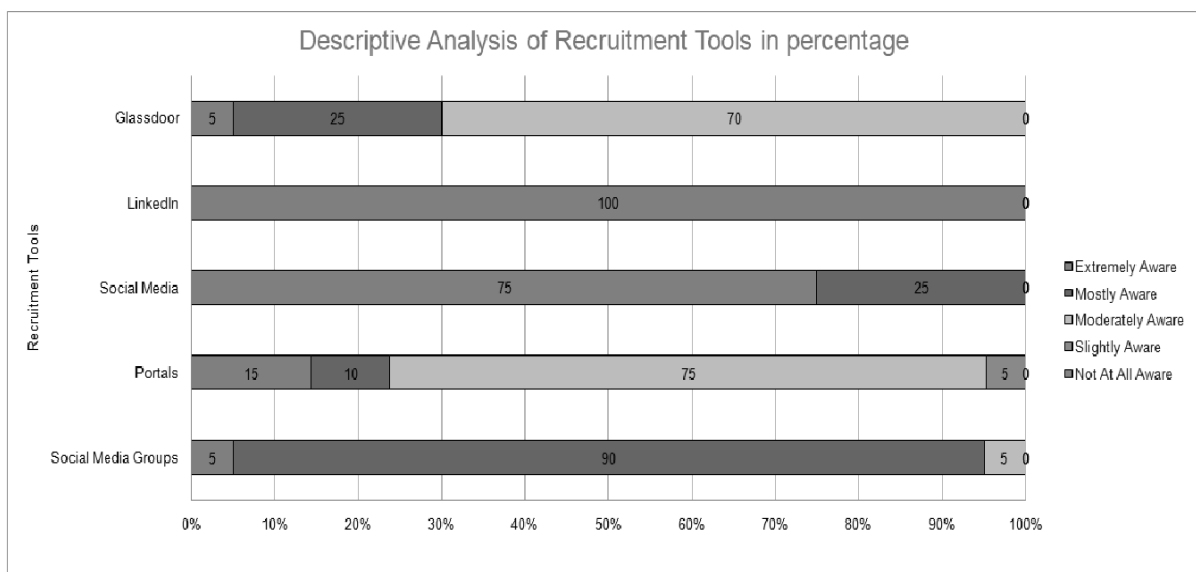


**Chart 3: Analysis of Number of Years the company is working since**



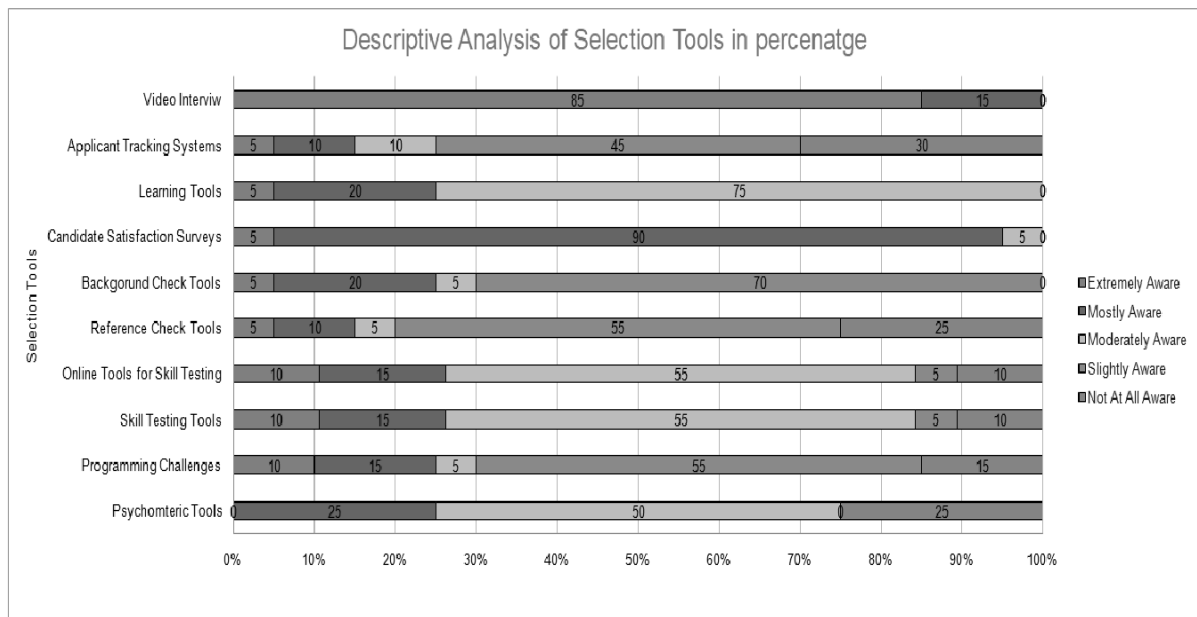
From above graph we can analyze that 25% of the data collected from company's are working since 5 to 10 years and 10 to 15 Years; 20% of the company's are working since 15 to 20 and More than 20 Years; whereas 10% of the company's are working since less than 5 Years.

**Chart 4: Descriptive Analysis of Recruitment Tools in percentage**



From the chart 4 we can analyze that all Recruiters are extremely aware about LinkedIn as a recruitment tool; 70% of the Recruiters are moderately aware of Glassdoor as Recruitment; 75% respondents are mostly of Social Media as recruitment tool; 75% are moderately aware whereas 5% are slightly aware of Job Portals as Recruitment tools.

**Chart 5: Descriptive Analysis of Selection Tools in Percentage**



From chart 5 we can analyze that 85% of the respondents are extremely aware of Video Interview as a selection tools; 45% are slightly aware whereas 30% are not at all aware of applicant tracking system as Selection Tools; 75% of the respondents are moderately aware of Learning Tools Selection Tools; 90% of the respondents are mostly aware of candidate Satisfaction Tools; 20% of the respondents are mostly aware and 70% are slightly aware of the Background check tools; 55% of the respondents are slightly aware and 25% are not at all aware of reference check tools; 55% of the respondents are moderately aware and 10% are not at all aware of skill testing tools; 55% are slightly aware and 15% are not at all aware of Programming Challenge tools and 50% of the respondents are moderately aware and 25% are not at all aware of Psychometric tools. The overall analysis majority of the respondents are quite well aware about video interview and candidate satisfaction surveys as selection tools but there are few respondents who are not at all aware of applicant tracking systems, Reference Check Tools, Skill Testing Tools, Programming Challenges and Psychometric Tools. The respondents are averagely aware about Learning tools, skill testing and psychometric tools.

**Table 1: Hypothesis Testing**

H0= Awareness about online tools and technologies for selection is independent of years of



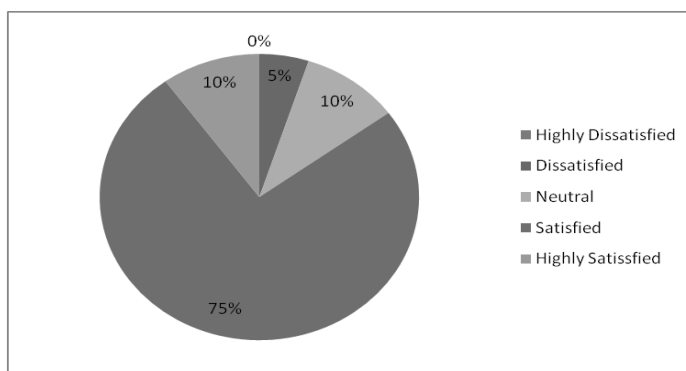
experience of the recruiter

H1= Awareness about online tools and technologies for selections is not independent of years of experience of the recruiter

Selection Tools	Chi Square Value	Significance Level	Results
Video Interview Tools - Skype	9.900 <sup>a</sup>	0.019	H0 is rejected
Applicant Tracking Systems - Greenhouse	21.738 <sup>a</sup>	0.010	H0 is rejected
Learning Tools - Lessonly	7.860 <sup>a</sup>	0.249	H0 is accepted
Candidate Satisfaction Surveys - Survey Monkey and Google Forms	11.138 <sup>a</sup>	0.084	H0 is accepted
Background Check Tools - Hire Right and Check	25.714 <sup>a</sup>	0.002	H0 is rejected
Reference Check Tools - Checkster	25.714 <sup>a</sup>	0.002	H0 is rejected
Online Tools for Skills Testing	24.438 <sup>a</sup>	0.004	H0 is rejected
Skill Testing Tools - eSkill and Interview Mocha	15.257 <sup>a</sup>	0.018	H0 is rejected
Programming Challenges - HackerRank	32.014 <sup>a</sup>	0.000	H0 is rejected
Psychometric Tools - Mind tools and Peoplogica	5.760 <sup>a</sup>	0.124	H0 is accepted

The Result Shows that awareness of most of the Selection tools depends on the years of the experience of the recruiter except Learning Tools and Psychometric Tools.

**Chart 6: Analysis on Satisfaction Level of Usage of Online Tools**



From the above graph 75% of the Recruiters are highly satisfied with the online recruitment and Selection Tools that they are using; 10% are averagely and highly satisfied with the online Recruitment and Selection tools that they are using whereas 5% are dissatisfied with the online tools used in the recruitment and selection process.

### **Limitations of the Study**

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- Qualitative factors are likely to change as a result of the recruiter's schedule.
- As the study is linked to human behavior, subjectivity in terms of responses becomes one of the major drawbacks.
- Statistical techniques have specific limitations and will also apply to the study.
- Limited time and cost are the inherent drawbacks of this research.

### **Implications of the Study**

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The present study may be used for technological advances in the Recruitment and Selection process, which may be useful to the society and industry. The study will also contribute to the development of new and effective technologies, algorithms which will be an overall advance in science and technology.

### **Scope of the Study**

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The study can further be extended by finding more online tools and technologies in recruitment and selection process and whether the companies are using it or not. Also research can also be done on the effectiveness and cost benefit analysis of these online tools and technologies over the traditional recruitment and selection method.

### **Conclusion**

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With the advent of technology and post-COVID, it has become more important for businesses to transition to the online Recruitment and Screening process. The study shows that majority of the IT recruiters are aware about most of the Recruitment tools but few are still not aware of some of the Selections tools such as Psychometric Tools, Reference check tools, Applicant Tracking Systems etc.

The Study also reveals that though many Recruiters are aware of majority of the tools but usage of it is still limited to Recruitment tools like LinkedIn and Job Portals and for Selections tools like Skype only. The Recruiters may think of converting the entire Recruitment and Selection process online which may help them in saving their time, money and manpower.

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## **A Study on Measuring Satisfaction Level of Employees with Existing Retention Practices in Banking Industry in the Context of Rajkot Region**

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### **ABSTRACT**

In any sector employee retention is always a strong base to promote teamwork, collaboration, and employee engagement. Employers can encourage active participation by clarifying company objectives, goals, and employee roles and celebrate victories as a team, whether business goals or personal successes. It uses mentorship programs to help new employees learn the ropes. This can show senior employees their expertise is valued and provide experienced training to new recruits. Retention encourages a healthy work-life balance. Unhappy employees are less productive, and more likely to result in turnover. Employers have to be proactive about asking employees what they need and remain vigilant about looking for the signs of employee burnout.

In banking industry healthy retention practices are important as all to employees having important and responsible portfolio in their hand and replacement of anyone's responsibility is quite tough and time consuming. Many studies have been conducted to find out the employee retention strategies by the organization towards issues related with human resource. In this particular research the researchers have tried to find out the relationship between employee retention and job satisfaction in private banking sector in the context of Rajkot region. Researchers have taken sample size of 50 employees of six leading banks through convenient sampling technique to analyse the relationship between satisfaction of employees and retention strategies used by their respective banks.

**KEY WORDS:** *Employee Retention, Relationship, Job Satisfaction, Banking Sector*

### **INTRODUCTION & MEANING**

Retention is always look for chances to promote teamwork, collaboration, and employee engagement. You can encourage active participation by clarifying company objectives, goals, and employee roles and celebrate victories as a team, whether business goals or personal successes. It uses mentorship programs to help new employees learn the ropes. This can show senior employees their expertise is valued and provide experienced training to new recruits. Retention encourages a healthy work-life balance. Unhappy employees are less productive, and more likely to result in turnover. Be proactive about asking employees what they need and remain vigilant about looking for the signs of employee burnout.

In banking industry healthy retention practices are important as all to employees having

important and responsible portfolio in their hand and replacement of anyone's responsibility is quite tough and time consuming.

## LITERATURE REVIEW

1. Petriglieri (2018) have studied that attract and retain skilful and talented people in the organization all organisations in the banking industry have to have sound retention practices he elaborate that everyone have found that what is crucial things that they have to take care for the betterment of employees in the organization. He defines that it is top management and HR manager's duty to put themselves into their subordinates' shoes, and then decide and design and considering every policy and everything in organization.
2. Kamal M.Y,(2017) in this study every banking organisation needs to utilize their best talent holistically in order to get the benefits for the development of banking industry. In the same public banking industry also needs to revise their scheme and program that relate with retain their employee on order to get the job satisfaction.
3. Dr. K. Balaji Mathimaran & Prof. Dr. A. Ananda Kumar, (2017) have investigated various available literature and research work on employee retention in which are the factors which affecting employee retention and job satisfaction among the employees. In these results and outcome suggested there are few factors which is influencing to every employee not to leave organisation those factors are like, salary, security performance appraisal and all.
4. Dr G.Balamurgan, (2016) The study suggested that it quit challenges for banking industry and HR department focus on work pressure, salary and benefits for retention practices. Every banking organisation has to provide best career enhancement opportunity to their employees so that any employee can feel or think to leave their organisation, so they have to work on them.
5. Zhang Yanjuan, (2016) In this article specified to give summary on employees turnover influence reasons and put forward counter measure from personal reason, organizational reason, work reasons, social and economic reasons.
6. Safdar Rahman (2012) he discussed that employee retention is the philosophy to retain and jeep daily wages workers in a series as a housing facility for specific period time in which he or she is giving service in the organisation, also suggested to follow best HR practices in the organisation.
7. Cole, C. L (2000), did the research on factors affecting employee retention and as per his research he concluded that career opportunities, work environment and work life balance mainly these three are the factors which is affected to employee retention if any organisation work on it then its easily to retain the employees.
8. Madan & Bajwa (2015), As per their survey motivation is the vital aspect of employee retention which helps to retain the employees in the organization so as to perform better. And for retaining the best and the most suitable employee organization needs to provide proper

career opportunities, working environment, compensation benefits and supervisor support to the employees.

9. Bhatia, S.K. (2010) said employee engagement is a crucial for retention. Organisation has to work on employee engagement and design activities and create opportunities in which employee engage their self they can share their views on what they want. And if organisation increase employee engagement.

10. Sherjung (2011) mainly focused on some HR practices which affect employee retention in the organization and the identified HR practices are hiring practices, compensation and benefits, job security, training and development, opportunity for growth, and these all are mandatory for every organisation to work on it.

## **RESEARCH METHODOLOGY**

### **Research Topic**

“A Study on Measuring Satisfaction Level of Employees with Existing Retention Practices in Banking Industry in the Context of Saurashtra Region.”

### **Research Objective**

- To know the relationship between level of satisfaction of employees with retention practices and demographic profile of respondents
- To study the retention practices for the employees of banking Industry.
- To measure the satisfaction level of employees with existing retention practices.

### **Research Designs**

Data Source	Primary and Secondary
Research Design	Descriptive
Research Method	Survey Method
Sampling Method	Random Sampling
Research Technique	Questionnaire
Type of Questionnaire	Structured
Type of questions	Close Ended
Apply Test	Chi Square
Population	Employees of Public & Private Banks
Location	Rajkot City
Sample Size	50 employees of Banks

### **Research limitation**

The limitations of the study are as follow:

**Personal Bias:** Individuals may have personal bias towards organisations, their policy,

working environment, relations with the superior and subordinates, past experience, etc.

**Sample Size:** The last limitation is Sample Size, which is of 50 only; due to lack of time and busy schedule and field work duty of employees.

**Decision Maker:** Conclusion is derived by oneself (Decision Maker)

**Research Error:** Some of the respondents were not giving the proper attention on the questioner and they were also lack of education so language become barrier for them but to minimize the error I explain question in local language.

### **Data Interpretation and Analysis**

The interpretations are listed here along with tables and charts in the following sequence:

- Research on Retention Practices for Banking Industry
- Overall analysis
- Analysis about Employee Retention Practices, Productivity, Satisfaction level, Work environment system, , Employee Relationship and Job Satisfaction

**Note:** The questionnaire consists of 12 questions which gives different view of employees on total 10 different parameters i.e. Compensation, Performance appraisal system, Career Development, Employee Engagement, Training and Development, Employer-employee relationship, Motivation, Job Satisfaction, Morale and Team Building.

I have converted research question from categorized to metric data to fulfil the condition to use Chi- Square Test.

In this survey I take sample of 50 employees of different 6 Banks in Banking Industry. To know different views of employees I used questionnaire and it covers various questions and analysis of these questions are as follows.

### **Testing of Hypothesis**

#### **Meaning of hypothesis**

A hypothesis is a statement about population parameter. Hypothesis testing significance. Testing is procedure that helps us to decide whether the hypothesized population parameter value is accepted or rejected by making use of the information obtained from the sample.

#### **Null hypothesis:**

A statistical hypothesis which is stated for the purpose of possible acceptance is called null hypothesis. It is usually denoted by  $H_0$ , the null hypothesis may be expressed symbolically.

“Null hypothesis is the hypothesis which is tested for possible rejection under the assumption that it is true.”

#### **Alternative hypothesis:**

Any hypothesis which complementary to null hypothesis. There are many chances that the calculated value is less or equal or more then null hypothesis.

**Chi-Square Test for** “Level of satisfaction with retention practices and type of organization”**Step-1: Hypothesized**

Null hypothesis (H <sub>0</sub> ):	H <sub>0</sub> : Level of satisfaction with retention practices is independent with/of type of organization
Alternative hypothesis (H <sub>a</sub> ):	H <sub>1</sub> : Level of satisfaction with retention practices is not independent with/of type of organization

**Step-2: Test**

Apply chi-square test of independence.

**Step-3: Analyse the data:**

Parameters of retention practices	Chi square Value	P-value	Significance	Hypothesis
Compensation	20.213	0.027	Yes	Null hypothesis rejected
Performance appraisal system	12.633	0.245	No	Fail to reject null hypothesis
Career Development	25.154	0.005	Yes	Null hypothesis rejected
Employee Engagement	14.255	0.162	No	Fail to reject null hypothesis
Training and Development	29.548	0.09	No	Fail to reject null hypothesis
Employer-employee relationship	32.692	0.003	Yes	Null hypothesis rejected
Motivation	25.69	0.011	Yes	Null hypothesis rejected
Job Satisfaction	23.502	0.024	Yes	Null hypothesis rejected
Morale	13.679	0.188	No	Fail to reject null hypothesis
Team Building	21.577	0.043	Yes	Null hypothesis rejected



**Step-4: Decision**

From the result of hypothesis testing summarized in table number, it has been observed that for most of the parameters of retention practices are independent with type of organization. Except for parameters like performance appraisal system, training and development programs and morale of employees the responses from the employees do not vary between private and public sector respondents or in another words we can say that there is no relationship between above parameters of retention practices and type of organization.

**Chi-Square Test for** “Level of satisfaction with retention practices and tenure with existing organization”

**Step-1: Hypothesized**

Null hypothesis (H <sub>0</sub> ):	H <sub>0</sub> : Level of satisfaction with retention practices is independent with tenure existing organization
Alternative hypothesis (H <sub>a</sub> ):	H <sub>1</sub> : Level of satisfaction with retention practices is not independent with tenure existing organization

**Step-2: Test**

Apply chi-square goodness of fit.

**Step-3: Analyse the data:**

Parameters of retention practices	Chi square Value	P-value	Significance	Hypothesis
Compensation	20.854	0.142	No	Fail to reject null hypothesis
Performance appraisal system	13.991	0.526	No	Fail to reject null hypothesis
Career Development	24.984	0.05	No	Fail to reject null hypothesis
Employee Engagement	16.331	0.36	No	Fail to reject null hypothesis
Training and Development	29.516	0.102	No	Fail to reject null hypothesis
Employer-employee relationship	38.419	0.112	No	Fail to reject null hypothesis
Motivation	33.419	0.015	Yes	Null hypothesis rejected
Job Satisfaction	27.714	0.067	No	Fail to reject null hypothesis
Morale	28.922	0.016	Yes	Null hypothesis rejected
Team Building	52.259	0	Yes	Null hypothesis rejected

#### **Step-4: Decision**

From the result of hypothesis testing summarized in table number, it has been observed that for most of the parameters of retention practices level of satisfaction is independent with tenure with existing organization. Expect level of satisfaction for the parameters of retention practices like morale of employees, team building and motivation of employees are having relationship with the tenure with the existing organization.

#### **Findings**

Write percentage analysis of demographic data and also from data of the main question.

Further from hypothesis testing it was found that except performance appraisal system, training and development programs and morale of employees level of satisfaction other parameters of retention practices are not independent with sector of the bank. Whereas except morale of the employees, team building and motivation level of satisfaction with retention practices has are independent with the tenure with the existing organisation.

After analysing the data and interpretation certain findings are drawn about the retention practices is that key variables which is implemented by any banking organisation is equally important.

#### **Suggestions**

Bank has to work up on Compensation, Performance appraisal system, Career Development, Employee Engagement, Training and Development, Employer-employee relationship, Motivation, Job Satisfaction, Morale, and Team Building

#### **Conclusion**

From the above research work we can say that every organisation have to to work up on retention policy In which they have to considered above said key variables equally according to preference and requirement by employees and market so that any bank can easily attract their employee and retain them properly on right time in the race to changing the world and competition.

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