



# ST. ALOYSIUS' COLLEGE

**AUTONOMOUS**  
**JABALPUR- 482001**  
**MADHYA PRADESH, INDIA**

## CRITERION-1



### CURRICULAR ASPECTS

**Key Indicator – 1.3**

**Curriculum Enrichment**

**Metric No.: 1.3.3**

**Percentage of programmes that have components of  
Field projects / Research projects / Internships during  
the last five years**

**Document Name**

**Sample Evaluated Project report/Field work  
Report submitted by the students**

**2020-21**



**ST. ALOYSIUS' COLLEGE**

**(AUTONOMOUS), JABALPUR(M.P.)**

Reaccredited 'A+' Grade by NAAC (CGPA 3.68/4.00)

College with Potential for Excellence (CPE) by UGC

DST-FIST Supported & Star College Scheme by DBT.

# **SAMPLE PROJECT REPORTS**

**2020-21**

## **FACULTY OF COMMERCE**



WELDSUPRA  
Project  
on  
INTERNET  
BANKING

By-Anushka  
Sharma

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# Introduction

Axis Bank established in 1993 was the first of the new private banks to have begun operations in 1994 after the Government of India allowed new private banks to be established. Axis Bank Ltd. has been promoted by the largest and the best Financial Institution of the country UTI. The Bank formerly known as UTI Bank (1993-2007)

I'm going to cover about Internet Banking. Internet Banking is one of the gifts to human beings by computer technology. Use of computers have automated banking system and thus have given birth to internet. Internet is a fast spreading service that allows customers to use computer to access account-specific information and possibly conduct transactions from a remote location such as at home or at the workplace. The increased adoption and penetration of Internet has recently redefined the playground for retail banks. The retail banks are now offering their services majorly through their internet branches. However, the effect of internet banking on bank profitability mainly on the bank profitability has remained an unstudied issue.





## INTERNET BANKING

Online payment gateway, electronic funds transfers and mobile payments



Internet Banking is the conduct of banking business electronically which involves the use of information communication technology to drive banking business for immediate and future goals.

Generally, the automation of banks makes transaction and data processing very easily accessible for quick management decision making. This led to another level of benefit which ushered in what is today referred to as internet banking.

Internet Banking helps the banks to speed up their retail and wholesale banking services.

The banking industry believes that by adopting the new technology - internet, the banks will be able to improve customer service level and tie their customers closer to the bank.

The adoption of internet banking has brought major challenges to the banking industry in terms of risk exposure. The volume of deposits has increased as well.

The effectiveness of deploying information technology in banks therefore can not be put to doubt. However, researchers have not given much attention to this revolution occasioned by internet banking with regard to profitability performance of banks.

Generally, there appears not to be improvement on banks' returns on equity and assets as speculated.



**E-Commerce**  
conducting business through  
electronic networks

**E-Finance**  
providing financial services  
through electronic channels

**E-Money**  
stored value or  
prepaid payment

**E-Banking**  
providing banking products  
& services through  
electronic delivery  
channels.

**Other financial  
services & products**

**Internet  
Banking**

**Telephone Banking**

**Other electronic  
delivery channels**



# SCOPE

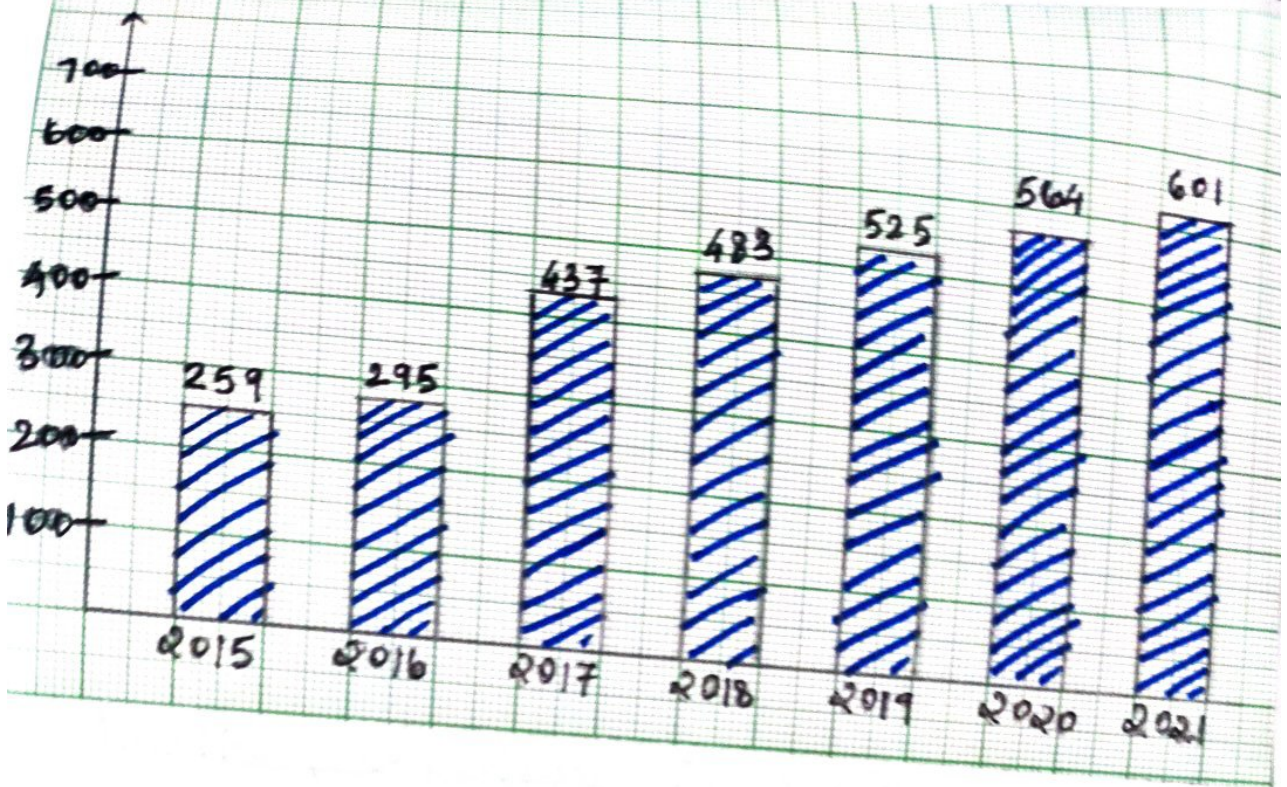
With the financial technology companies, e-commerce names, big data firms, and cloud based software and service, the digital element is truly revolutionizing things, quite quickly & effectively. And it becomes even more relevant to take a moment to contemplate where the banking sector figures in the midst of all these changes.

With the help of online banking, there are several indispensable services which are made available to customers, without them having to personally visit the bank. Customers can perform financial transactions like transfer funds online, pay bills, apply for loans and open a saving account among various other debit card transactions. Under non-financial transaction, customers can carry out several activities which may require going to the bank like applying for a new cheque book, getting account statements, update contact information, start/stop payment, etc.

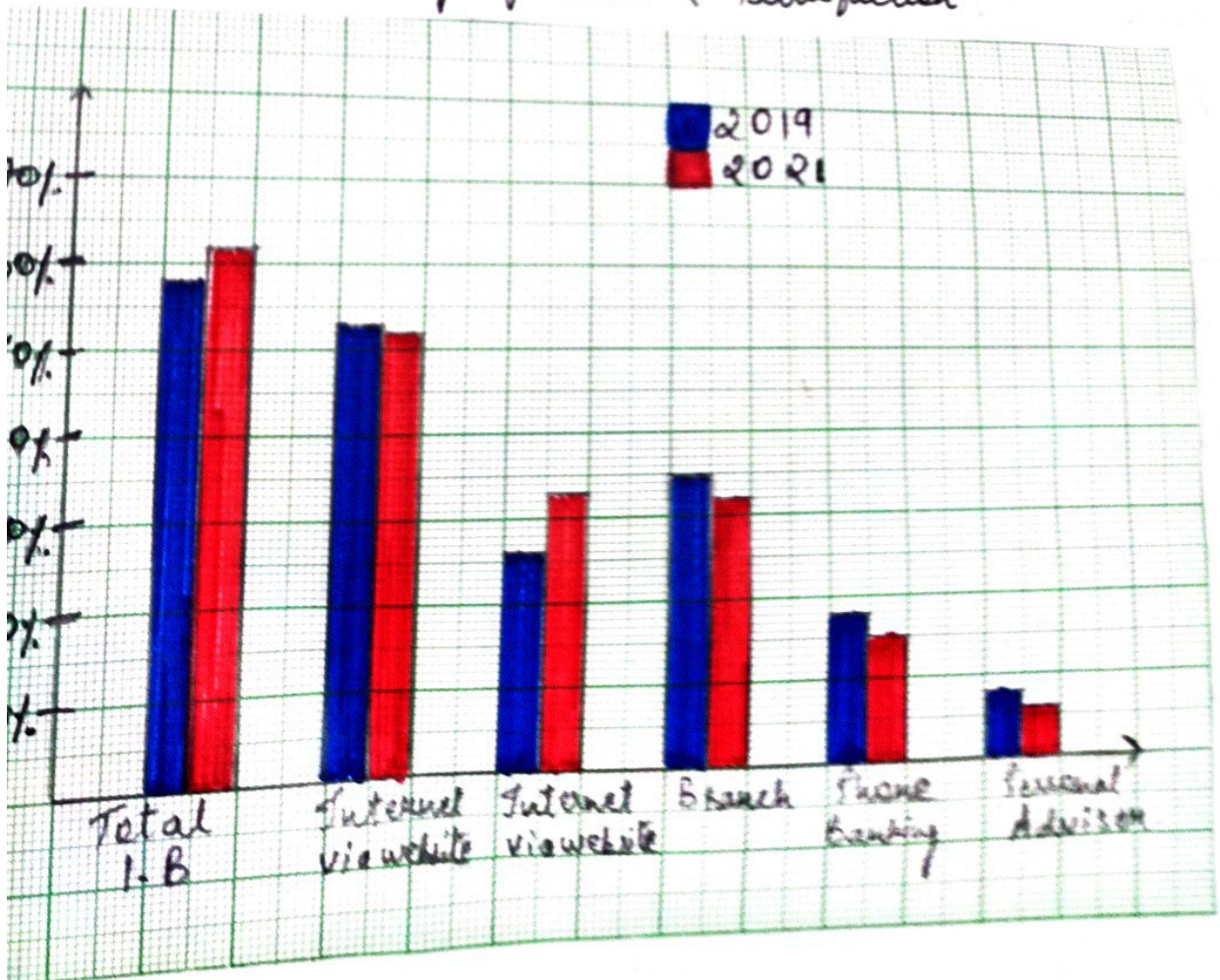
Most online payments are done via internet banking option. It has become one of the most convenient payment modes for transferring money. Most banks have created their own apps that can be downloaded on the phone and used any time.



No. of Internet users in India from 2015-2021 (in million)



Internet Banking growth & satisfaction





# PLANNING

The term 'project' has a wider meaning to include a set of activities.

Project planning help us to:

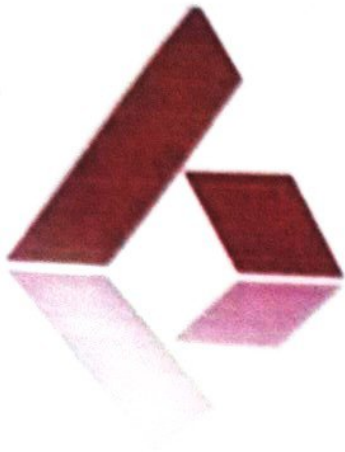
1. think ahead & prepare for the future
2. clarify goals & develop a vision
3. identify issues that will need to be addressed
4. choose between options
5. consider whether a project is possible
6. make the best use of resources.
7. motivate staff and the community
8. achieve the best results

Project planning helps to eliminate

1. poor planning
2. overambitious projects
3. unsustainable projects
4. undefined problems
5. unstructured project work plans.

The process involves completing a community - wide needs assessment to engage the community in identifying and prioritizing all long - range goal and the community problems preventing the achievements of these goals.

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**AXIS BANK**

AXIS BANK





# Description

Axis Bank Limited, formerly known as UTI Bank (1993-2007), is an Indian banking and financial services company headquartered in Mumbai, Maharashtra. It sells financial services to large and mid-size companies, SMEs and retail businesses.

The bank offers lending services to individuals and small businesses, along with liability products, card services, Internet Banking, Automated Teller Machine (ATM) services, depository, financial advisory services, and Non-resident Indian (NRI) services. Axis bank is a participant in RBI's NEFT enabled participating bank list.

Axis Bank provides products and services related to transaction banking to customers in areas of current accounts, cash management services, capital market services, trade, foreign exchange and derivatives, cross-border trade and correspondent banking services and tax collections on behalf of the Government and various State Governments in India.

Axis Bank established in 1993 was the first of the new private banks to have begun operations in 1994 after the govt. of India allowed new private banks to be established.



# OBJECTIVES & RELEVANCE

## The Objectives of BANKING

### SAFEGUARD DEPOSITS-

Bank serves the main purpose of accepting deposits from public and safeguarding it. It guarantees the safety of funds to customers for depositing their money in their accounts.

### PROVIDE LOANS-

It advances loan to customers at both short-term & long-term basis as per their needs.

### ENCOURAGE SAVINGS-

Banking institutions have an efficient role in encouraging saving habits among people.

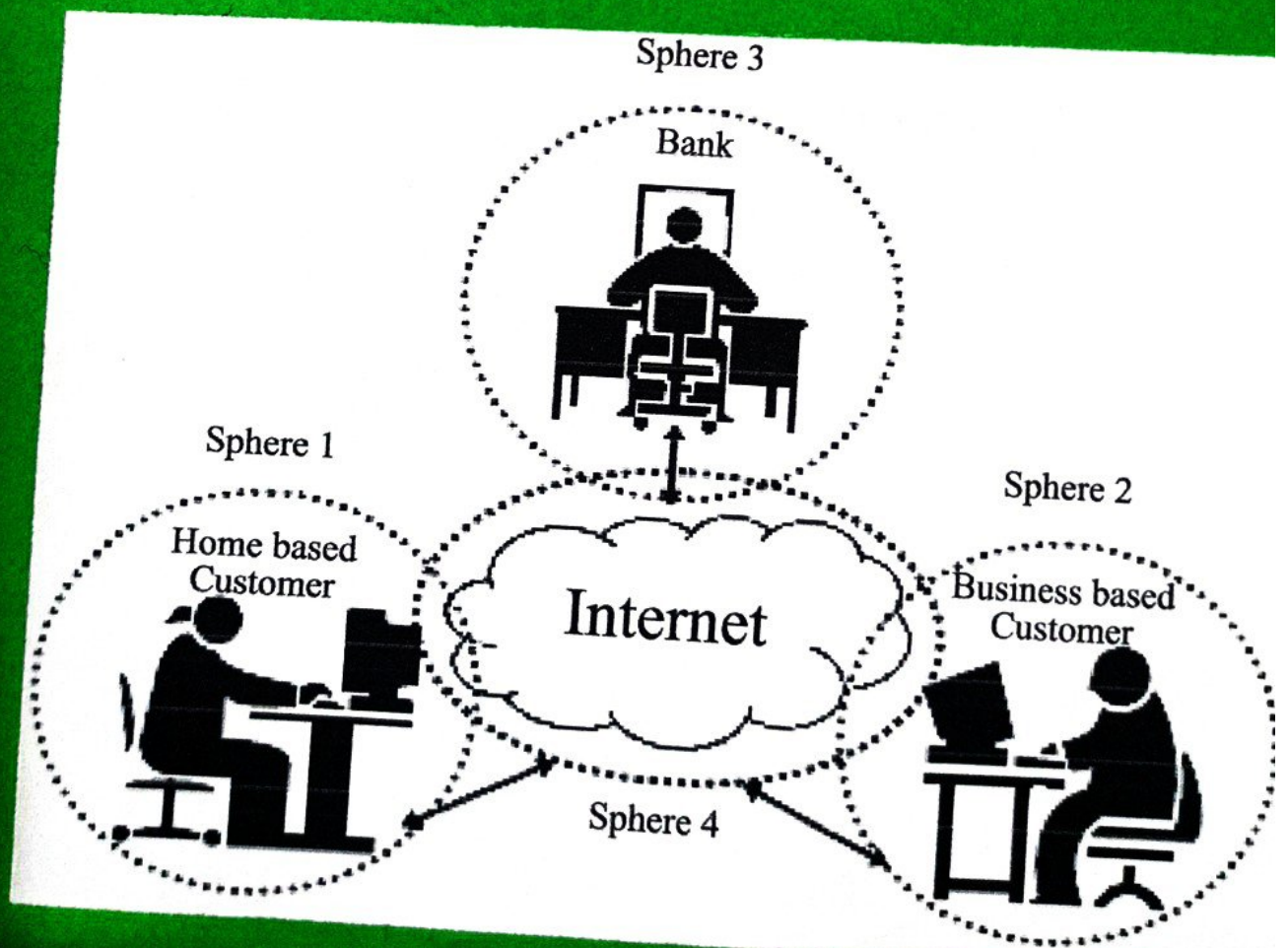
### CAPITAL FORMATION-

Banking accelerates the capital formation rate within the country.

### CURRENCY ISSUES-

Banking organizations does the purpose of issuing currency which is served as a legal tender in country.











The relevance (importance) of Banking.

## BRING ECONOMIC STABILITY -

Banking sector plays a crucial role in attaining the economic stability. They are the one who assists in controlling the depression & inflation phases.

## CREATES MONEY -

Bank generates money in an economy by advancing loans to all those who are in need of funds. It is one which grants credits out of the money collected by it from public.

## FACILITATES TRADE -

It helps in both doing both internal & external trade. Banks enable merchants in conducting trade by providing them proper payment facilities.

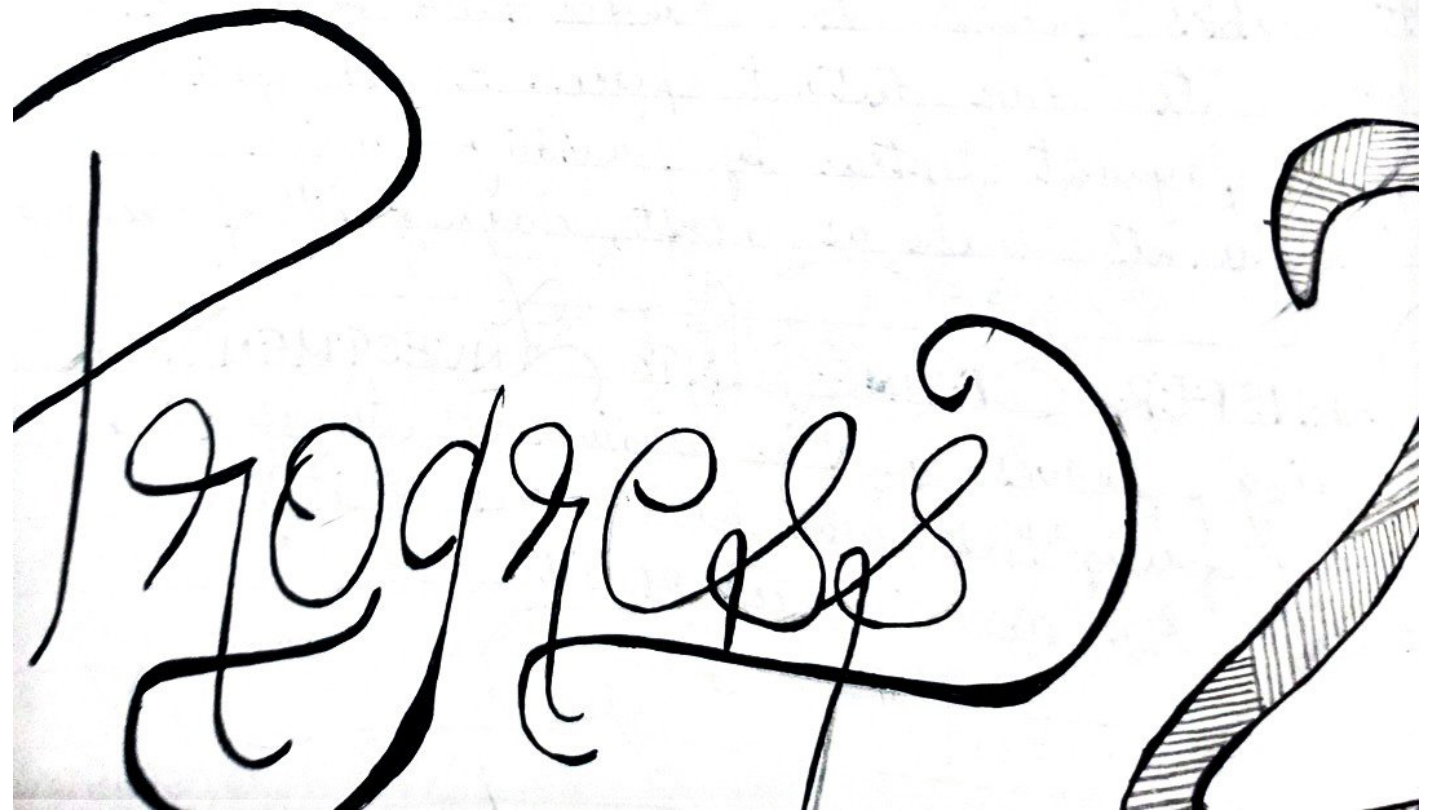
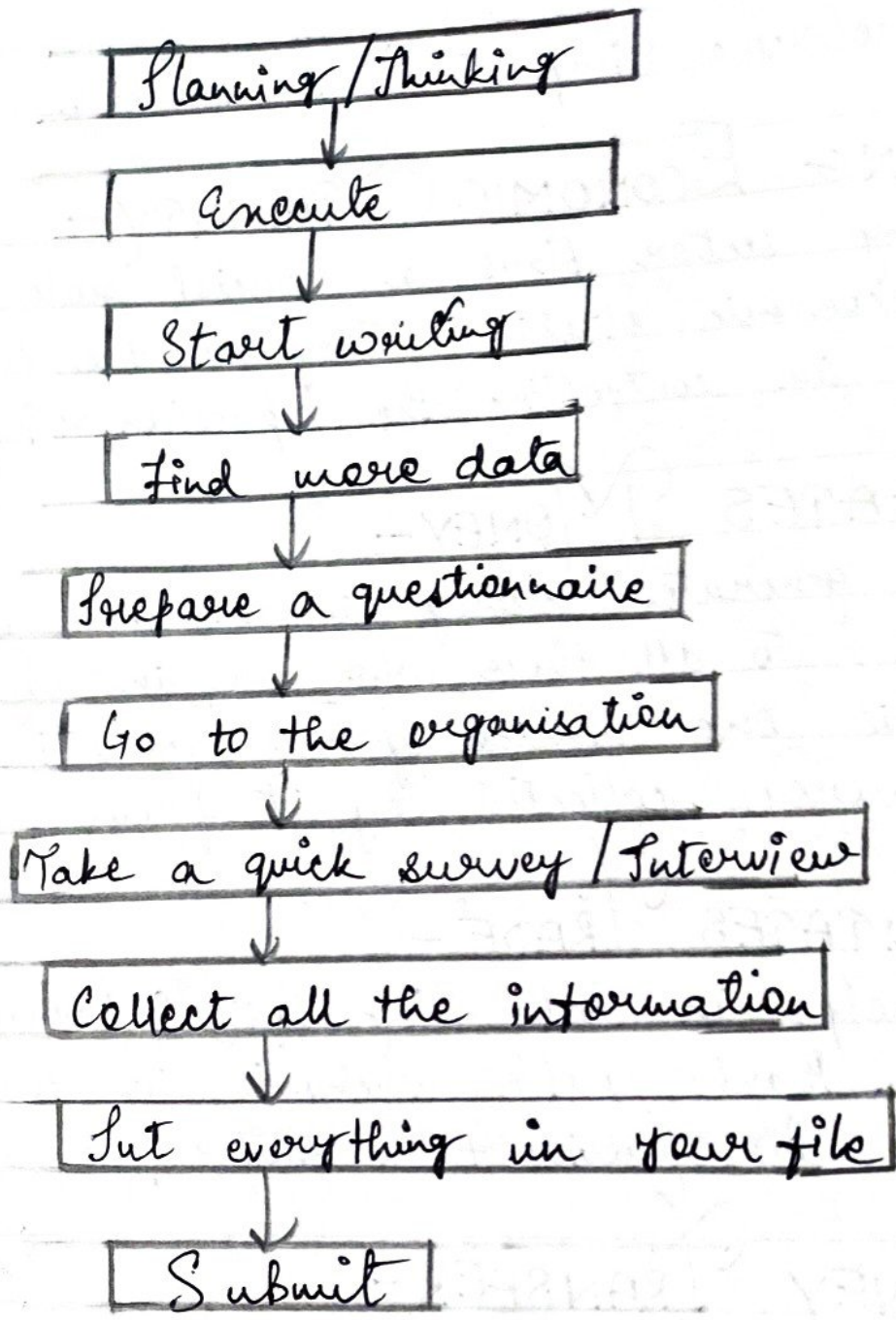
## MONEY TRANSFER -

It enables people to transfer their funds rapidly even to far distant places. It has facilitated the payment system by providing various instruments such as draft, cheque & bill of exchange.

## TRANSFER SAVING INTO INVESTMENTS -

Banking serves as the medium of transferring money from those who have excess of it to those who are in need of it.

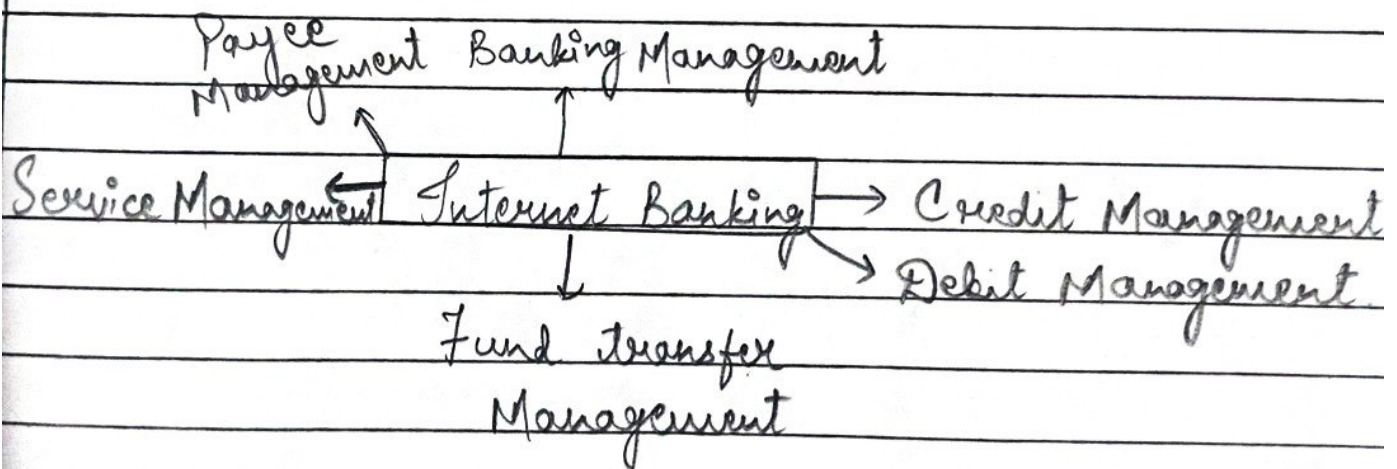




# WORK FLOW

A workflow consists of an orchestrated and repeatable pattern of an activity, enable by the systematic organizations of resources into processes that transform materials, provide services, or process information. It can be depicted as a sequence of operations, the work of a person or group, the work of an organization of staff or one or more simple or complex mechanisms.

A workflow management system is a software system for setting up, performing and monitoring of a defined sequence of processes and tasks, with the broad goals of increasing productivity, reducing costs, becoming more agile, and improving information exchange with an organization.



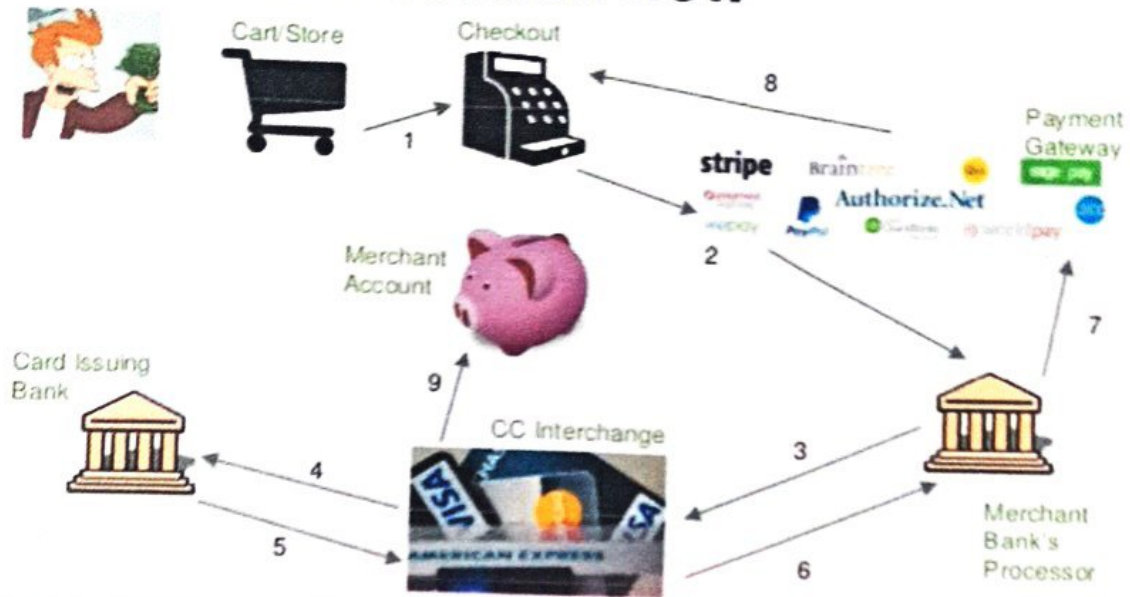


**WORKFLOW**

OPERATIONS  
BLOCK  
CONNECTED  
SUBSEQUENT  
STEIN  
RESEARCH

OUTPUT  
COMPONENTS  
DOCUMENT  
PROCESS  
SEQUENCE  
SERIES  
TASKS  
SYSTEM  
MONITORING  
CONCEPT  
SCHEDULING  
MANAGEMENT  
MECHANISM  
ABSTRACTION  
FLOW CONTROL  
PLANNING  
INPUT

# Online transaction flow



2018 Profiler

# Banking Industry



Brought to you by Media Group Online, Inc.

*Making Progress, Despite Still Relying on Physical Branches*

## INTERNET BANKING

### PERSONAL DETAILS:

NAME: Abhijeet Motwani AGE: 35  
GENDER: M OCCUPATION: Clerk

### QUESTIONNAIRE

1. In which year your bank started online service?

2003

2. Does your competitors also provides similar services with respect to you?

- Yes
- No

3. Does online banking helps you to retain your customer and helps into discover new customer?

- Yes
- No

4. Have your competitors already built m-commerce sites?

- Yes
- No

5. Is the security always updated to protect any theft or fraudulent?

- Yes
- No

6. Does online banking provide more revenue than traditional banking?

- Yes
- No

7. What kind of services are you providing in online banking?

- Online bill payment
- Mobile recharge
- Online fund/money transfer
- All of the above

8. Do you advertise your bank on other websites?

- No
- Yes

9. Is online banking well fitted in your long term strategy?

- Yes
- No

10. Did online banking done well according to your expectations?

- Yes
- No

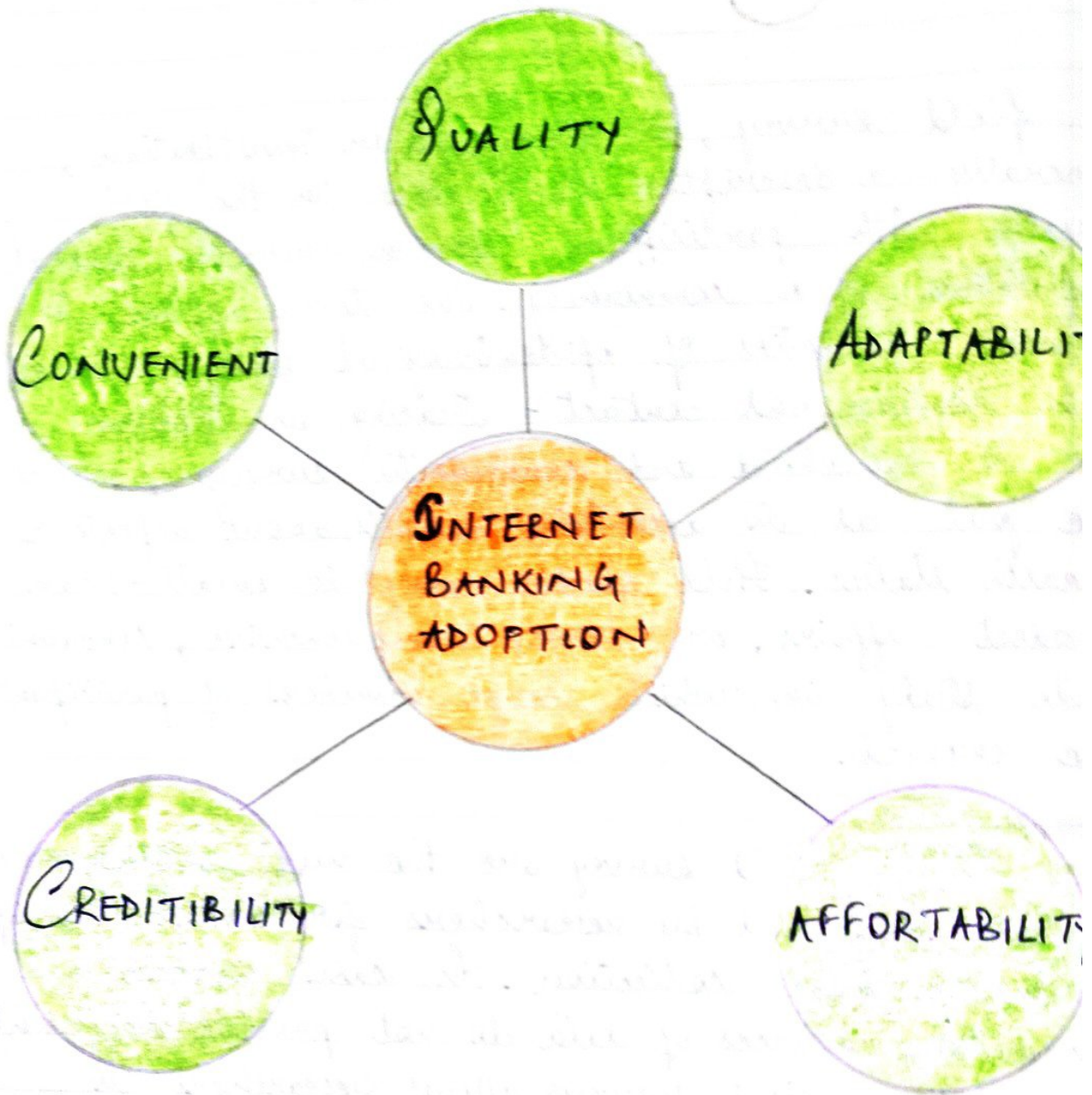


# FIELD SURVEY

A field survey, or study, is an investigation, generally a descriptive study, done in the field usually with participants drawn from the general population of a community. The term applies to several varieties of epidemiological study, such as case finding and contact-tracing in epidemics, or to household and community surveys, where the goal is to ascertain details about aspects of health status. Field studies may be small-scale, modest affairs, or large, comprehensive, community-wide study in which large numbers of participants are engaged.

Field surveys are the most commonly used method used by researchers for the process of primary data collection. In cases where secondary sources of data do not provide sufficient information, field surveys allow researchers to better monitor and evaluate the impact of field experiments. If the research team decides that conducting a field survey is in fact feasible, they can move to the process of preparing for field surveys.







# Background

Over a last few decades, technology had drastically affected the banking industry which gave rise to a new concept called E-Banking.

E-Banking became popular in late 80s where the system could be accessed with phone lines.

But nowadays with computers and internet, E-Banking continued to grow. Online Banking was first adopted in New York in 1981 where the major banks like Citibank, Chase and others provided home banking services by making use of a system called videotext. Stanford Federal Credit Union first service provider of Internet Banking in October 1994.

The use of E-Banking business is advantageous for both business and stakeholders. They can access the service 24-hour and retrieve any information easily. Moreover it is affordable for both large and small companies. In addition, it has created new way of marketing the financial services and share mutual support and guidance within a virtual community.

But on the other side, there are dangers and disadvantages of E-banking prevailing. It can be seen that the system available for accessing the services may be discouraging because of peer control in many cases.



# REVIEW of LITERATURE

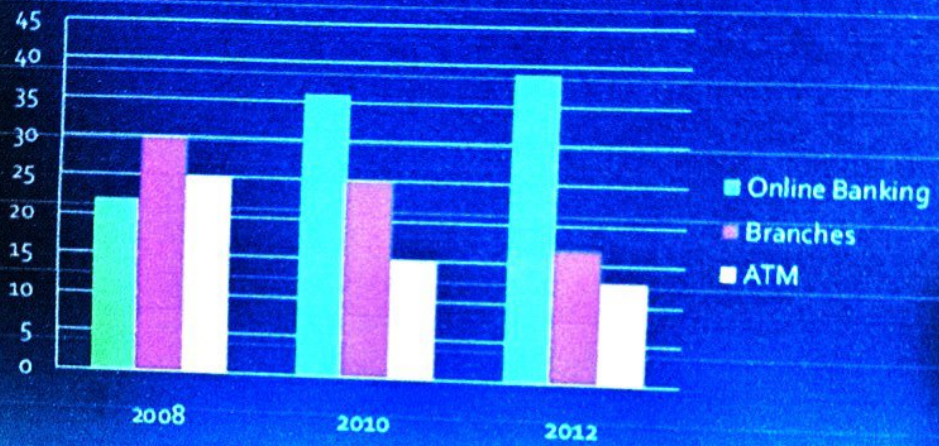
Azouzi, D. (2009) this paper aims to check if the current and prompt technological revolution altering the whole world has crucial impacts on the Tunisian banking sector.

Particularly, this study seeks some clues on which we can rely in order to understand the customers' behavior regarding the adoption of online banking. To achieve this purpose, an empirical research is carried out in Tunisia and it reveals that panoply of factors is affecting the customers' attitude toward online banking. For instance; age, gender and educational qualifications seem to be important and they split up the group into electronic banking adopters and traditional banking defenders and so, they have significant influence on the customers' adoption of online banking. Furthermore, this study shows that despite the presidential incentives and in spite of being fully aware of the online banking's benefits, numerous respondents are still using the conventional banking. It is worthy to mention that the fear of loss because of transactions errors or hackers plays a significant role in alienating Tunisian customers from online banking.



# Online Banking Chart

Preferred banking method of all ages



Progress



# DATA ANALYSIS

## ∴ Research Design

Research design is systematic procedure for collection and analysis of data. It is a blue print that guides the study to be done. The present research work is done with the descriptive research design method. Descriptive research has been used in this study to obtain information about the various challenges and opportunities emerging in online banking.

## • DATA COLLECTION.

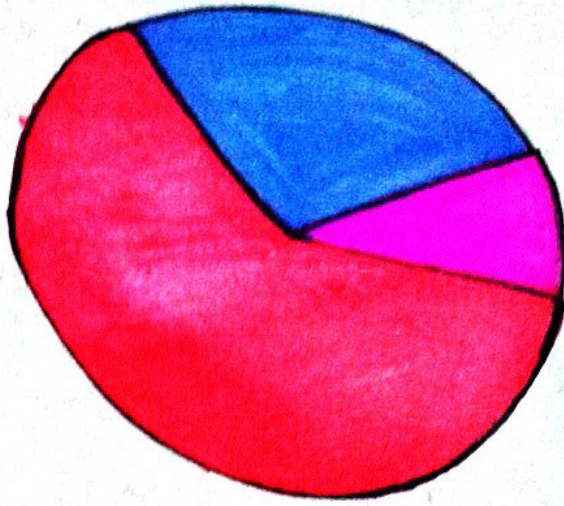
For this study, data has been collected from two sources:

Primary Data are those which are collected a fresh and for the first time. In this study, has been collected through personal contact. Questionnaire was used to collect primary data from respondents.

Secondary Data are those which have already been collected by someone else. In this study, secondary source data has been collected from articles, journals and websites, research papers.

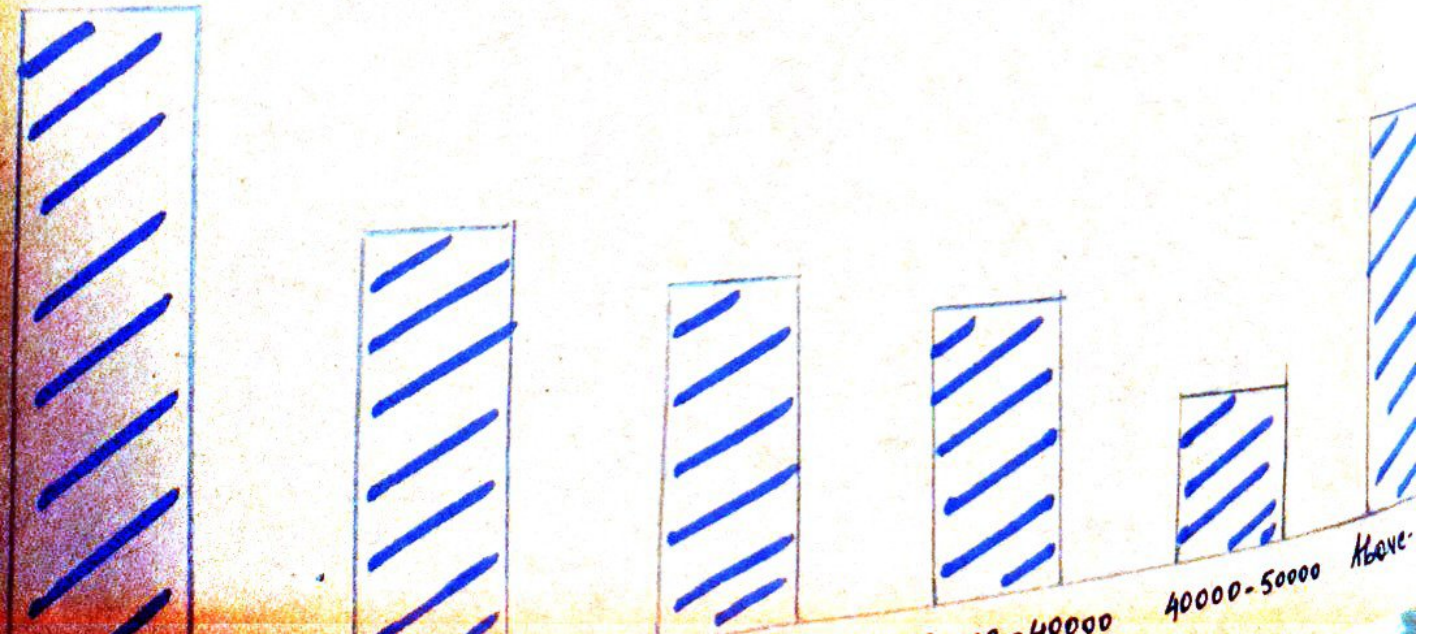
Sources of  Primary source





- 20-35
- 35-50
- Above 50

Monthly Income.





# METHOD of ANALYSIS

As per method analysis we have noticed 2 analysis in bank. (i) Age Basis Analysis  
(ii) Income Basis Analysis.

## (i) Age Basis Analysis:

As per the survey we have noticed that there are age groups of 20-35, 35-50 & Above 50  
This shows with the help of a pie-chart.

Age Group	Frequency	Percentage	Cumulative Frequency
20-35	44	38%	78
35-50	24	21%	102
Above 50	12	11%	114

## (ii) Income Basis Analysis:

As per the survey we have noticed that there are 28% belong to ₹ 0-10000 income group, 18% belong to ₹ 10000-20000 income group, 15% belong to ₹ 20000-30000 income group, 12% belong to ₹ 30000-40000 income group, 7% belong to ₹ 40000-50000 & 20% belong to above ₹ 50000 group.

Monthly Income	Frequency	Cumulative Frequency	Percent
0-10000	32	32	28%
10000-20000	21	53	18%
20000-30000	17	70	15%
30000-40000	14	84	12%
40000-50000	08	92	7%
Above 50000	22	114	20%



# CHALLENGES

Managing a project is a bit difficult - you have to keep several elements of the project at the top of your head (mind), while also considering multiple different outcomes and how long the route to completion will take.

Along the way, you're bound to hit some bumps on the road, with projects some struggles are more common than others including issues regarding scope, budget, communication and more.

The most challenging task was to go to + organization (institution) and discuss about your project and take a quick survey (interview).

1. Setting clear goals and objectives.
2. Budget restrictions and changes.
3. Lack of communication.
4. Finding effective project
5. Impractical deadlines.
6. Scheduling
7. Uncertainty
8. Technology.



# CONCLUSION

Internet banking offers a high level of convenience for managing one's finances. However, it continues to present challenges to financial security and personal privacy. Many people have had their account details compromised, as a result of online banking. Thus, if one is going to use it for financial transactions, he should be aware of the risks involved.

Awareness of the risk & problems enables him to take precautions for a more secure online banking experience. The internet banking system is not only popular nationally, but also internationally, where a person can transfer money through any part of the world. The internet banking system is useful for bankers as well as customers of banks.

Internet banking is changing the banking industry and is having the major effects on banking relationship. Banking is now no longer confined to the traditional brick and mortar branches, where one has to be at the branch at person, to withdraw cash or deposit a cheque or request a statement of accounts.



# Recommendation

We can see the time is changing and we are now accepting technology but there is still a lot of perceptual blocking which hampers the growth its normal tendency of technology, that's why the growth of internet banking is very primitive in nature.

## ∴ Recommendations to Banks:

Banks should obey the RBI norms and provide facilities as per the norms. But this is not completely followed by the banks. Some of our respondents complained that their bank do not give feedback of online transactions in proper times.

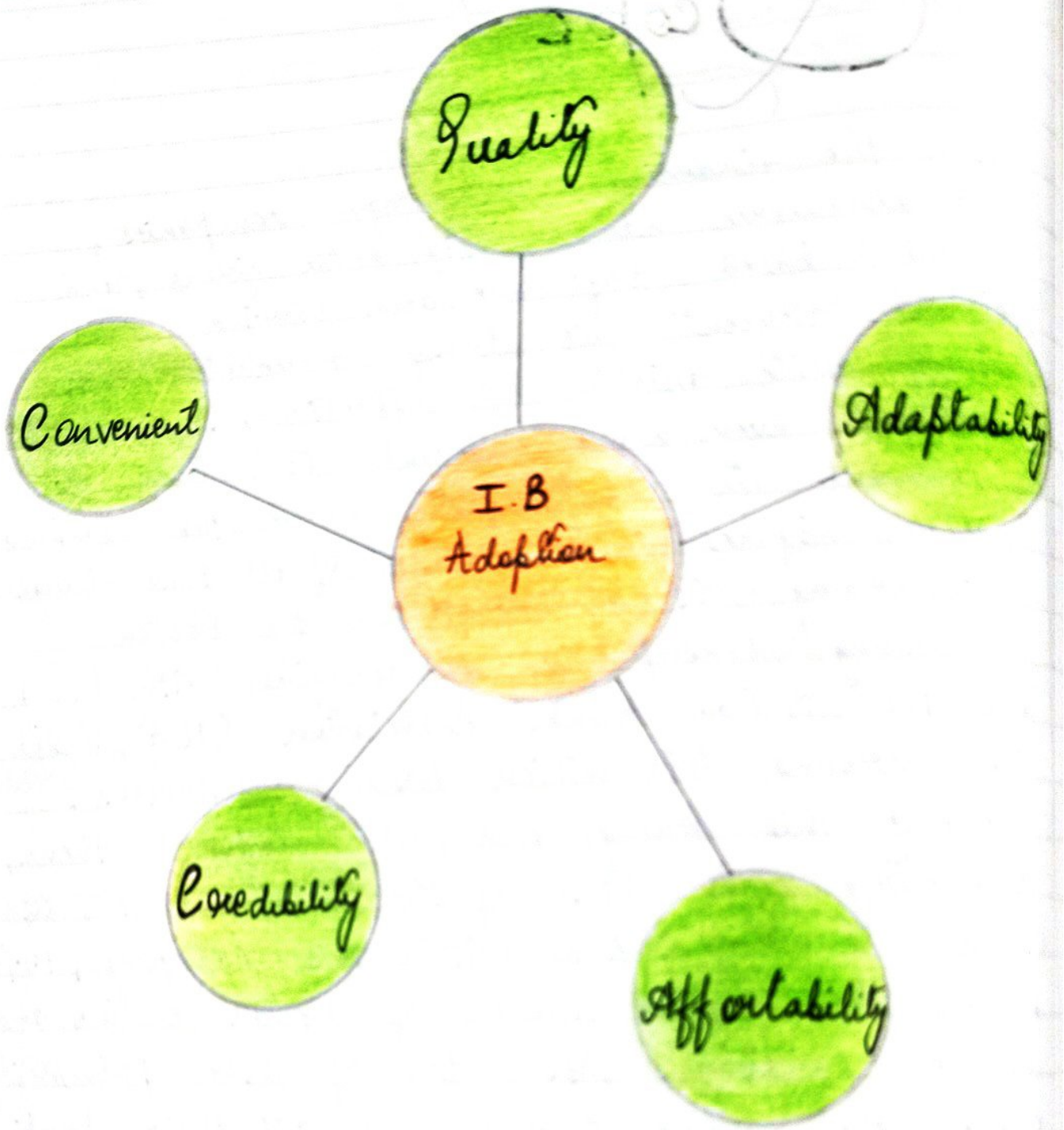
If customers do not get proper feedback then their interest in online services will be reduced. So bank should take proper steps to build their feedback services.

## • Recommendation to users:

• Use anti-virus and maintain the integrity of your computer by scanning regularly for computer viruses.

• Always use original operating system with original commercial anti-virus which could be better than crack version or free sample







# Background

Over a last few decades, technology had drastically affected the banking industry which gave rise to a new concept called E-banking.

E-banking became popular in late 80s where the system could be accessed with phone lines. But nowadays with computers and internet, E-banking continued to grow. Online Banking was first adopted in New York in 1981 where the major banks like Citibank, Chase and others provided home banking services by making use of a system called videotext. Stanford Federal Credit Union was the first service provider of internet banking in October 1994.

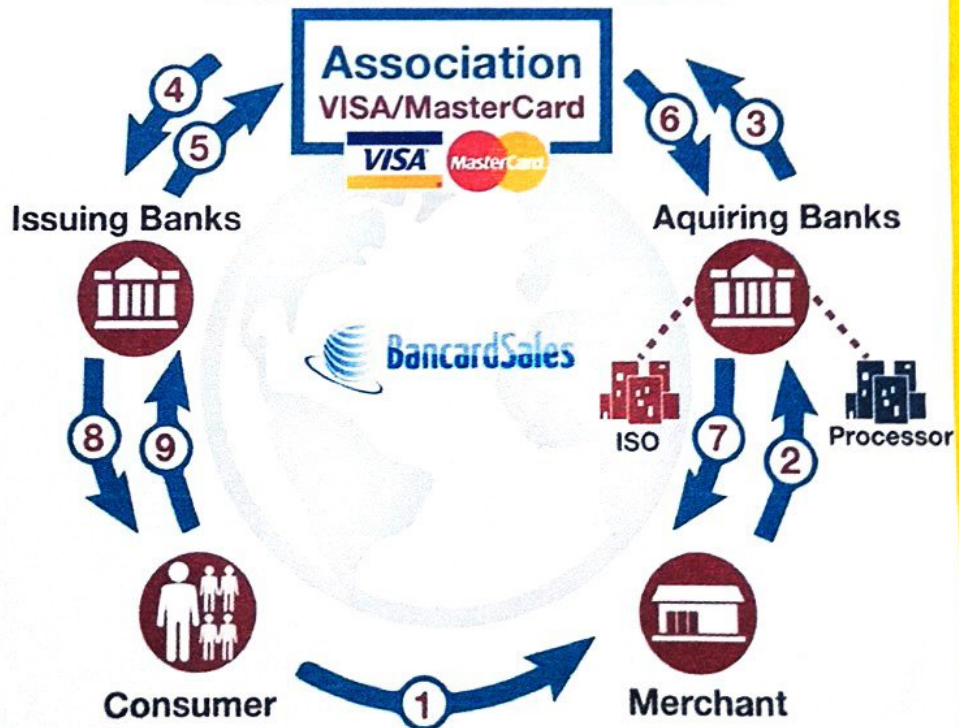
The use of E-banking business is advantageous for both business and stakeholders. They can access the service 24-hour and retrieve any information easily. Moreover it is affordable for both large and small companies. In addition, it has created new way of marketing the financial services and share mutual support and guidance within a virtual community.

But on the other side, there are dangers and disadvantages of E-banking prevailing. It can be seen that the system available for accessing the services may be discouraging because of poor control in many cases.





## Transaction Flow





# Literature

Malhotra, Soja & Singh, B. (2010) this study is an attempt to present the present status of online banking in India & the extent of online banking services offered by bank. In addition it seeks to examine the factors affecting the extent of online banking services. The data for this study are based on a survey of bank websites explored during July 2008. The sample consists of 82 banks operating in India at 31<sup>st</sup> March 2007. Multiple regression technique is employed to explore the determinants of the extent of online banking services. The results show that the private and foreign online banks have performed well in offering a wider range & more advanced services of online banking in comparison with public sector banks. Among the determinants affecting the extent of online banking services, size of the bank, experience of the bank in offering online banking, financing pattern & ownership of the bank are found to be significant. The primary limitation of the study is the scope and size of its sample as well as other variables which may have an effect on the decision of the banks to offer a wide range of online banking services. The purpose of the study is to help fill significant gaps in knowledge about the online banking landscape in India.



The findings are great to be use to the government, regulators, commercial banks and other financial institution. The bankers as well as society at large will come to know where the banks lags in terms of adoption of online banking and in providing different products & services. An understanding of the factors affecting the extent of Online banking services is essential both for economists studying the determinants of growth & for the creators and producers of such technologies. Moreover, this paper contributes to the empirical literature on diffusion of financial innovations, particularly online banking, in a developing country i.e., India.

Solaris Software Lab (2010) In this study Solaris software lab limited, a leading financial technology company, launched intellect (TM) PRIVACY based on state-of-the-art technology and four patents filled by the Indian Institute of Technology Madras. Indusland Bank has become the first bank in India to implement Intellect (TM) PRIVACY, an online and online banking security card for its online banking customers. The technology will protect customers and banks from practically all kinds of phishing attacks, viz, deceptive e-mail, key/screen logger, brute force/dictionary attacks and Trojans, etc. Intellect PRIVACY uses multi factor, dynamic authentication technology providing for authorizing online banking transactions in a completely secure platform.



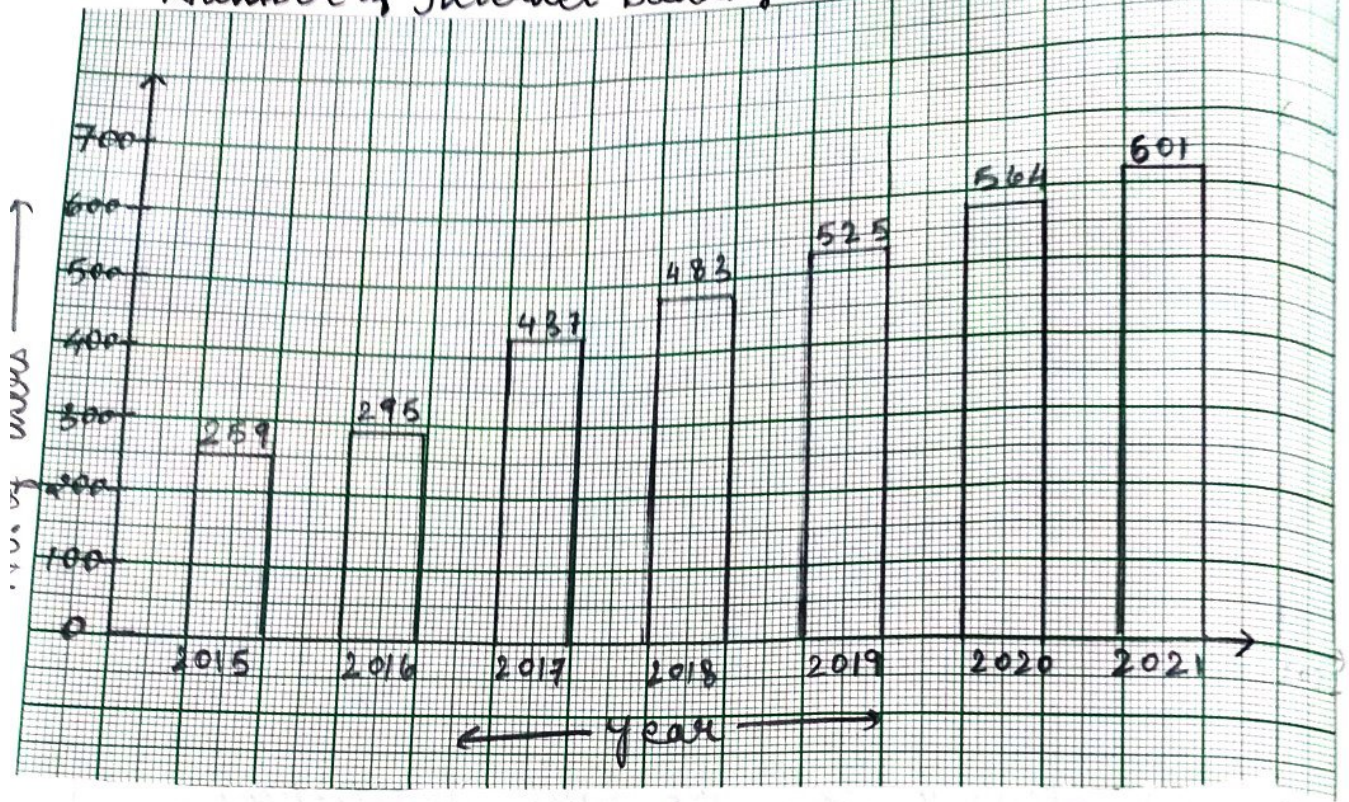
Commenting on the innovation, Professor L S Ganesh, Coordinator of the programme said, "At IIT Madras, the department of Computer Science and Engineering and the Department of Management Studies got particularly interested in designing an online security technology that is cost efficient and easy to use in a rapidly growing e-commerce scenario, and transfer it commercially. We chose the cost - Usability - Security (CUS) approach to arrive at a solution and Polaris Software created an eminently usable application for the banking security.

Industrial Bank, which was looking for providing greater security for web based transactions, became the first organization to adopt it".

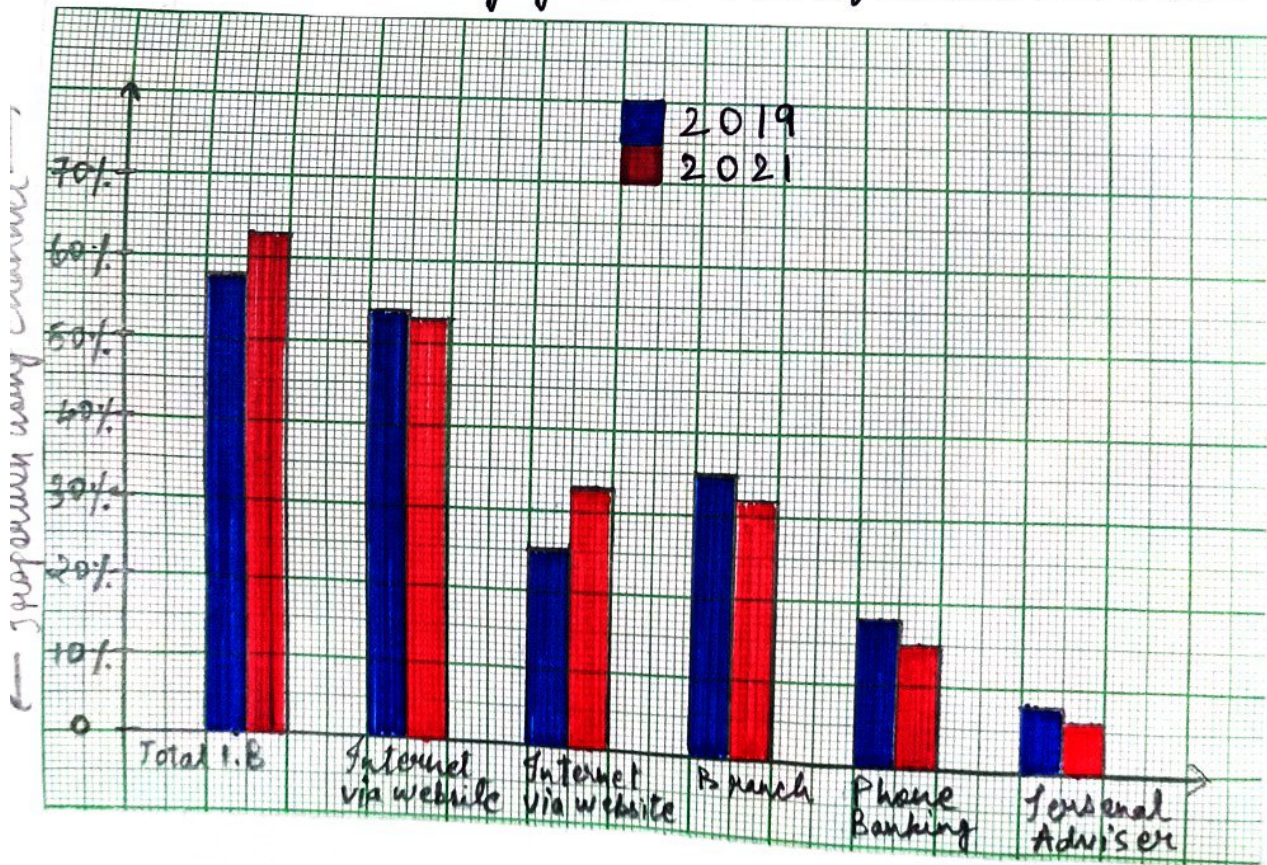
Intellect PRIVACY is a simple plastic card that customers can use to generate a one time password (OTP) for carrying out any kind of online banking transaction including the sign on. Banks can issue booklets containing a desired number of cards that would last many transactions. The card has no pilferage value by itself and customers can easily manage its life cycle, including making a request for a new booklet and reporting loss of cards through online banking.



Number of Internet Banking users in India from 2015.



Internet Banking growth & satisfaction.





# PLANNING, RELEVANCE & OUTCOMES

## Planning -

The Internet banking plan includes all activities and planning to begin constructing and implementing an Internet or corporate website.

Planning includes -

1. Accessibility -  
An internet banking is a global service and accessible to all.
2. Easy to Use -  
Internet banking is used to access the internet, is designed very simple.
3. Low Cost -  
The development and maintenance cost is low.
4. Security -  
Internet banking facility has to a certain extent helped the security systems. It is very safe to use.

## Relevance -

When everyday is a race against time in our busy lives, we were looking at saving time everywhere possible. When it comes to daily errands, online banking has made the visits to bank a rare occurrence.

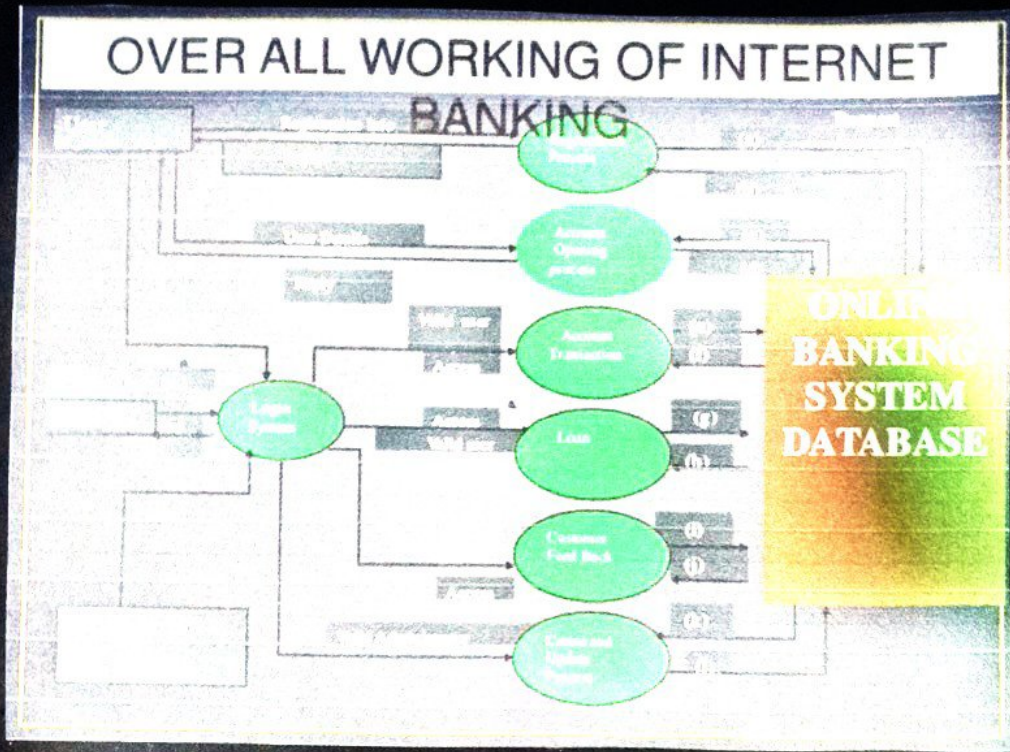


1. It saves time spent in banks
2. It provides ways for international banking
3. It provides banking throughout the year 24/7 days.
4. It provides convenience in terms of capital, labour time all the resources needed to make a transaction
5. It provides some security and privacy to customers by using state-of-the-art encryption and security technologies.

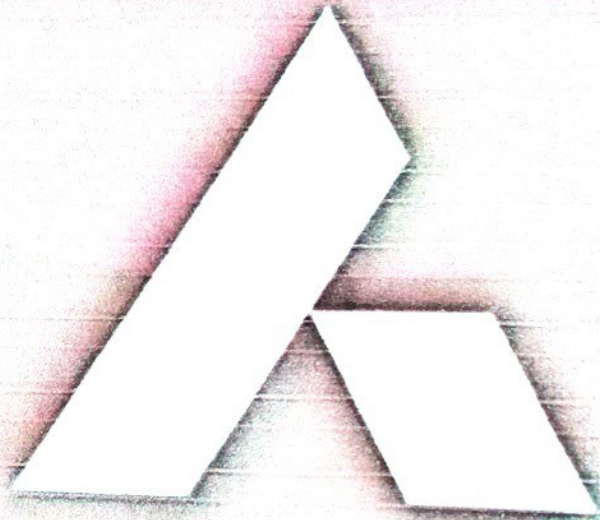
## OUTCOMES -

This paper examines the drivers of adoption of Internet banking and the linkages among adoption drivers & outcomes. We relate internet banking adoption to customer demand for banking services, the availability of alternative channels, customers' efficiency in service coproduction and local internet banking penetration. We find that customers who have ~~greater~~ transaction demand & higher efficiency, and reside in areas with a greater density of online banking adopters, are faster to adopt online banking after controlling for time, regional, and individual characteristics. Consistent with prior work, we find that customers significantly increase their banking activity, acquire more products, and perform more transactions.









**AXIS BANK**



# Description

Axis Bank limited, formerly known as UTI Bank (1993-2007), is an Indian banking and financial services company headquartered in Mumbai, Maharashtra. It sells financial services to large and mid-size companies, SMEs and retail businesses.

The bank was founded on 3 December 1993 as UTI Bank, opening its registered office in Ahmedabad and a corporate office in Mumbai. The bank was promoted jointly by the Administrator of the Unit Trust of India (UTI), Life Insurance Corporation of India (LIC), General Insurance Corporation of India, National Insurance Company, The New India Assurance Company, The Oriental Insurance Corporation and United India Insurance Company. The first branch was inaugurated on 2 April 1994 in Ahmedabad by Manmohan Singh, then finance minister of India.

In 2001 UTI Bank agreed to merge with Global Trust Bank, but the RBI withheld approval and the merger did not take place. In 2004, the RBI put Global Trust under moratorium and supervised its merger with Oriental Bank of Commerce. The following year, UTI bank was listed on the London Stock Exchange.



In the year 2006, UTI Bank opened its first overseas branch in Singapore. The same year it opened an office in Shanghai, China.

In 2007, it opened an office branch in the Dubai International Financial Centre and branches in Hong Kong.

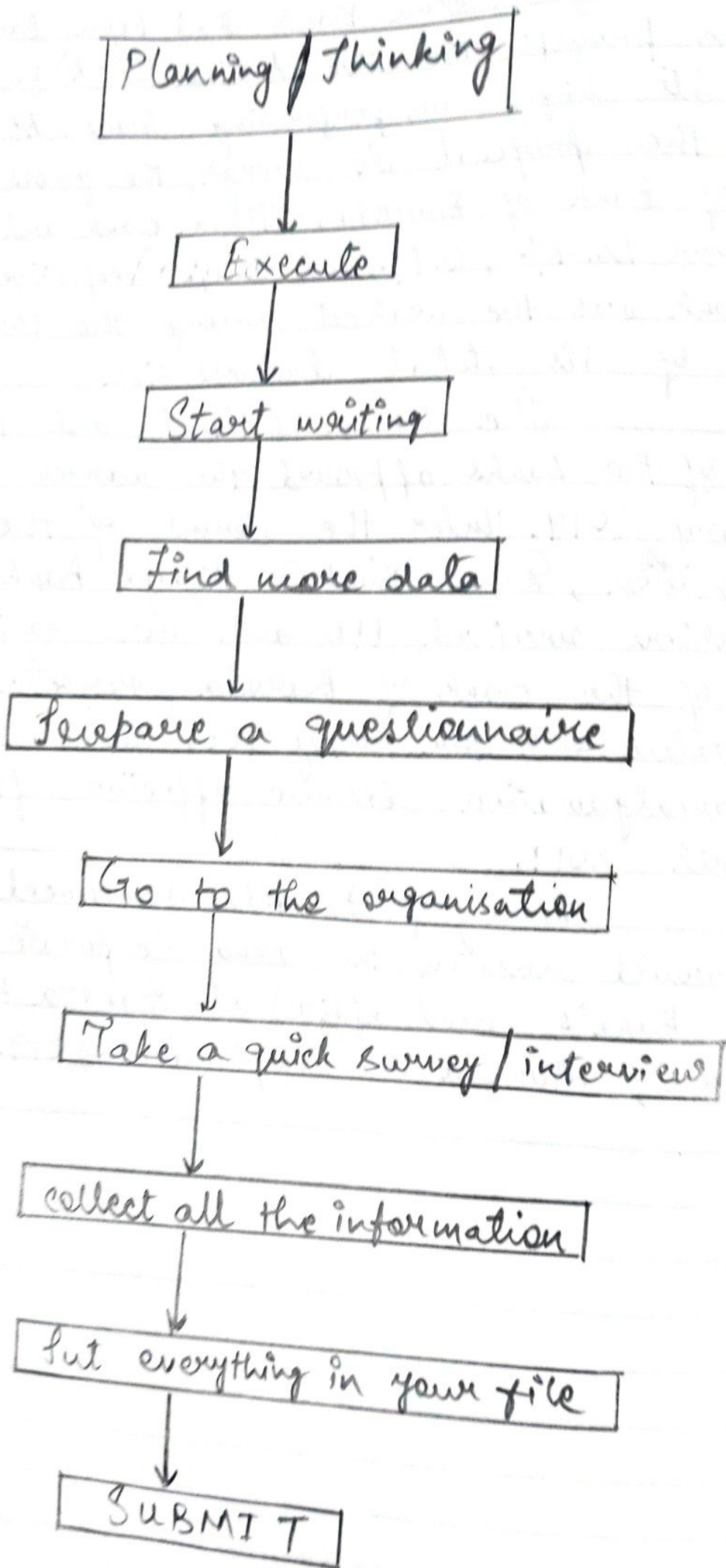
As of 12 August 2016, the bank had a network of 4096 branches and extension counters and 12,922 ATMs.

Anis Bank has the largest ATM network among private banks in India. It even operates an ATM at one of the world's highest sites at Thegu, Likkim.

The bank has nine international offices with branches at Singapore, Hong Kong, Dubai (at the DIFC), Shanghai, Colombo and representative offices at Dhaka, Dubai, Sharjah and Abu Dhabi which focus on corporate lending, trade finance, syndication, investment banking and liability businesses. In addition to the above, the bank has a presence in UK with its wholly owned subsidiary Anis Bank UK Limited.

The bank offers lending services to individuals and small businesses, along with liability products, card services, Internet banking, automated teller machines (ATM) services, depository, financial advisory services, and Non-Resident Indian (NRI) services. Anis Bank is a participant in RBI's NEFT enabled participating banks list.





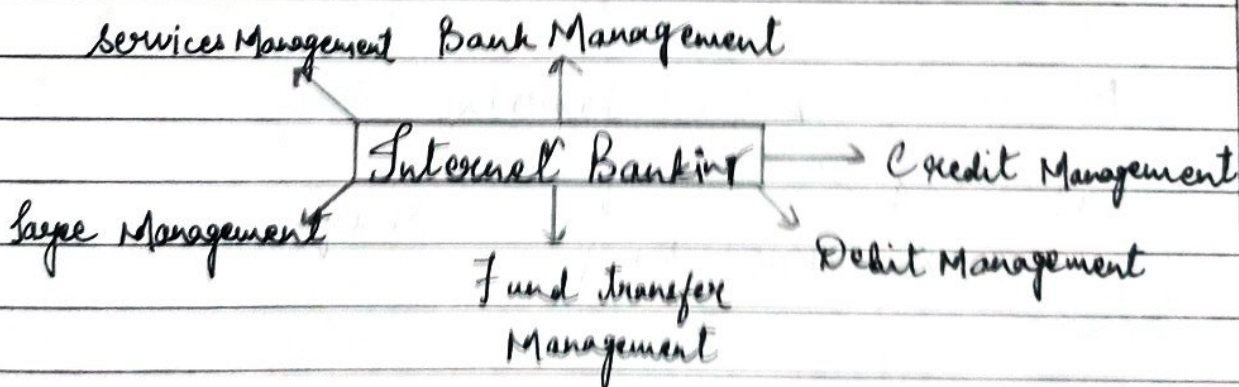


# Work Flow

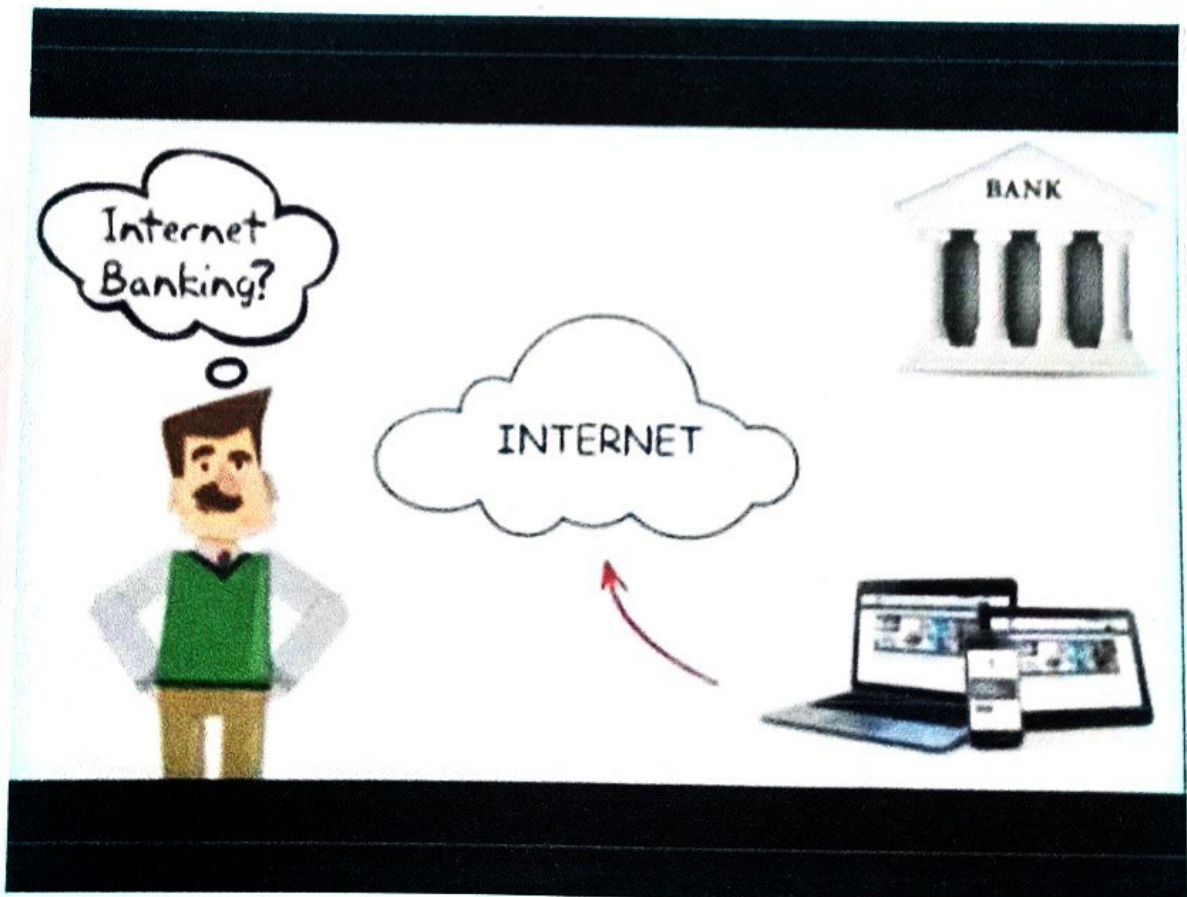
A workflow consists of an orchestrated and repeatable pattern of activity, enabled by the systematic organizations of resources into processes that transform materials, provide services, or process information. It can be depicted as a sequence of operations, the work of a person or group, the work of an organization of staff, or one or more simple or complex mechanisms.

A workflow management system is a software system for setting up, performing, and monitoring of a defined sequence of processes and tasks, with the broad goals of increasing productivity, reducing costs, becoming more agile, and improving information exchange with an organization.

There are zero level Data Flow of Internet Banking.  
First level Data Flow, Second level.









## INTERNET BANKING

### PERSONAL DETAILS:

NAME: Abhijeet Motwani AGE: 35  
GENDER: M OCCUPATION: clerk

### QUESTIONNAIRE

1. In which year your bank started online service?

2002

2. Does your competitors also provides similar services with respect to you?

Yes

No

3. Does online banking helps you to retain your customer and helps into discover new customer?

Yes

No

4. Have your competitors already built m-commerce sites?

Yes

No

5. Is the security always updated to protect any theft or fraudulent?

Yes

No

6. Does online banking provide more revenue than traditional banking?

Yes

No

7. What kind of services are you providing in online banking?

Online bill payment

Mobile recharge

Online fund/money transfer

All of the above

8. Do you advertise your bank on other websites?

No

Yes

9. Is online banking well fitted in your long term strategy?

Yes

No

10. Did online banking done well according to your expectations?

Yes

No



# Field Survey Description

A field survey, or study, is an investigation, generally a descriptive study, done in the field usually with participants drawn from the general population of a community. The term applies to several varieties of epidemiological study, such as case finding and contact-tracing in epidemics, or to household and community surveys, where the goal is to ascertain details about aspects of health status. Field studies may be small-scale, modest affairs, or large, comprehensive, communitywide study in which large numbers of participants are engaged.

Field surveys are one of the most commonly used methods used by researchers for the process of primary data collection.

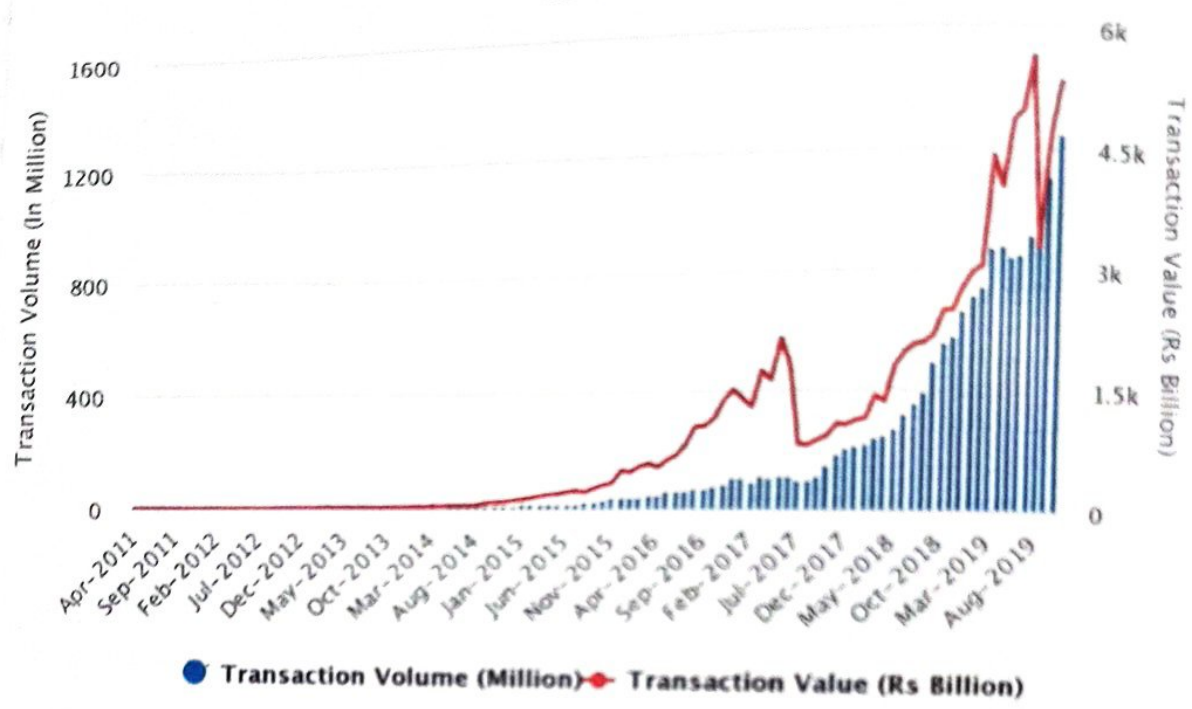
In cases where secondary sources of data do not provide sufficient information, field surveys allows researchers to better monitor and evaluate the impact of field experiments.

If the research team decides that conducting a field survey is in fact feasible, they can move to the process of preparing for field surveys. This process involves multiple stages such as drafting, piloting, programming and translating, with clearly defined timelines for each step.



*Handwritten notes at the top of the page, including the name 'Pradyumn Kumar' and a signature.*

### Mobile Banking Transactions In India by Month: Volume vs Value



© Dazemo / Data Source: RBI

*Handwritten notes and scribbles at the bottom of the page, including the name 'Pradyumn Kumar' and a signature.*



# Method of Analysis

Method of Analysis is the study of tasks and how they are performed.

It involves a detail process. Methods of Analysis is used by a company while developing new products & services.

The result is a standard operating procedure.

There are 3 methods:

1. Qualitative vs Quantitative

2. Primary vs Secondary

3. Descriptive vs experimental

## Data Analysis -

Data Analysis is a technique that typically involves multiple activities such as gathering, cleaning, and organizing the data.

I'll be doing data analysis through my surveys.



# Challenges

Managing a project is a bit difficult - you have to keep several elements of the project at the top of your mind, while also considering multiple different outcomes and how long the route to completion will take.

Along the way you're bound to hit some bumps on the road, with projects, some struggles are more common than others, including issues regarding scope, budget, communication and more.

1. Setting clear goals & objectives
2. Budget restrictions & changes
3. Scheduling
4. Uncertainty
5. Lack of communication
6. Impractical deadlines
7. Finding effective project

The most challenging task was to go to the organization (institution) and discuss about your project and take a quick survey (interview).



# Conclusion

In a country like India, there is need for providing better and customized services to the customers.

Banks must be concerned about the attitudes of customers with regard to acceptance of internet banking. The importance of security and privacy for acceptance of internet banking has been noted in many earlier studies and it was found that people claim that they have knowledge about security issues but they have no clear idea about all kind of frauds. The present study shows that customers are more reluctant to accept new technologies or methods that might contain little risk. Hence, banks should design the website to address security and trust issues.

People are not confident enough to whether to rely completely on online banking. There is hesitancy in their minds with regards to preference. So they use both the online and offline banking.



# Recommendation

We can see the time is changing and we are now accepting technology but there is still a lot of perceptual blocking which hampers the growth its normal tendency of Technology, that's why the growth of Internet banking is very primitive in nature.

## ∴ Recommendations to Banks:

- Banks should obey the RBI norms and provide facilities as per the norms. But this is not completely followed by the banks. Some of our respondents complained that their bank do not give feedback of online transactions in proper times. If customers do not get proper feedback then their interest in online services will be reduced. So bank should take proper steps to build their feedback services.
- Internet banking facilities must be made available in all banks as well as in all branches.
- There are some co-operative banks in this area and this type of banks still do not have core banking facilities. For this reason this type of bank lose their customers. So co-operative banks should be covered under core-banking system.



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<https://shodhgangaebi.inflibnet.ac.in>





**ST. ALOYSIUS' COLLEGE**

**(AUTONOMOUS), JABALPUR(M.P.)**

Reaccredited 'A+' Grade by NAAC (CGPA 3.68/4.00)

College with Potential for Excellence (CPE) by UGC

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# **SAMPLE PROJECT REPORTS**

**2020-21**

## **FACULTY OF MANAGEMENT**



# **St. ALOYSIUS COLLEGE**



**(Autonomous) Jabalpur**

**SESSION - 2020-21**

## **INTERNSHIP REPORT**

### **A STUDY OF HUMAN RESOURCE PRACTICE AT STCO**



**SUBMITTED TO :-**

**Dr. RASHMI A. PATRAS  
(Dept. OF MANAGEMENT)**

**SUBMITTED BY :-**

**KHUSHI KESHARI  
BBA III year  
ID No - 46763**



## ACKNOWLEDGEMENT

I would like to express my gratitude and appreciation to our Principal Rev. **G. Vazhan Arasu**, who gave me this opportunity to carry out this research. My special thanks to our Head of Department **Dr. Rashmi A. Patras** whose suggestions and encouragement helped me throughout the research process and in writing this report.

I also thank my class teacher Dr. Rashmi Singh for guiding me in this research process and providing the materials which was required for this report.

Also I would like to thank Mr. Anil Kumar Sharma under whose guidance I have successfully pursued my internship project.

By: Khushi Keshari



## DECLARATION

I **Khushi Keshari** do, hereby declare that the project report submitted to the St. Aloysius College (Autonomous) Jabalpur (M.P) in partial fulfilment for the award of degree of Bachelor of Business Administration entitled Internship report on **A Study of Human Resource Practice At STCO** is an original piece of major project work carried out by me under the guidance and supervision of Dr. Rashmi A. Patras, Head Department of Management.

I further declare that the information has been collected from genuine and authentic sources and I have not submitted this project report to this or any other university for the award of degree of examination.

Date:-



Madhya Pradesh: 26 Dixit  
Enclave, Hasthal Gorakhpur,  
Narmada Road, Jabalpur, MP -  
482001

New Delhi: 3-Scindia House,  
2<sup>nd</sup> Floor, Janpath Road, Near  
Outer Circle, Connaught  
Place, New Delhi - 110001

Delhi NCR: 1<sup>st</sup> Floor,  
SCO 107, Sector 16,  
Faridabad,  
HR - 121002

Karnataka: STCO, 69, Con  
Card Layout, Pattanagere,  
Bangalore - 560059

Mo.: +91 700 020 9293  
Off: +91 761 492 1510  
email: [info@stco.co.in](mailto:info@stco.co.in)  
Website: <https://akssai.com>

DATE: 28<sup>th</sup> February 2022

## CERTIFICATE OF INTERNSHIP TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Ms. Khushi Keshari**, D/O **Mr. Lavkush Keshari**, a student pursuing Bachelors of Administration from ST. Aloysius College Sadar, Jabalpur is pursuing her internship project in the field of **Human Resource Management** for the period of 1 Year i.e., from 25.04.2022 to 25.04.2023 in our firm STCO Consulting LLP.

During the period of her internship training with us, we found her punctual, hardworking and inquisitive.

We hope and pray bright and good speed in your future life.

We wish her all the best for her future endeavors.

**STCO CONSULTING LLP**

Thanks & Regards

Authorized Representative/Partner

STCO Consulting LLP



Date

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## Company Profile

### STCO CONSULTING LLP.

#### About :-

STCO believes in solving business issues for organization. It has a very strong team of decades long experienced professionals CA, CS, CMA, Advocates, MBA, IT professionals, Jtd Bank officers and graduates.

The team has worked in MNC's, Big 4's, Govt-companies and carry such insights to navigate through challenging scenarios. The combined talent pool is available to help solving any business issues be it finance related, IT related, tax related, compliance, licensing advisory, HR issues or any other domain of running a business. We have helped several foreign companies tap into the Indian Markets over they years.



## • Service Providers To Various Industries.

### ① Industrial Manufacturing.

STCO industrial manufacturing practise gives direction in such regions as income development, edges, stock cost, venture patterns, M&A, item life cycle management arrangement, client relationship management, deals and tasks, coordinated business arrangig and administration situated engineering technologies.

### ② pharmaceuticals and life sciences

STCO pharmaceuticals and life science practice help pharmaceutical biotech, and clinical gadget, customers create future-centered business methodologies and to execute the fine-basic project and strategies fundamental to progress inside overall administrative system.

### ③ Energy, utilities and resources.

STCO gives affirmation, tax and advisory guidance to the oil and gas, power and utilities, mining and metals and conection organization.



## • Insurance

STW Insurance practice gives guidance in such regions as technology, regulations, client experience, the efficiency plan and different issues.

## • Foreign Investment Funds.

STW group provides understanding and expert information that can help SIFs in improving execution.

## • Telecommunications

Giving affirmation, consulting and tax guidance to Telecom, cable, satellite and internet companies.

STW provides best ways to deal with accomplishing your financial, operational and strategic objectives.

## Consumer Market.

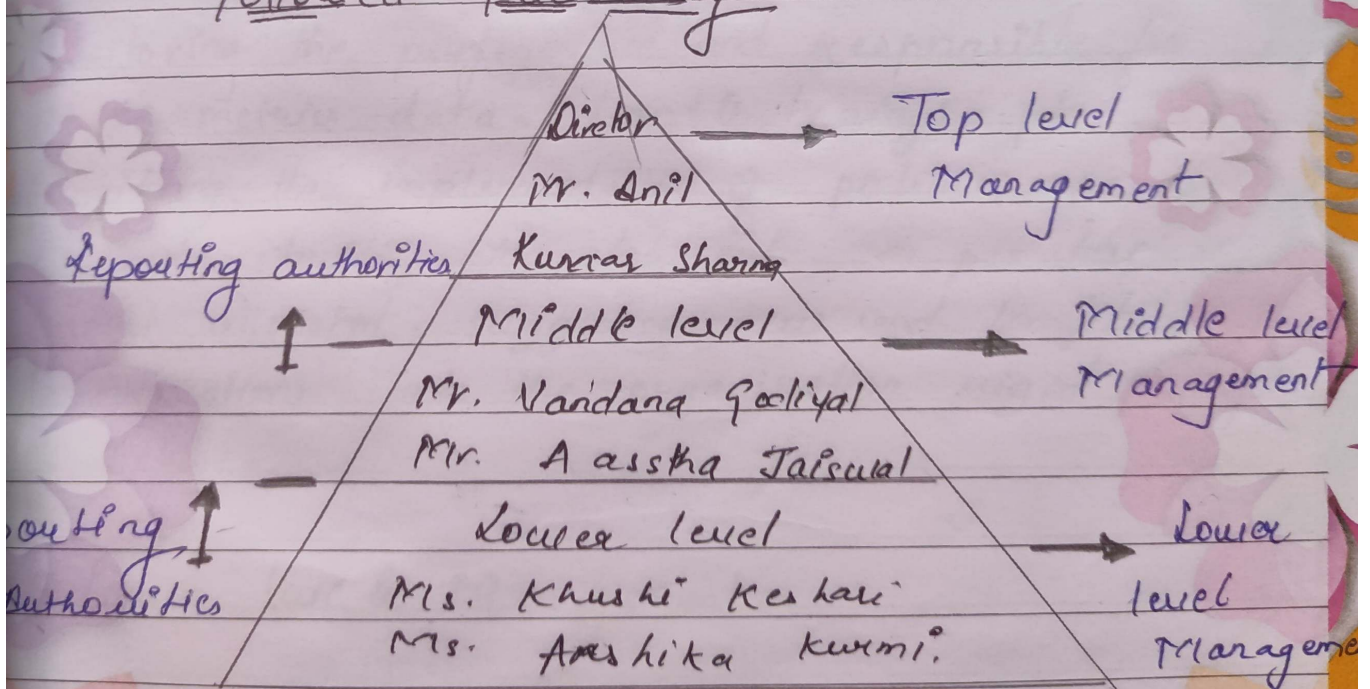
STW consumer market practices provides support in areas, for example, description, the impact of e-commerce, inventory network management, compliance and regulatory pressures, information investigation and changing customer demands.



## STCO's HR Department

- Company's HR department includes:-
- Senior Manager → Mrs. Vandana Godiyal
  - Assistant Manager → Ms. Aastha Jaiswal
  - Assistant (HR) → Mrs. Khushi Keshari
  - Executive (HR) → Ms. Anshika Kurmi.

### Followed Hierarchy





Date

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• Roles Played by Levels of Management in my Organisation.

• Top level Management:-

This level of management include CEO of organisation roles such as policy maker, decision maker, Budget allocator, hierarchy and organization's full control remains under him.

• Middle level Management:-

Monitoring the performance and responsible for all the metrics data, L and D trainings, monitoring the implementation of policies are done or not, deciding the slab rate as per the budget allocated, suggesting new and benefit innovations into the organisation rigid policy structure.

• Lower level Management:-

• Monitoring the leave Management, responsible for offer and internship letter, onboarding induction and post and pre candidate experience.



Date

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## \* About HR Department in a Company \*

A company's human resource department is tasked with the training and development of its workers who are considered some of the company's most important resources.

The human resource department's mission is to make sure the company's employees are adequately managed, appropriately trained. The department is also responsible for recruiting, hiring, firing and administering benefit.

## How Does a Human Resource Department Work?

A human resource department is involved with making sure the company has a solid roster of employees who are trained to fulfill their roles and compensated appropriately for doing so.

The human department provides effective policies, procedures, and people-friendly guidelines and support. Additionally, the human resource function serves to make sure that the company's mission, vision and values are part of the company's culture.



Human Resource departments include :-  
Recruiting, Hiring, Administration, Compensation,  
Training, Development and Firing.

### Types of Human Resource Department.

There are many different jobs that can be part of a human resource department. These roles range from general work to leadership or managerial roles and can include:-

- Human Resource assistant
- Human Resource generalist
- Human Resource manager
- Human Resource director
- Vice President of HR

Additionally, HR departments in larger organizations have employees who are organized around providing a specific component of human resource services, such as organization development or safety. They have titles such as training manager, organization development consultant or safety coordinator.







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# Talent Acquisition

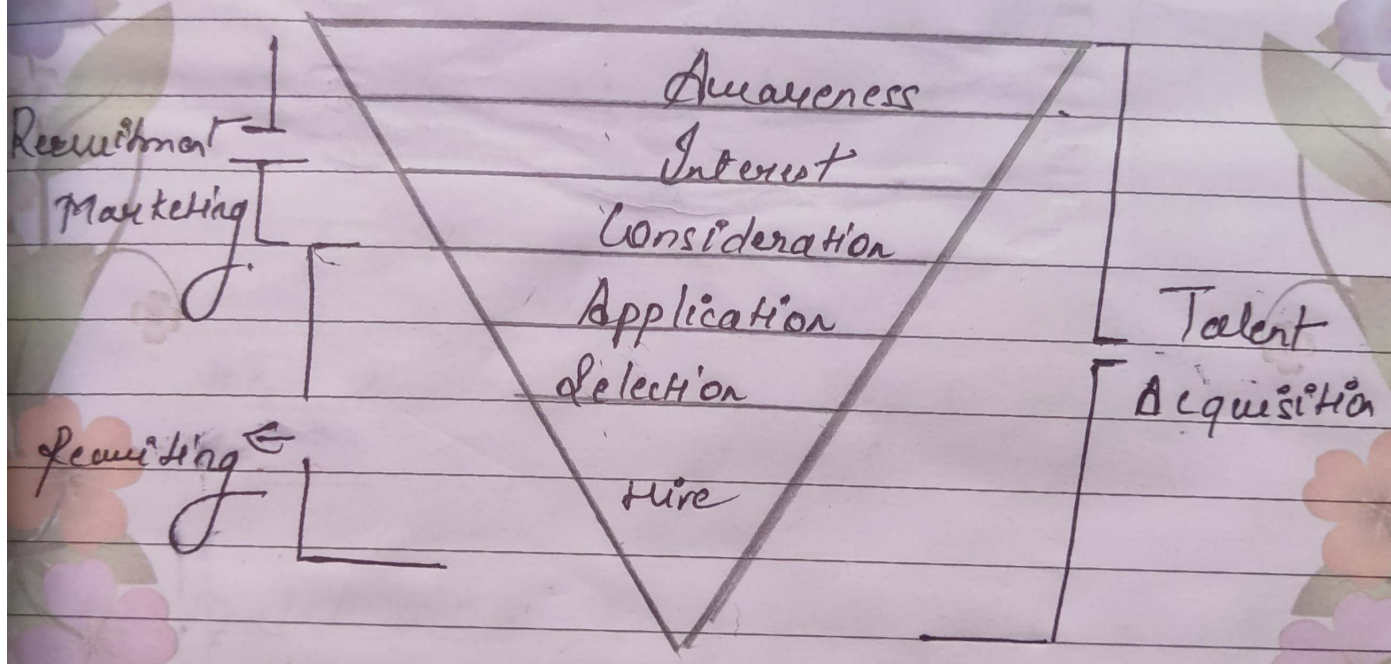


Figure (1)



\* Roles and Responsibilities handled by me in each department.

\* Talent Acquisition.

Talent acquisition deals with the strategies, tactics and processes for identifying, recruiting and retaining the human resource a company needs. It includes developing, implementing and evaluating programs for sourcing, recruiting, hiring and orienting talent.

\* For this department my day to day activities include:-

- 1) Coordinated with the hiring manager to identify and staffing needs.
- 2) Determined selection criteria
- 3) Determined various job portals and searched for the same to select the most appropriate one.



• After selecting the portals, posted opening or opened vacancy and started hunting for the perfect fit.

• Sourced potential candidates through online channels through social platforms and professional network like Instahyre and LinkedIn.

• As I was working for both the categories Tech and Non Tech hiring I have to connect with various job portals like Naukri, Indeed, Instahyre, Monster, Job dekho.com etc.

• Planned Interview and Selection procedures including screening calls, assessments and in person.

• Assess candidate information including resumes and contact details using our Applicant Tracking System.

• Designed job description and interview questions that reflects each position's requirement.



Attended various meetings for campus drive in Gyan Ganga College Jabalpur to close the vacant positions for interns.

Being the part of various meeting with the Top and middle level of management for forecasting quarterly and annual hiring needs by other department.

Foster long-term relationship with past applicants and potential candidates.

Selection procedure.

Pre Recruitment Activities.

After a candidate qualified all rounds of interviews I have made sure to have proper interaction with him during his joining period to maintain his/her interest in the company.

Timely preparation of offer letters and sending it to the shortlisted candidate.



Involvement in Reference check of a new employee who will be joining our organization by sending reference check email to the contact details received from him or her.

Involvement in Background Verification of new employee by sending candidate details

Making his or her official credentials by sending details to the IT department.

Asking documents like scanned copy of adhar card, pan cards, 3 months bank statement with previous company's payslip, marksheet, previous organization's offer letter, experience letter, relieving letter, confirmation letter, photographs, and signed offer letter with their acceptance on it.

Ensured a full and smooth pre candidate experience with the organization by providing answers to each queries raised by him within the span of assigned hours by the engagement senior.



## → Post Recruitment Activities.

### → Onboarding And Induction.

#### ◦ Purpose

To ensure all employees are provided with key information on working at the organization including policies related time management, dress code, ethical code and conduct, firm's expectations etc. associated with their employment through an appropriate induction and onboarding programs.

→ Conducted onboarding and induction program for both onsite and remote working employee with available HR Induction ppt updated by me and firm's expectation slide and checklist.

→ provided credentials to the new joinees and assigned them with the employee id by keeping company's rules and regulations within the loop.



• Introduced employee with the director and other staff in the organization.

• Coordinated with the IT department for successful allocation of the work stationery of an. new joinee.

• Work stationery includes laptop, bag, charger, mouse, notepad and general employee handbook.

• Coordinated with the hiring manager for successful completion of joining formalities of new joinee.

• Update Human Resource Information System of company by feeding details of new joinee into it.

• Sending five introductory mails to new joinee which include charge code, calendar, induction ppt, their welcome note photographs.



• Preparation of welcome note by adding details like their name, their designation, department and their brief introduction and sending email to everyone working in the organization.

• Assigning Manager / Assistant Manager / and reporting authority to the New employee.

• Setting up of laptop by configuring it with the official credentials provided by the IT Team.

• Feeding their employment details into payroll software with their salary structure for smooth payroll cycle.

• Updating joining form records both in hard and soft copies, arranging documents received from the new joiner.

• Ensuring smooth transition and of every new joiner by handling and solving grievances raised by them.



## Off boarding of an Employee.

These include exit forms, exit interview and their full and final settlement with the firm.

Conducted Exit interviews in which tried to change the mindset of an employee by explaining their/him about the expansion of the organisation and their personal growth in terms of exposure and monetary benefits.

If everything goes well, then no need for the form but if employee is still need to resign then moved ahead with the exit formalities.

Coordinated with the other department for successful completion of exit forms with concerned dignitaries signature and the concerned responsible person signature who will now going to handle the responsibility which were prior in the hands of person who is leaving or taking Exit.



Coordinated with the senior staff for full and final settlement of exit employee.

Prepared relieving and experience letter for the same.

Make sure the person who is leaving should submit the company's belongings like laptop, charger, official devices etc to the IT department.

Make sure to coordinate with Admin and IT department for blocking his/her official credentials.

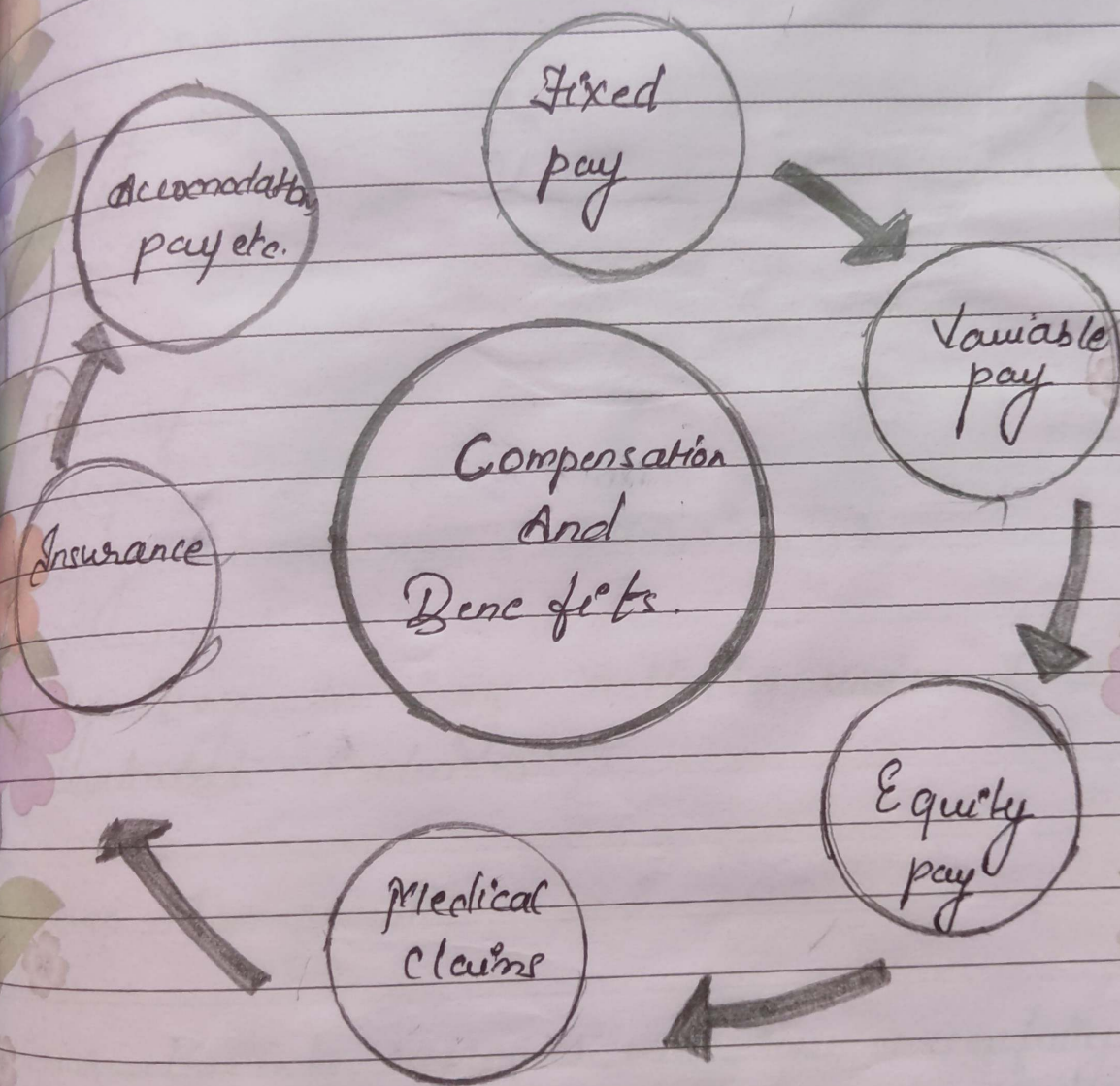
Closing his/her employment by updating the company's record.

His/Her Id cards, Drawer locker keys bio matrix cards should be submitted in the reception, clearing all their pending works with the other persons in the organization.



# COMPENSATION + \$

## Benefit Department.





Date

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Compensation and benefit is a branch of human resource that deals with the payment of employee provisions of benefits. It include the process of determining how much an employee should be paid and deciding what benefit should be allowed. Compensation and benefit also encompasses the administration of employee benefit programs, including enrolling employee in benefit plans, processing claims, and communicating information about benefit to employees.

Types of Compensation pay Include:-  
Wage

Salary (Basic pay + allowances)

My Day to Day activities under this department includes:-

Leave Management:-

Assigning leaves to employees who have successfully completed their probation period.



Asking every employee to verify their leave balance with HR Department for smooth functioning of payroll cycle.

Feeding their attendance into the payroll software for correct calculation of the salary they will receive every month.

Reloading Sodexo Meal cards:-

What are Sodexo Meal cards?

Sodexo Meal cards offers employees tax savings through a fully digital meal cards. Employees can also take advantage of it.

These meal cards are exempt of tax upto the limit of ₹ 50 per meal, under the section or Rule 3(7)(iii) of income Tax.

Maximum limit is upto to 1100 to ₹200 per month which is totally restricted upto 2 meal per day during your working hours.



Date

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• Maintaining TDS working in excel to avoid confusion while preparing the TDS challan.

• Preparation of TDS challan before 7<sup>th</sup> of every month and ensuring successful payment of amount withheld from employee's pay to the government.

• Filing quarterly TDS return with the help of top level management.

• Compliance Handling

Provident Fund (PF)

• The Employee Provident Fund is a scheme run by the Employee's Provident Fund Organization, which is aimed at providing social security and retirement benefits.

• EPF Eligibility Criteria.

• If you are a salaried employee with a basic + DA allowances less than Rs 15000 per month.



Date

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It is mandatory for everyone to open ~~their~~ an EPF account by an employer. Organisation with 20 or more employees are required by law to register for EPF scheme while those of fewer than 20 employee can go for voluntary registration.

• EPF Contribution percentage.

• It is generally calculated 12% of Basic + DA allowance of an employee

• Preparing ECR challan before every 15<sup>th</sup> of every month and ensuring payment for the same before the due date.

• Saving Payslip.

After successful completion of payroll cycle and remittance of funds to employee, I start generating payslips for every employee and saving it on their portals plus emailing this to their official Id's.



## Insurance Handling.

Coordinating with the Insurance company to renew the health cards and the vehicle insurance as directed by the manager.

## Expense Reimbursement

Providing Expense claim form to every employee if they incur any kind of travelling or official expense.

Taking the forms for approval.

Asking everyone to give hardcopies with their signature for the future records.

After successful completion of forms • Submitting the forms to CEO for his signature.

Adding those expenses into the payroll software for remittance of the same.



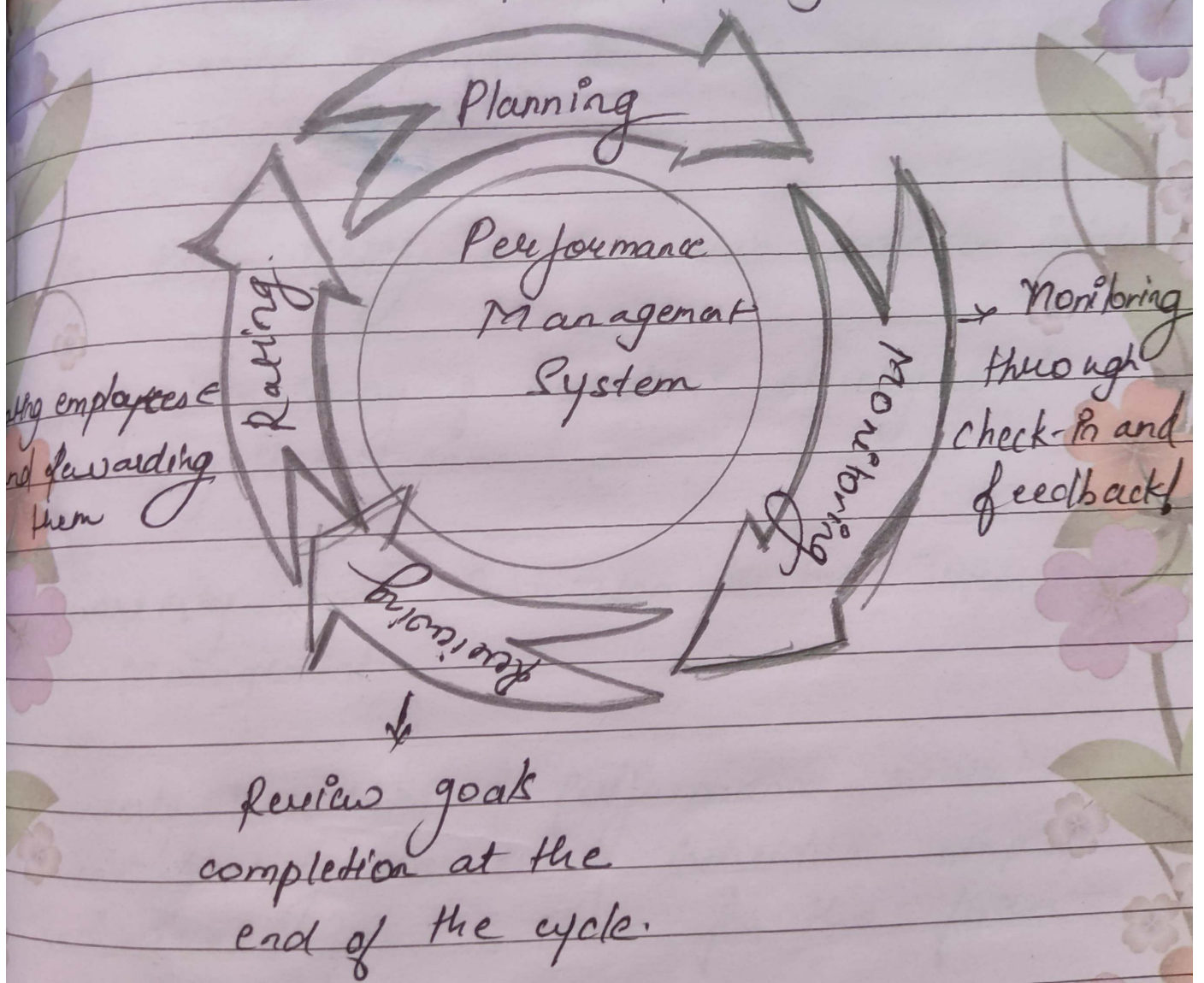
# PERFORMANCE MANAGEMENT





# Performance Management System

Setting SMART goals  
and acting on them.





performance Management process is used to communicate organizational goals and objectives, reinforce individual accountability for meeting those goals, and track and evaluate individual and organizational performance results. It reflects a partnership in which managers share responsibility for developing their employees in such a way that enables employees to make contribution to the organization.

My responsibility under this function includes:-

Daily Monitoring of timesheet strictly and implementing it the same.

Quarterly Report Submission to the Top level Management

Quarterly Monitoring of performance evaluation forms sent by an every individual employee and recording the same for the future records.

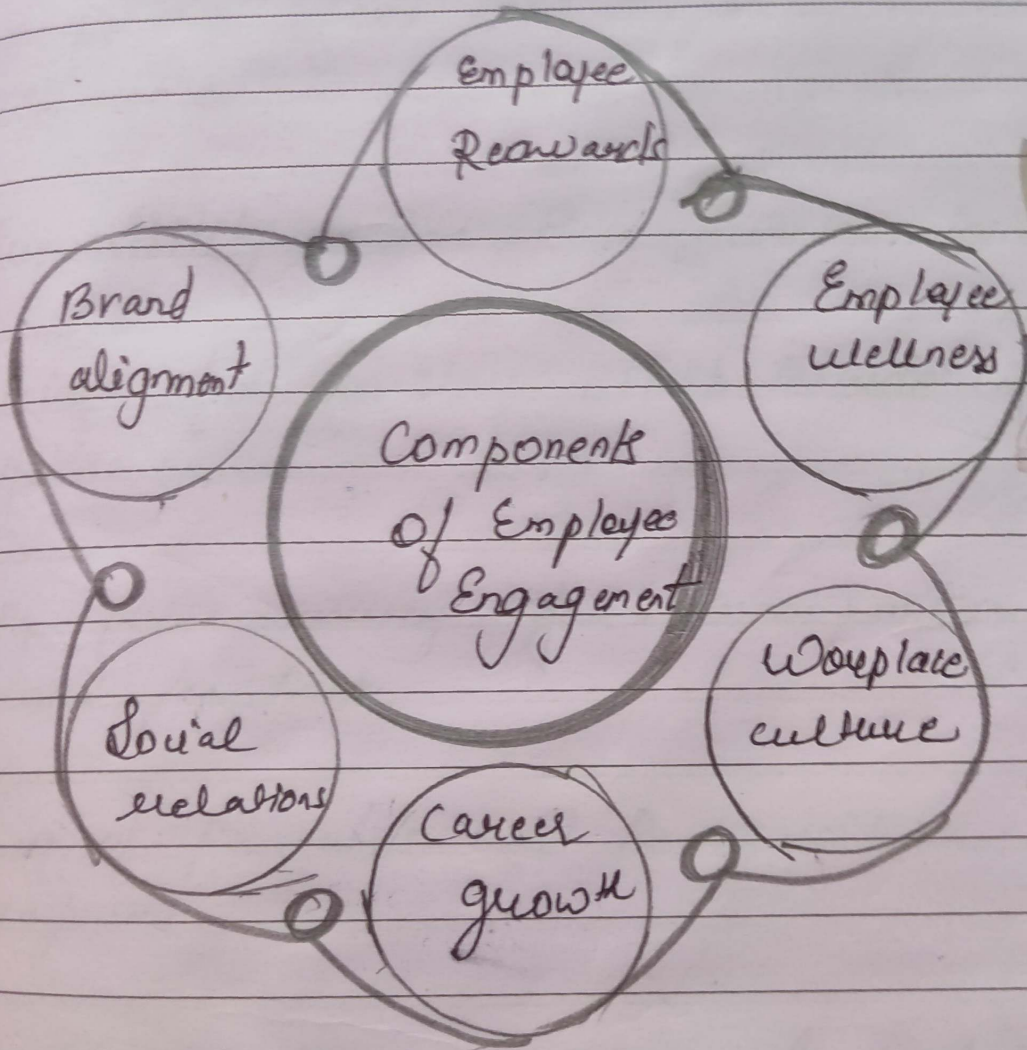
Preparing yearly HR matrix for the appraisal purpose.



Date

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# Employee Engagement Programme





Employee Engagement is a human resource concept that describes the level of enthusiasm and dedication a worker feel towards their job. Engaged employees care about their work and about the performance of the company and feel their efforts to make a difference.

My Responsibility under this function include:-

Organising fun funday which include various corporate games.

Circulating pulse survey for transparency and feed backs

Setting up of Rewards and Recognition programs

Introducing various employee friendly policy and benefits.

Strive to create conflict free work atmosphere.



# Client Handling

At my organisation mainly works for the client by handling their day to day compliance so I was also associated with some clients and was handling some of the major client's payroll compliance which clients from USA and UK, hospital compliance etc.

For Indian clients I was handling their PF and ESIC by making ECR challans ~~get~~ get it reviewed by my engagement service and successful completion of the same.

For USA and UK clients I was handling the full payroll cycle of an employee using softwares like Quickbooks / Bamboo HR / iHR etc. I was also indulged in some of the incorporation related work of the company.



# Vendor Management

Vendor Management is the process that empowers an organization to take appropriate measures for controlling cost, reducing potential risks related to vendors, ensuring excellent service deliverability and deriving value from vendors in the long run.

My Responsibility under this function includes:-

Coordinating with Background verification vendors to render their services

Coordinating with Insurance providers for validating and updating insurance policies when required

Coordinating with third party payroll service providers on behalf of our clients for successful and smooth payroll cycle for the employees.



# Skills Acquired

## Communication Skills:-

No matter the position they're trying to fill, the HR is the key link between a company and candidate depending on the impression they make, they can either attract or discourage the candidate for applying.

## Marketing Skills :-

Finding top talent's market extremely hard. The no of open position is much higher than no of applicants.

## Confidence

It is one of the most important skill a HR must possess when they are hiring for a role they have very little experience with.

## Team work Skill +

Whether working ~~externally~~ + externally or internally recruiters needs to function within a team to find organisation



# Challenges faced During The Internship.

The place I worked for was having a healthy working environment. Assigned Team was very accepting and helpful. It was very easy to ask them whenever I had an issue or faced in recruiting employees. But some time hiring team wants to hire as fast as possible because vacant position cost money and delay operations depending on STCO consulting fee.

As I didn't have any prior work experience during my internship sometimes got stuck with a task and I wouldn't know what advice to pass on to a client but assigned team helped me out how to handle this and overcome this problem.

Luckily I've worked in a team where the manager had a collaborative relationship such that other questions easily.



first week of my internship. I was not able to figure out how to test and interview candidate to determine if they can actually do the job before we hire them but as time went on with the support of my team, I coped up with this problem and Anurag Maam, my manager also helped me too.

Biggest problem, I faced during internship was labour shortage. The shortage is most likely to continue and manifest itself even more painfully in the years to come. I coped up with this problem slowly. I used data to find the best place to recruit, tools like LinkedIn, TalentBright helped me to determine where to focus my recruiting efforts by showing areas where there is short supply etc.

It was very useful and knowledgeable which helped me to learn new skills as well as boost up my confidence level.



# OUTCOME OF THE STUDY.

It is a steady pipeline of young qualified and ambitious candidates who are ready to put their skills to work.

It is a prospective candidate to your liking which ensure the job duties are performed in your standards.

It is a way to try out different candidate before committing to hire as internship gives the benefit of seeing a person in day to day life setting working.

The study of whole life process increases productivity at a low cost. However there's great value to work intern do. When coached effectively they can be an asset that increases productivity.



Employee Engagement Studies helps in less employee turnover and improve retention of new hire.

It develops leadership skill in existing employees. as the most successful program i.e. interns are those that follows a structure, gives participants meaningful project to work and provide useful regular coaching.

Gain a push perspective as today's generation age gap are following millennials whose members were born after. Internship improves my services, strengthens marketing strategy and streamline my work forms.

I gained overall practical exposure in to the core HR professionals day to day activities had an access to all the expected areas of working from recruitment to performance management to payroll processings I have an full exposure to all these areas with full zeal and confidence.



## Conclusion :-

In conclusion this internship in STIO consulting LLP under Mr Anil Kumar Sharma is very useful experience for me. However I do think that there are some aspect of the job that I could have done better and I need to worked on.

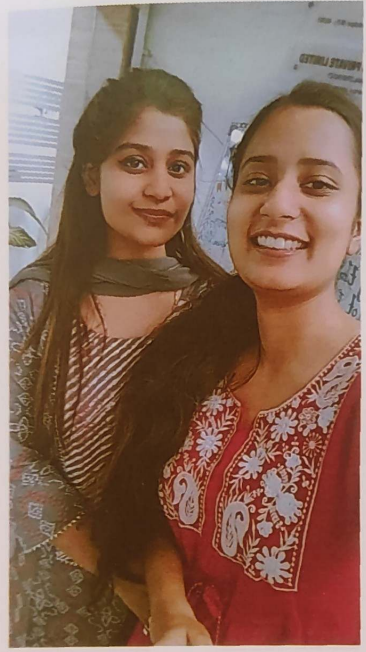
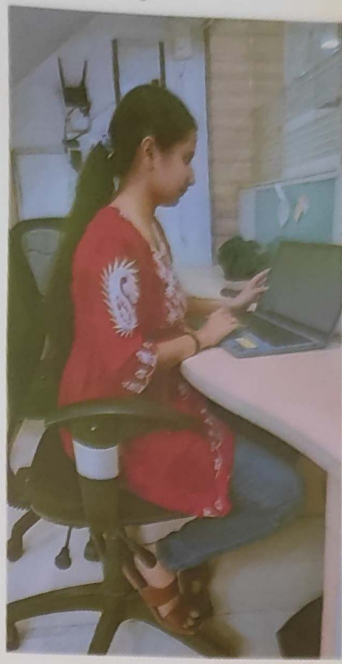
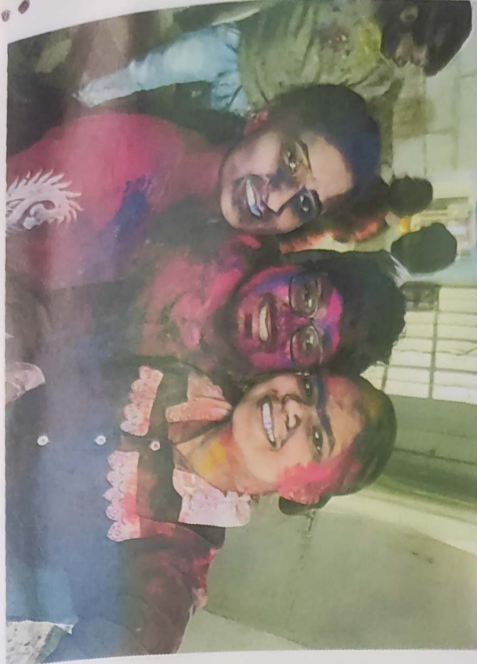
My mentor in the industry planned and assigned the work for me to execute them during my Internship period I did not only learn about process practically but I learned and developed skills. The atmosphere at the office was always welcoming which made me feel right at home.

While I was able learn a lot from office. The internship taught me that recruitment is not everyone's cup of tea. I need special skills.



...INTERNSHIP

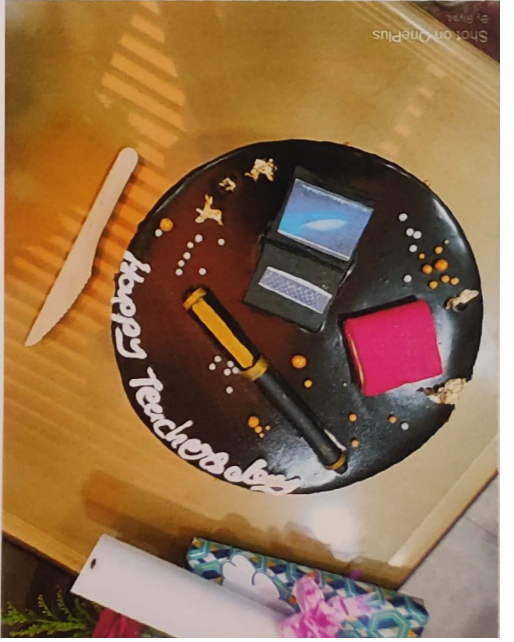
7AUGURY....















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# **SAMPLE PROJECT REPORTS**

**2020-21**

**FACULTY OF SCIENCE**



**MOLECULAR STUDIES ON WOLBACHIA CLEARANCE FROM FRUIT FLY  
DROSOPHILA MELANOGASTER USING TETRACYCLINE**

**A  
DISSERTATION REPORT**

*Submitted for the partial fulfillment for the award of*

**MASTER OF SCIENCE  
IN  
BIOTECHNOLOGY**

*Submitted By*  
**ANKITA BADHAI**

*Under the Guidance of*



**icmr**  
INDIAN COUNCIL OF  
MEDICAL RESEARCH

**NIRTH**  
NATIONAL INSTITUTE OF  
RESEARCH IN TRIBAL HEALTH

**Dr. Vidhan Jain**  
Scientist 'C'

ICMR-National Institute of Research in  
Tribal Health, Jabalpur (M.P)

*Under the Co-Guidance of*



**Dr. Laxmikant Pandey**  
Head of Department  
Department of Biotechnology  
St. Aloysius' College (Autonomous),  
Jabalpur (M.P)

**ST. ALOYSIUS' COLLEGE (AUTONOMOUS)**

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ICMR - National Institute of Research in Tribal Health  
Department of Health Research, Ministry of Health  
and Family Welfare, Government of India

### CERTIFICATE

This is to certify that the Dissertation report entitled "Molecular studies on *Wolbachia* clearance from fruit fly *Drosophila melanogaster* using tetracycline" was carried out by **Miss Ankita Badhai**, M.Sc. (Biotechnology) student from January to June, 2021 at the Division of Virology and Zoonotic Diseases, Indian Council of Medical Research, National Institute for Research in Tribal Health (ICMR-NIRTH), Jabalpur (M.P.) for the partial fulfilment of the requirements for the degree of Master of Science in Biotechnology, St. Aloysius' College (Autonomous), Jabalpur, (M.P.). It is a record of candidate's own work carried out by her under my supervision and guidance. The matter embodied in this report has not been submitted for award of any degree.

DATE: 12/7/21

Place: Jabalpur, M.P.

**Dr. Vidhan Jain**

Scientist - 'C'

ICMR-NIRTH, Jabalpur (M.P)



एन.आई.आर.सी.एम.आर. नेशनल इंस्टीट्यूट ऑफ रिसर्च इन ट्रिबल हेल्थ  
NIRTH Complex, Nagpur Road, P.O. Garha, Jabalpur, Madhya Pradesh - 482 003, India

Tel: +91-761-2370800  
Fax: +91-761-2672835  
director@nirth.res.in | www.nirth.res.in

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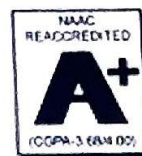
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Phone : 0761-2620738, 2624631, Fax : 0761-2629655

Email : staloyuscollege1951@gmail.com, Website : www.staloyuscollege.ac.in



## CERTIFICATE

*This is to certify that Ms. Ankita Badhai who is a regular student of M.Sc IV semester (biotechnology) of this college carried out her dissertation work entitled "Molecular studies on Wolbachia clearance from fruit fly Drosophila melanogaster using tetracycline" under the supervision of Dr. Vidhan Jain (Scientist 'C') at ICMR-National Institute of Research in Tribal Health, Jabalpur (M.P)*

*This dissertation is submitted for partial fulfillment for an award of the degree Master of Science in Biotechnology to St. Aloysius College (Autonomous) Jabalpur (M.P).*

Jabalpur

Date 12/7/21

**Dr. Laxmikant Pandey**

(HOD)

Department of Biotechnology

St. Aloysius College, Jabalpur

(M.P)



**HEAD**

Department of Biotechnology  
St. Aloysius (Autonomous) College  
Jabalpur (M. P.)



## DECLARATION

I **Ankita Badhai**, declare that the dissertation report entitled "*Molecular studies on Wolbachia clearance from fruit fly Drosophila melanogaster using tetracycline*" is submitted by me for the partial fulfillment of the award of degree of Master of Science in Biotechnology from the Department of Biotechnology, St. Aloysius' College, Jabalpur (M.P.). It is an authentic record of my work done under the supervision of **Dr. Vidhan Jain** (Scientist - 'C'), National Institute of Research in Tribal Health, Jabalpur (M.P.).

I have not submitted this report or any part of it for any other degree or diploma.

DATE: 12/7/21

Place: Jabalpur, M.P.



**ANKITA BADHAI**

M.Sc. Biotechnology (IV Sem.)

St. Aloysius' College (Autonomous),

Jabalpur, M.P.



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**Ankita Badhai**



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## ABBREVIATIONS

1. WHO - World Health Organisation
2. DENV - Dengue virus
3. API - Annual Parasite Index
4. NVBDCP - National Vector Borne Disease Control Programme
5. NMEP - National Malaria Eradication Programme
6. CI - Cytoplasmic Incompatibility
7. WMR - World Malaria Report
8. NFME - National Framework for Malaria Eradication
9. cDNA - Complementary Deoxyribose Nucleic Acid
10. CIF - Cytoplasmic Incompatibility Factors
11. AA - Amino Acids
12. CHIKV - Chikungunya virus
13. PCR - Polymerase chain reaction
14. EtBr - Ethidium bromide
15. UV - Ultra Violet



## INTRODUCTION

Mosquito borne diseases like dengue, malaria, filariasis, yellow fever etc. cause enormous public health problems for people living in Subtropical and Tropical parts of the world. Even after years of extreme research, and efforts being put to control them, it seems like that some of these diseases are increasing in geographical distribution, prevalence, and severity. Malaria is a treatable and preventable disease caused by bites of infected female *Anopheles* mosquito. Most of the time disease is presented with mild to moderate symptoms (fever with chills and rigor, headache, vomiting) but Sometime disease becomes severe and presented with organ complications. Severe malaria is associated with complications like cerebral malaria, acute renal failure, acidosis, hypoglycemia, pulmonary edema, severe anaemia and/or bleeding, all of these could be life threatening. Thus, adequate personal protection measures using mosquito repellent and chemoprevention must be used to avoid the disease (WHO World Malaria Report 2019).

According to the World Health Organization, 2020 (world malaria report), around 229 million malaria cases and 0.4 million deaths were recorded all over the world (majority of the infections due to *P. falciparum*). More than 94% of this burden inclined in WHO African regions. Most of this disease burden is bear by preschool children and expectant mothers. Three percent (3%) global burden is accounted by the WHO South-East Asia region. Malaria cases reduced by 73% (India contributing to the largest reductions about 72% compared to year 2000) in this region and Sri Lanka, Maldives and Timor-Leste reported zero malaria cases.

Dengue is another mosquito borne disease which has affected all WHO regions. It is transmitted primarily by *Aedes aegypti* and *Aedes albopictus* to an extent. Fever is the most common symptom which is also associated with headache, body ache (muscle, joint, bone pain and pain at the back side of eyes) and sometimes rashes. There are 100-400 million infections caused by dengue viruses and approximately 22,000 people die from severe dengue every year. Dengue



virus comes from the family of *Flaviviridae* and has 4 serotypes i.e DENV-1, DENV-2, DENV-3 and DENV-4 which cause disease (Gupta, et al, 2012).

In India major Anophelines vectors includes *Anopheles baimaii*, *An.culicifacies*, *An.stephensi*, *An.dirus*, *An.minimus*, *An.fluviatilis*, *An.sundaicus* those are involved in transmitting malaria in diverse geo-ecological locations (Tiwari et al, 2019). India contributes 77% of the total malaria cases in Southeast Asia. The six Anopheline vectors spreading three *plasmodium* species: *P. falciparum*, *P. malariae*, *P.vivax*, and *P. ovale*. In India about 75-80% malaria burden is caused by *An. culicifacies* (mainly in plains) and *An. fluviatilis* (in forested areas) where *An. culicifacies* alone is responsible for 60-70% of the disease. In rural areas *Anopheles culicifacies* is the principle cause of malaria whereas *An. stephensi* is mainly responsible for causing disease in urban areas. Primary breeding sites of *An. stephensi* are overhead tanks, construction sites etc (Subbarao, et al, 2019, Dev Vas & Sharma VP, 2013).

In the north eastern states of India, *An. minimus* was the main vector species however studies revealed, that due to deforestation for agricultural purposes *An. culicifacies* was also found in higher sporozoite rates than *An. minimus* (Subbarao, et al ;2019). In the Andaman and Nicobar Islands *An. sundaicus* is mainly responsible for the cause of disease.

There exist five sibling species of *An. culicifacies* are A, B, C, D, E (order of predominance C>D>B>E>A) whereas of *An. fluviatilis* are mainly S and T. Among the five siblings of *An. culicifacies*, species B is found predominantly in rural India but species A is predominantly found in the northern parts of the country and species B in southern regions. Sibling species C is mainly found in the Western and Eastern regions of India along with species D throughout Central and Western Indian regions. Species E (highly anthropophilic) is mainly found throughout southern India and is thought to be occupying other endemic states. Among the sub species, specie B may be a less effective vector as it is mainly zoophilic biting taste;



A, C and D are of moderate importance, whereas specie E is also considered as malaria vector. The sibling species of *An. fluviatilis* S is mainly found in the districts of Odisha whereas specie U predominantly cover northern India. Specie T rests in cattle sheds and found across India, Nepal, Pakistan and Iran. V form is found in Haridwar, Uttarakhand states of northern India (Dev Vas & Sharma VP, 2013).

In order to express malaria cases per thousand population, the annual parasite incidence (API) is used as malariometric index. As per the NVBDCP records of the year 2004, in majority of India the API was less than 2, 2-5 API was in dispersed regions (mainly Madhya Pradesh, Gujarat, Chattisgarh, Karnataka, Andhra Pradesh and North Eastern states) whereas >5 API were scattered in some parts of Rajasthan, Gujrat, Odisha, Jharkhand, Karnataka and Goa and in North Eastern states. According to World Malaria Report 2020, India reported a sharp reduction of 17.6% in 2019 as compared to 2018 and has maintained API Less than 1 since 2012.

Indiscriminate use of insecticides like DDT (Dichloro-Diphenyl-trichloroethane), organophosphates, pyrethroids, malathion, carbamates etc. to control mosquitoes in order for controlling various vector borne diseases can be effective, but is sometimes unsustainable, expensive and environmentally undesirable. A book "SILENT SPRING" wrote by Rachel Carson where the adverse effects of pesticides were stated referring pesticides as biocides. Furthermore, continuous exposure of mosquitoes to these insecticides may increase chances of further development of insecticide resistance (WHO, 2008). Sometimes double and triple resistance have been recorded seen in mosquitoes as reported from Odisha in *Anopheles culicifacies* (Sahu, et al,2015). Alternative environmental friendly approaches for controlling of mosquitoes such as elimination of oviposition sites, the use of bioenvironmental control methods like mosquito predators (fish and copepods) could also work in some areas but these are also not self-sustainable (Kay & Vu, 2005).

In 1947, India has population of 330 million, and every year malaria used to cause about 75 million infections, direct mortality due to the malaria in 1950's was estimated at 0.8 million per annum. National Malaria Control Programme was launched to combat this menace, by the Govt. of India in April 1953. Use of DDT and Chloroquine made high impact on disease burden and programme was proven highly advantageous as the number of malaria cases remarkably reduced to around 2 million by 1958. Further, the name of the programme was changed and National Malaria Eradication Programme was launched in 1958 with more ambitions. Interestingly by 1961 the malaria cases further dropped to a mere 49151 cases, without recorded deaths.

But, due to technical, operational and administrative reasons the programme suffered and the cases started rising again (DDT shortages, mosquito resistance, chloroquine etc.). Later malaria resurgence badly hit the country in late 1970s and in 1976, there were nearly six and half million cases were noted by the National Malaria Eradication Programme (NMEP). Further, intense malaria control program has limited the disease burden 2-3 million in subsequent years.

In the growing years of research, a new approach has been made in the direction of controlling mosquito borne diseases by the use of an endosymbiotic group of bacteria called WOLBACHIA. The potential application of this maternally transmitted endosymbiotic bacteria is that the strains of Wolbachia induce CYTOPLASMIC INCOMPATIBILITY, which is the crucial tool to control medically important insects. Due to the cytoplasmic incompatibility numbers of eggs hatching either decreases or eggs do not hatch. Some strain of Wolbachia also causes shortening of the lifespan of adults (wMelPop) and interfere with pathogen replication. Some other insects are also targeted for CI like analysis like in medfly, cherry fruit fly, mites, wasps and woodlice (Perrot-Minnot et al., 1996; Rasgon and Scott, 2003, Riegler M, et al.2004 ).

Wolbachia belongs to the class alpha-proteobacterium, this was first identified in the year 1924 during dissection of the ovaries of common household Culex mosquitoes by Hertig and



Wolbach. It is the most common known endosymbiotic microbe in the biosphere. About 76% of the insect species in the biosphere are infected with it (Hilgenboeker et al, 2008; Jeyaprakash & hoy, 2000). This intracellular bacterium ranged in size 0.6-1.2 micron and because of Wolbachia's ability to cause a series of reproductive alterations in their hosts which includes feminism (transformation of genotypic males into phenotypic females), cytoplasmic incompatibility (altering male sperms such that female cannot produce offsprings unless they cross with a male infected with the similar strain of bacteria) cytoplasmic incompatibility and parthinogetic induction (female produce progeny without male partner). It increases the reproductive efficiency of Wolbachia infected females, increasing the maternal transmission of bacteria (Stouthamer et al, 1999).

All this information and data gave us a promising vision to conduct work on WOLBACHIA for future prospective with following objectives.

### AIMS & OBJECTIVES

To study the effects of antibiotic (tetracycline) treatment on Wolbachia over three generations in fruit fly *Drosophila melanogaster*.

**Objective:**

- To determine prevalence of Wolbachia infection among local *Drosophila* species using Isofemale lines preparation and PCR.
- To culture *Drosophila melanogaster* (a species already maintained in the lab) in Tetracycline medium in order to clear Wolbachia.



## REVIEW OF LITERATURE

### Malaria

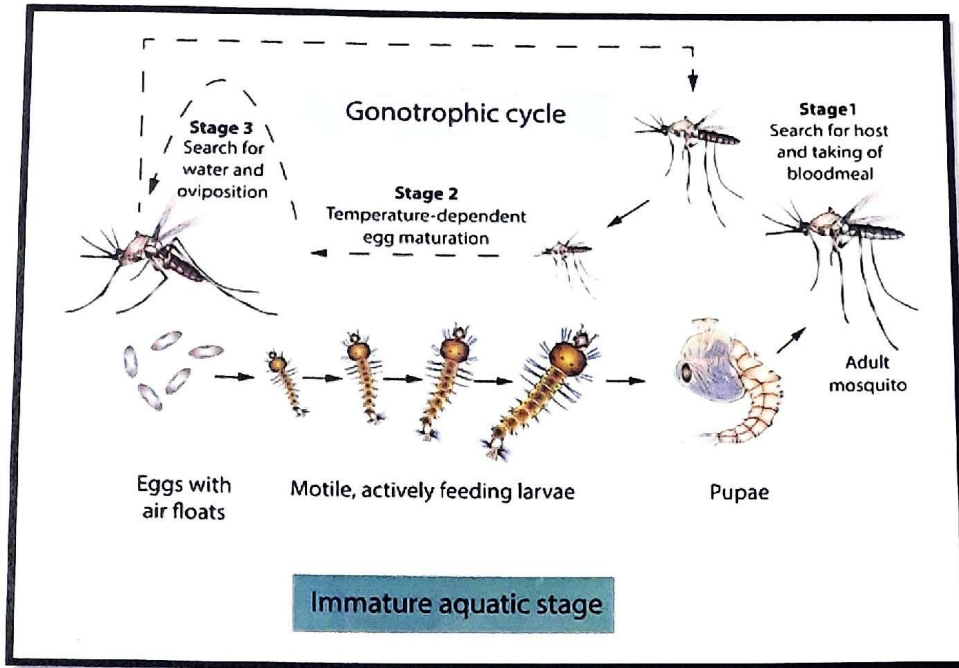
Malaria is caused by parasite of genus *Plasmodium*. Malaria, commonly spread by the bite of mosquito (infected female *Anopheles*). During biting mosquito introduces the parasites into person's bloodstream. The sporozoite form of the parasite travels to the liver within 30 minutes for further maturation and reproduction. Five species of *Plasmodium* can infect humans. Most deaths are caused by *P. falciparum*. The most severe *falciparum* malaria are cerebral malaria, severe anaemia and acute respiratory syndrome. Other malaria species like *P. ovale*, *P. vivax* and *P. malariae* generally cause a lenient form of the disease (except some case series of severity due to *P. vivax* malaria is also reported). Relatively newer species known to infect human is *P. knowlesi*, which is recently reported to be transmitted through *Anopheles sundaicus* in Andaman and Nicobar Islands in India. *P. knowlesi* is distributed across Southeast-Asia and extend from Malaysia Borneo to Peninsular Malaysia (Singh B, 2004).

### Life cycle of mosquito:

Mosquitoes undergo through four different stages in their life cycle:


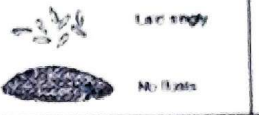
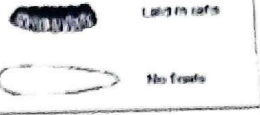
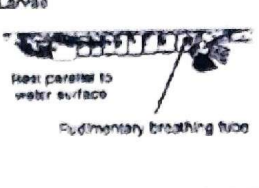
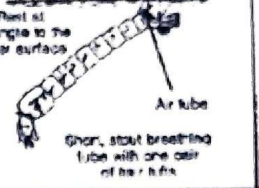
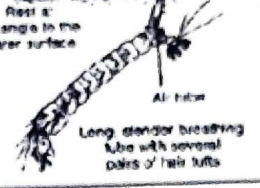
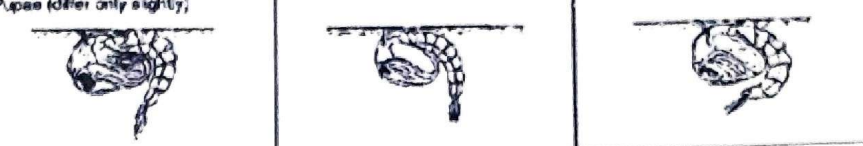
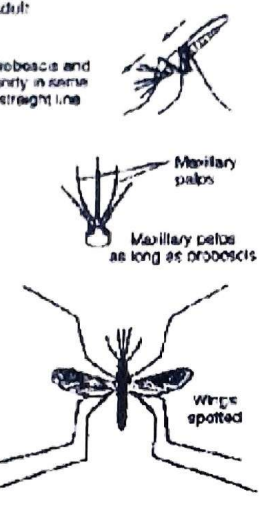
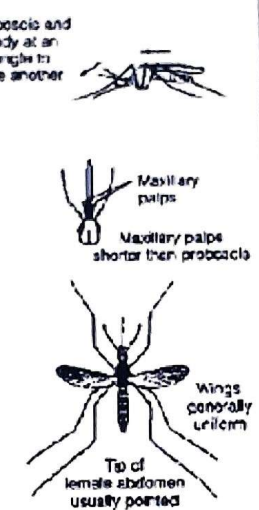
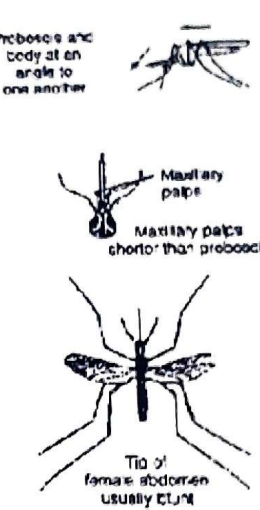
- Egg – Under optimum condition hatches within 24 hours in shallow water.
- Larva – Move continuously in water; exhibit moulting several times; use surface siphon to breathe air. The larva matures through stages.
- Pupa – It does not feed; adult emerges from this stage.
- Adult – After floating for very short time on water surface it flies for shorter distance and rest till hardening of its parts of body.

The initial three stages occur in water, but the adult form is an actively flying insect. Only the females bite and survives on the blood of animals or humans.



**Fig A: Life cycle of Mosquito**



<i>Anopheles</i>	<i>Aedes</i>	<i>Culex</i>
<b>Eggs</b>  Laid singly Has floats	<b>Eggs</b>  Laid singly No floats	<b>Eggs</b>  Laid in rafts No floats
<b>Larvae</b>  Rest parallel to water surface Rudimentary breathing tube	<b>Larvae</b>  Rest at an angle to the water surface Air tube Short, stout breathing tube with one pair of hair tufts	<b>Larvae</b>  Rest at an angle to the water surface Air tube Long, slender breathing tube with several pairs of hair tufts
<b>Pupae (differ only slightly)</b> 		
<b>Adult</b>  Proboscis and body nearly in same straight line Maxillary palps Maxillary palps as long as proboscis Wings spotted	<b>Adult</b>  Proboscis and body at an angle to one another Maxillary palps Maxillary palps shorter than proboscis Wings generally unicolor Tip of female abdomen usually pointed	<b>Adult</b>  Proboscis and body at an angle to one another Maxillary palps Maxillary palps shorter than proboscis Tip of female abdomen usually blunt

**Fig B: Differentiating mosquito species of medical importance**

***Aedes*, *Culex* and *Anopheles* mosquito**

The eggs of *Anopheles* and *Aedes* mosquito is laid singly where as in *Culex* it is laid in rafts, the eggs of *Anopheles* mosquito floats where the rest two do not. The larval forms of *Aedes* and *Culex* rest on the water surface in an angle whereas *Anopheles* rest on the surface of water being parallel. *Anopheles* has rudimentary breathing tube, *Aedes* has short and stout breathing tube with one pair of hair tuft and *Culex* has a long and slender breathing tube with several hair tufts.

The pupal forms are more or less same in all three. In both *Aedes* and *Culex* both body and proboscis are at an angle whereas in *Anopheles* it is straight. Maxillary palps are of same length in *Anopheles* but in *Aedes* and *Culex* they are shorter than proboscis. Wings are spotted in *Anopheles* and uniform in rest two with pointed tip of abdomen in *Aedes* and blunt tip of abdomen in *Culex*.

#### **The Transmission cycle:**

A female *Anopheline* mosquito becomes infected by taking blood meal from a person who has sexual stages of malaria parasite in its blood. While taking blood meal mosquito takes male and female gametocytes. In the wall of stomach and intestine, after fusion male and female gametocyte forms zygote. Motile form of the zygote is called ookinete which ultimately forms oocyst and release sporozoites. If infected mosquito bites to any person, it further transmits the malaria parasites.

1. **In Liver:** As the parasites enter our body, it travels to our liver — where some types can remain dormant for as long as a year.
2. **Through the bloodstream:** Once the parasites mature i.e schizonts, they rupture the liver cells releasing merozoites and invade red blood cells. This is when people typically develop malaria symptoms. The incubation period for the malaria parasite is between 7-30 days (usually short for *P. falciparum*). Gametocytes development takes place in human.
3. **To next person:** At this time, if an uninfected mosquito bites the infected person (with malarial gametocytes), it will become infected with malaria parasites and can easily transmit malaria to others by subsequent biting.



### Other means of malarial transmission:

Individuals can also get malaria infection by exposure to infected blood, including:

- From pregnant females to unborn child (placental rupture leads congenital malaria) (<https://www.cdc.gov/malaria/about/faqs.html>).
- Through blood transfusions
- By same needles on different patients.

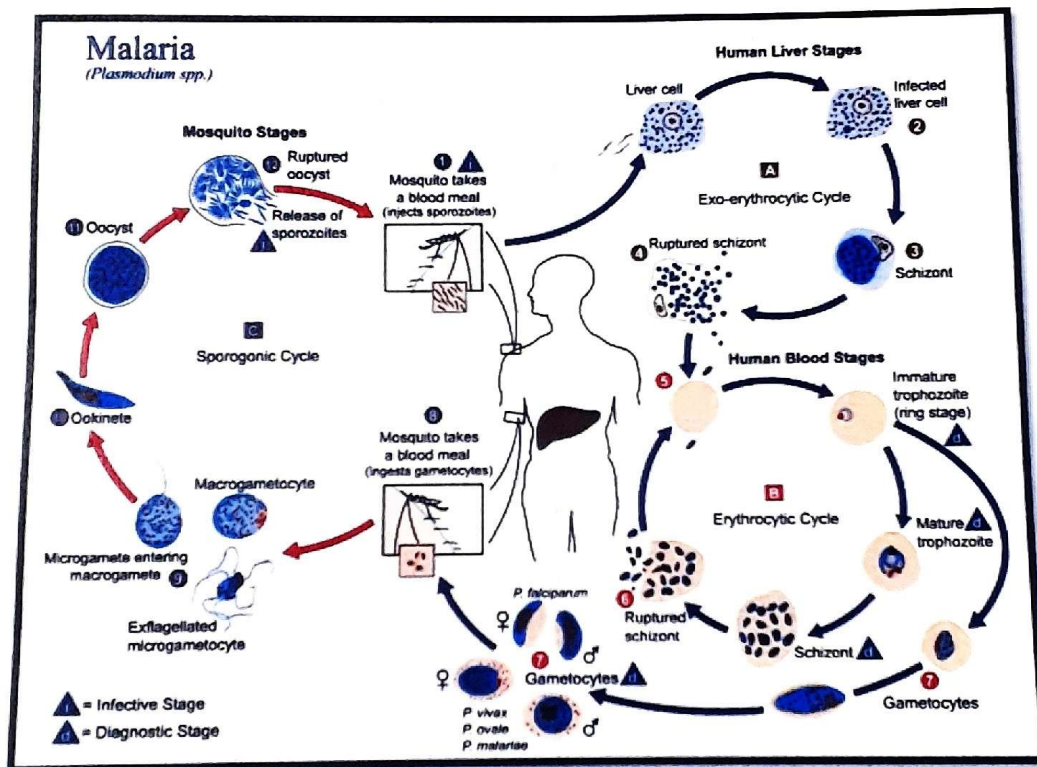


Fig C: *Plasmodium* lifecycle, Source: CDC

### Symptoms:

In general, fever with chills and headache, nausea, vomiting, abdominal pain, diarrhoea, muscle or joint pain, fatigue, rapid heart rate, rapid breathing, and sometimes cough and general feeling of discomfort. If not treated some people who having malarial infection

experience cycles of malarial "attacks", which usually starts with rupturing of RBCs releasing asexual parasites causing chills & rigor (cold stage), followed by high fever (hot stage) and then by sweating (sweating) and returning to normal temperature. Malarial symptoms usually start appearing in the following weeks after the bite of a carrier mosquito. However, several types of malaria parasites can lie dormant in the body for a year (Bruce-Chwatt, et al. (1986).

#### ❖ **Diagnosis:**

Malaria is typically diagnosed by blood smear microscopy where stains like Giemsa, Field's, Wright's and Leishman's stain are used or with antigen-based rapid diagnostic tests. Recently new detection method like colorimetric Loop Mediated Isothermal Amplification method i.e LAMP where primers are designed to amplify segment of *Plasmodium genes* are used for detection. The loop-mediated isothermal amplification (LAMP) could be a reliable alternative of detecting low parasitemia in field condition (Jaymin C. Patel, 2014) as it is more sensitive and specific in detecting all five *plasmodial* species as compared to conventional PCR.

#### ❖ **Treatment**

Malaria is curable and preventable disease. The main aim of treatment is to ensure complete cure (full and rapid elimination of parasite from the patient's blood), in order to prevent development of severe malaria or death, or to chronic infection which leads to malaria-related severe anaemia. However, types of drugs and the course of treatment can vary, depending on the type of malarial parasite, transmission setting, age, pregnancy status and the severity of symptoms.

#### ❖ **Medications**

Most commonly used antimalarial drugs include:



1. **Chloroquine phosphate** – Although chloroquine was the preferred treatment for any malaria parasite but in many parts of the world, due to *P. falciparum* resistance to chloroquine the drug is no longer an effective treatment. However, it is still choice to treat *P. vivax* malaria in many parts of the world. It is given in **10mg/kg** body weight per day for first three days.
2. **Artemisinin-based combination therapies (ACTs)** - ACTs are combinations of two or more drugs which work against the malaria parasite in differently. This is basically used for chloroquine-resistant *P. falciparum* malaria. Examples: Artesunate–Sulfadoxine & Pyrimethamine, Artemether-lumefantrine and Artesunate-mefloquine combinations.
3. **Quinine sulfate** – It is a cinchona alkaloid and is given 10 mg/kg by body weight in every 8 hours for a week. Loading dose is administered fast. It is slightly soluble in ether, water and chloroform, odorless and bitter.
4. **Primaquine phosphate** – It is basically given to cure both blood stage (gametocytes) and liver stage infection. It is given in 0.75mg/kg body weight of adult.

#### ❖ Preventive measure:

Some of the preventive measures which can help to prevent disease include wearing full sleeve protective clothing. Spraying insect repellent on skin is also possible (20-35% N N, N-Diethyl-meta-toluamide - DEET). Use a mosquito net is most common measure to prevent biting of mosquitoes. For additional safety, Bednets can be treated with the different insecticide like permethrin (long lasting insecticide bednets). Along with spraying insect repellents on skin it is better to spray it on clothes as well.

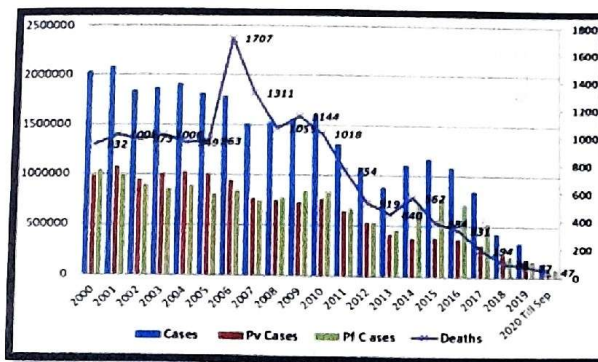
It is easy for mosquitoes to bite through thin clothing. Also keeping home and surroundings clean without any junks or wastes further prevent mosquito breeding and ultimately disease preventive. Further it is important to be vigilant for fever symptoms and go

for proper diagnosis when developing signs of malaria infection. Other common measure to prevent mosquito entry to household is to keep your windows and doors close at evening and night time.

❖ **Malarial burden across the world:**

Globally, around 3.4 billion people across 92 countries are bearing perpetual danger of being infected with malaria. As per the World Malaria Report 2018, there were 219 million incidences of malaria globally in 2017 (95% confidence interval: 203–262 million) and 435 000 recorded malarial deaths. The burden was inclined to the WHO African Region, where approximately 93% of all malaria deaths happened (61% of all deaths among children). According to the WMR 2019 (World Malaria Report), India represents 3% of the global malaria burden. The World Malaria Report (WMR) 2020 has been released by WHO, gives the estimated cases for malaria across the globe including India. India being the only high endemic country has reported a reduction of 72% of malaria compared to the baseline year 2000. India has also contributed to the largest drop in deaths of about 73.9% between years 2000 to 2019. India is on track to achieve 6<sup>th</sup> of the Millennium Development Goals (50-75% decline in cases between 2000 and 2019). After the launch of National Framework for Malaria Elimination (NFME) in 2016, Malaria Elimination efforts were intensified in India (<https://pib.gov.in/,28/6/21>).





**Figure 1:** Epidemiological trends of Malaria in India (2000-2019) Pv; Plasmodium vivax & pf; Plasmodium falciparum (Source: NVBDCP)

#### ❖ Mosquito vectors:

In India more than 58 *Anopheles* species are recognized and only six are of high epidemiological importance. *Anopheles culicifacies* Giles is a predominant malaria vector in rural areas (in the plains) and is responsible for an around 65-70% of malaria across India. It is zoophagic and prefers to breed in plain-land ecosystem (Dev, Vas & P., Vinod. (2013). *Anopheles stephensi* is primary vector of malaria in urban areas and it is zoophagic. *An. minimus* (forested regions), is exophilic and *Anopheles dirus* (forested hilly areas), is exophagic. In forested areas of northeast regions, *Anopheles minimus* exhibits exophilic and zoophilic behavior. *Anopheles fluviatilis* James, which is zoophagic and anthropophagic, acts as the main vector in hill and foothill areas. *Anopheles sundaicus* is the predominant malarial vector in Andaman and Nicobar islands, which is zoophagic (Dev, Vas & Sharma VP, 2013).

#### Insecticide sprays & resistance:

Insecticides like DDT, Malathion, Deltamethrin, Cyfluthrin are used to control the spread of mosquito. Many species of vectors particularly *Anophelines* (Mortality rates < 90%) are now resistant towards the effects of insecticides like DDT by mutation or natural selection and are less susceptible. According to the latest World malaria report, 70 countries and many more reported mosquito resistance to any or more of the 4 commonly-used insecticide classes within

2010-2019. Mosquito resistance was reported in 28 countries to many of the main insecticides groups. A new class of insecticide called spinosads was developed by Clarke Internationals LLC, USA against organophosphate resistant insects. Spinosad is a combination of spinosyn A and spinosyn D, which targets nicotine acetylcholine receptor subunits. On semi field application in Brazil, no cross resistance was found between temephos and spinosads proving it as an alternative approach against organophosphate resistant insects (Corbel, V; et al.2017).

❖ **New approach:**

As the preventive measures using insecticides was neither eco-friendly nor cost effective, several other approaches were made by the scientists, where the vectors causing the disease were modified. In one of the method, this modification was made using a bacterium named “WOLBACHIA” which is an endosymbiont of nearly 76% of insects residing on earth (Hilgenboeker et al, 2008; Jeyprakash & Hoy, 2000).

This approach exploits the ability of this organism to distort or modify the reproductive phenotypes of its host which prevents the host from spreading some of the mosquito borne diseases like dengue, chikungunya and malaria along with providing resistant against some viruses and parasite (Iturbe-Ormaetxe I, et al; May 6, 2011).

*Drosophila* hosting *Wolbachia* strains (**wMel**) can infect and sustain themselves in mosquito populations, reducing adult lifespan (**wMelpop**), and also affecting mosquito reproduction and interfering with pathogen replication. *Wolbachia*-infected *Aedes aegypti* mosquitoes have been released in some regions of Australia where incidences of dengue fever occur, it was seen that the acquired cases of dengue plummeted causing a 95% reduction in dengue cases in *Wolbachia* treated populations,(Scott L. O'Neill, 2019).



## ❖ WOLBACHIA

*Wolbachia* falls under class  $\alpha$ -proteobacterium. Hertig & Wolbach, 1924 identified it inside the ovaries of *Culex* mosquitoes in 1924. Probably this is the most-commonly found endosymbiotic microbe in biosphere. Approximately, 76% of the around 2–5 million insect species on Earth are thought to be infected with it (Hilgenboecker et al, 2008; Jeyaprakash & Hoy, 2000). *Wolbachia* is vertically transferred from a mother to its offsprings through the egg cytoplasm (by chromosomal latching on spindle fibre). *Wolbachia* is often referred to a 'reproductive parasite' as it optimizes its transmission by the manipulation of its host's reproductive mechanism.

## ❖ INSECTS :

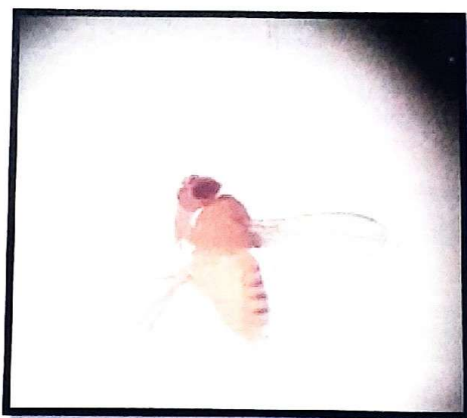
As a large population of insects residing on earth is infected with *Wolbachia*, therefore it is necessary to study this class to get an idea over the expansion of *Wolbachia* in class Insecta. \_Class Insecta is under kingdom *Animalia* and under phylum *Arthropoda*, this class of organisms basically has body developed into Head, Thorax and Abdomen, 3 pairs of legs, compound eyes and one pair wings (not specifically). Based on the characteristics of organisms and similarity between them, this class is further divided into 30 orders: i.e., thysanura (e.g. silver fishes), diplura (primitive insects with ability of regeneration e.g. Diplurans), Ephemeroptera (Mayflies), protura (e.g. tselontails), collembolan (e.g. Springtails), Odonata (Dragon flies), Grylloblatodea (Rock crawlers), Plecoptera (Stoneflies Phasmida (stick insects), Embioptera (Webspinners), Dictyoptera, Isoptera (termites), Zoraptera (angel insects), Orthoptera (Grasshoppers, Crickets), Psocoptera (booklice), Mallophaga (The louses), Dermaptera (Earwigs), Siphunculata (e.g. Sucking lice), Hemiptera (e.g. true bugs aphids), Thysanoptera (e.g. Thrips), Neuroptera (e.g. Snakeflies and antilions), Mecoptera (Ex: Scornflies.), Siphonaptera (eg: Fleas), Coleoptera (beetles), Strepsiptera (eg:

Stylopids), **Diptera** (e.g. *Drosophila*, house flies, mosquitoes), **Lepidoptera** (e.g. moths and butterflies), **Trichoptera** (e.g. Caddis flies), **Hymenoptera** (e.g. ants, bees).

***Drosophila* and its Life Cycle:**

• Classification:

- ✓ Kingdom : Animalia
- ✓ Phylum : Arthropoda
- ✓ Class : Insecta
- ✓ Order : Diptera
- ✓ Family : Drosophilidae
- ✓ Genus : *Drosophila*
- ✓ Species : *melanogaster*



**Fig2: *Drosophila melanogaster* (female)**

Commonly known as fruit fly (*Drosophila*) can be easily seen on fruits, kitchen and gardens. They are unusually brown coloured with black bands on abdominal segments and red colored compound eyes. Its body is divided into head thorax and abdomen; It has three pairs of legs, one pair of compound eyes and one pair of wings. It undergoes metamorphosis from larval stage till adult flies. It is mainly an African native but is found in all continents and countries.



and likes to live in moist and cold place. Hawaiian Islands has the highest diversity of *Drosophila* with 500 species (Bennett et al. 2012, Singh BN, 2015). Reproduction is sexual mode and sometimes parthenogenesis.

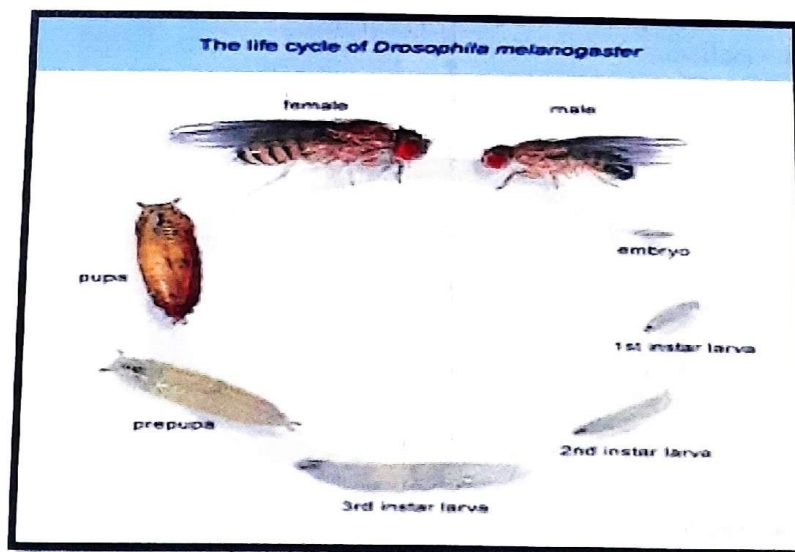
- Male individuals of this species have combs in their forearms whereas females have ovipositor which is absent in males. Males are smaller than females.
- It is the most common and feasible insect for research study as due to short life span of 30-50 days.
- Its life cycle has 4 stages i.e. Embryo, larval, pupa, adult:

1. **Embryo:** After fertilization egg is laid by the female on a solid and moist place.

2. **Larva:** 1<sup>st</sup> instar larva is released after one day and by 3<sup>rd</sup> day 3<sup>rd</sup> instar larva is formed.

3. **Pupa:** As the 3<sup>rd</sup> instar larvae is released it feeds and grows, after 2-3 days it starts pupariating.

4. **Adult:** From the pupa adults are released on 9-11<sup>th</sup> day of egg release.



**Fig 3: Lifecycle of *Drosophila***

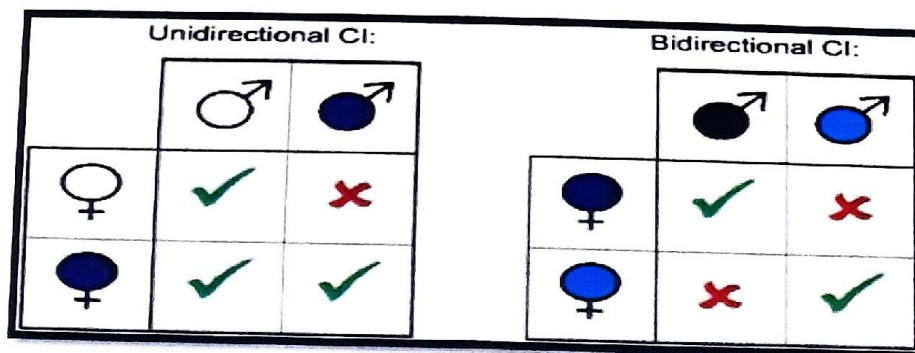
Transinfected strains of *Wolbachia* in *Aedes aegypti* mosquitoes, the primary vector of dengue fever, inhibit pathogen replication (*Plasmodium gallinaceum*). In addition, transient *Wolbachia* infections in *Anopheles gambiae* remarkably reduce *Plasmodium* levels (Moreira *et al.*, 2009a).

### DYNAMICS OF WOLBACHIA:

In mosquitoes, *Wolbachia* induces cytoplasmic incompatibility (CI) a form of embryonic death or lowering hatch rate. This results due to incompatibility between sperm-egg happening when *Wolbachia*-infected males cross with uninfected females (**unidirectional CI**) or infected females carrying incompatible *Wolbachia* strain (**bidirectional CI**) (Fig. 1B). CI can be complete or partial, different and complex patterns of incompatibility with a number of different crossing types can be seen between infected populations, specifically in the *Culex pipiens* group (e.g. Irving-Bell, 1983, Laven, 1967b, O'Neill and Paterson, 1992, Magnin *et al.*, 1987, Guillemaud *et al.*, 1997).

Therefore, CI has been studied by different investigators as a mechanism to control field populations of insects of medical importance or to help in driving transgenes into field populations. In addition, recent researches showed that *Wolbachia* can affect virus transmission both by interfering with the arthropod-borne parasite and by reducing the lifespan of the infected vectors.

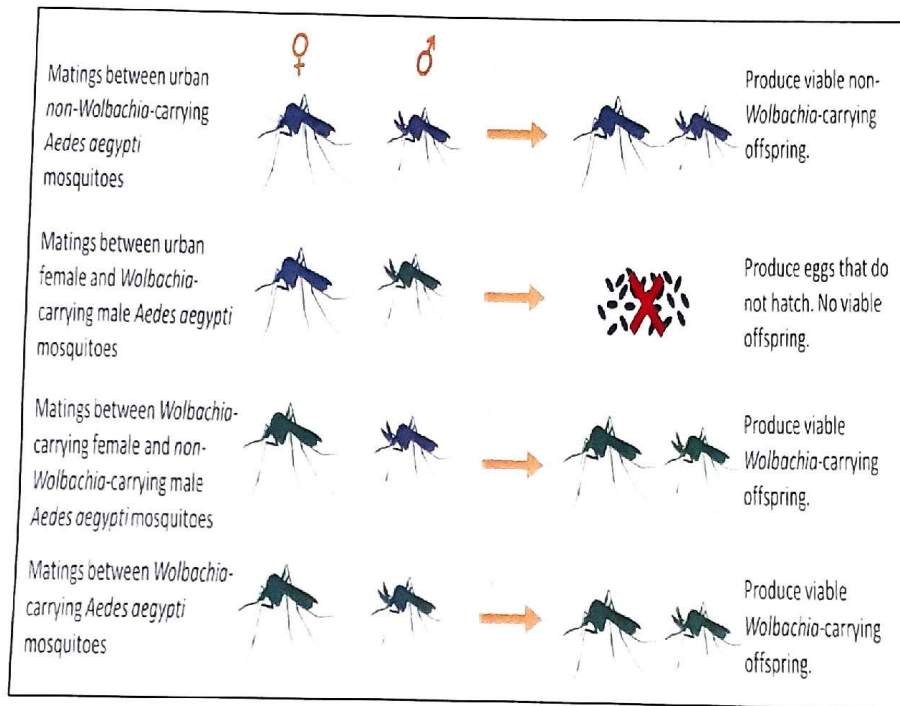
### Unidirectional and Bidirectional CI:



**Fig 4: Unidirectional and Bi-directional CI**



In unidirectional CI, the crossing between infected males and uninfected females are incompatible. Whereas in bidirectional CI, crossing between males and females carrying different strains of CI-inducing *Wolbachia* are incompatible. Sometimes, unidirectional CI is also observed between hosts carrying different strains of bacteria).



**Fig 5: Cytoplasmic incompatibility in *Aedes* mosquito World Mosquito Project:**

### Cytoplasmic Incompatibility (CI) and Its Factors

- The genes responsible for cytoplasmic incompatibility are present in the eukaryotic association module of phage residing inside *Wolbachia*. Temperate phage can modify CI effects in the primary host caused by *Wolbachia*, so when the host carrying same strains of *Wolbachia* produce offsprings CI is rescued.
- The two genes responsible for cytoplasmic incompatibility are referred to as CIF A and B. A study showed that one of the protein products was present in the spermathecae of infected female mosquitoes (Beckmann and Fallon, 2013) and

interestingly absence of these genes in wAu strain of Wolbachia which has lost CI like function (Sutton et al., 2014).

- Both the genes are present as a bicistronic genes but do not function as a traditional operon where all the genes are individually transcribed with one promoter.
- Somewhere copy number of these genes correlates with CI levels. Also, CIFA and CIFB genes are single transcriptional unit under one promoter control, referred to as an operon (amplification of both genes using cDNA in single run is possible but simultaneously flanking regions could not be amplified).
- Cif A and Cif B genes are homologous to CidA and CidB genes naturally found in common household *Culex* Mosquitoes, having the similar tendency of inducing CI.
- CidA has rescue effect on the function of Cid B (toxin) as CidB codes for deubiquitylase protein and CidA codes for a anti toxin protein which binds in region of CidB and the transcription gets restricted resulting in the inhibition of CI. Here both CidA and CidB play a toxin-antitoxin role for the induction of CI.
- However, from the molecular analysis of flies it cannot be said that it goes the same way for CifA and CifB in Wolbachia's WO phage mediated CI as both Cif genes are required for the induction of CI.
- Though both the genes are required to induce CI, genes are not transcribed equally, CifA is transcribed in high number as compare to CifB in different stages like in adults and late embryogenesis whereas CifB is produced in high levels in larval stage and early embryogenesis.
- From the RT-PCR studies of both the genes together and separately it was found that there is a junctional unit is present between them, which is also transcribed in high levels as compared to CifB.
- Both Cif genes have three structural modules of proteins:



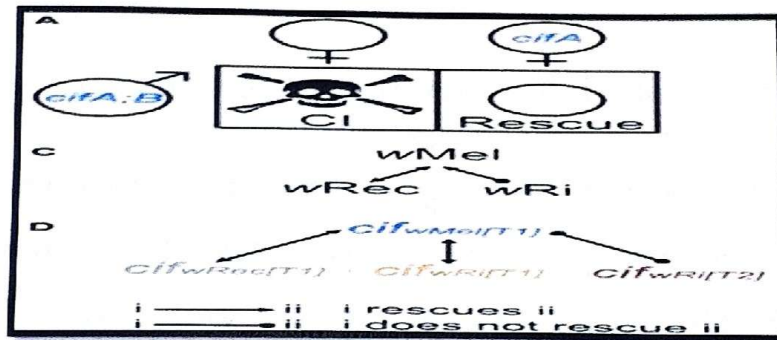
S.no	Protein	Module	Size Range (AA)	Homology
1.	CifA	ModA-1 (in type 1)	21-22	<ul style="list-style-type: none"> <li>Catalase-rel, decomposes hydrogen peroxide into water and oxygen</li> </ul>
		ModA-2	65-264	<ul style="list-style-type: none"> <li>DUF3243 domain of unknown function.</li> <li>Puf family RNA binding.</li> <li>Globin like protein</li> </ul>
		ModA-3	47-74	<ul style="list-style-type: none"> <li>STE-like transcription factor.</li> </ul>
2.	CifB	ModB-1	103-133	<ul style="list-style-type: none"> <li>PDDEXK, PD-(D/E) XK nuclease superfamily.</li> <li>Endonucleases NucS</li> <li>Restriction endonucleases like family.</li> <li>HSDR_N, type 1 restriction enzyme R protein N terminus.</li> </ul>
		ModB-2	122-205	<ul style="list-style-type: none"> <li>PDDEXK, PD-(D/E) XK NUCLEASE superfamily.</li> <li>MmcB-like DNA repair protein.</li> <li>COG5321, uncharacterized protein</li> <li>HSDR_N, type 1 restriction enzyme R protein N-terminus.</li> <li>Endonuclease NucS.</li> </ul>
		ModB-3 (only in type 1)	95-147	<ul style="list-style-type: none"> <li>Ulp-1, ubiquitin-like proteases.</li> <li>Various proteases and peptidases (C5, C57, Sentrin-specific protease)</li> </ul>

**Table 1: Structural modules of Cif proteins**

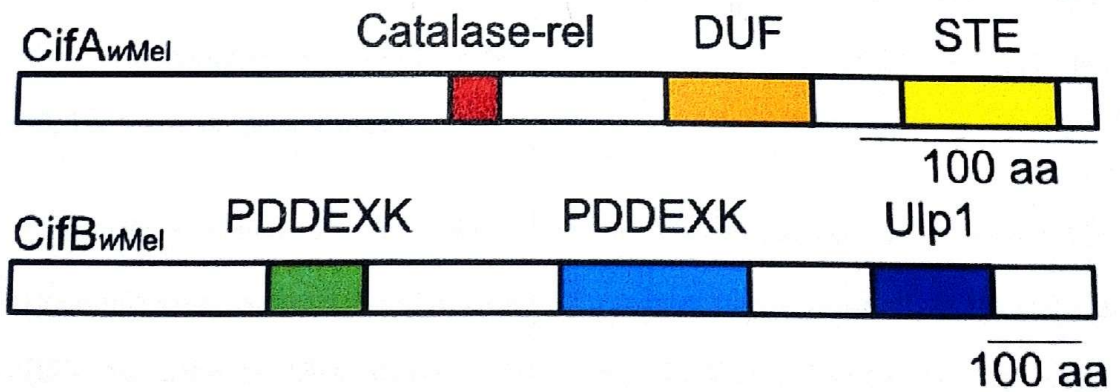
Genes encoding Cif proteins further divides into five phylogenetic clades (types 1–5) ( Lindsey *et al.* 2018; LePage *et al.* 2017; Bing *et al.* 2020; Chen *et al.* 2019; Shropshire and Bordenstein 2019; Beckmann *et al.* 2017; LePage *et al.* 2017; Martinez *et al.* 2020), and distant homologs of Cif proteins are found in *Rickettsia* and *Orientia* bacteria, which are usually not known to induce CI. wMel (type 1 of CI), wRi (type 2 of CI), wNo (type 3 of CI), wPipPel (type 4 of CI).

▪ **Two by one model :**

The Two-by-One genetic model of Cytoplasmic Incompatibility: *cifA*:*B* causing CI which can be rescued by females expressing *cifA* (Shropshire and Bordenstein et al., 2019)



**Fig 6: effect of Cif genes on CI**



From the Fig, CifA protein has three structural modules: first is Catalase-rel which breaks hydrogen peroxide into hydrogen and oxygen and has 21-22 amino acids. The second module



is a globin like Puf family RNA binding domain with unknown function and has 65-264 amino acids. The third module is a STE like transcription factor having 47-74 amino acids.

CifB also has three structural Modules where the first having 103-133 amino acids and second module PDDEXK having 122-205 amino acids, belongs to a class of nuclease superfamily and matches with other endonucleases like NuCS, HSDR\_N, and MmcB. Third module Ulp1 has 95-147 amino acids and codes for several peptidases and ubiquitin like proteases.

It is quite interesting that CifA and CifB genes synteny is maintained throughout prophage WO regions, despite high level of recombination and rearrangements in the genome of prophage and *Wolbachia*.

#### **WOLBACHIA AGAINST VIRUS AND HUMAN PATHOGENS:**

Ability of *Wolbachia* to restrict arbovirus transmission (West Nile virus, dengue and chikungunya viruses etc.) in its host makes it a useful tool to combat various vector borne-transmitted diseases. Some *Wolbachia* strains can interfere with insect viruses in *Drosophila* (like *Drosophila C* RNA virus or DCV, Cricket paralysis virus, Flock House and Nora viruses and also fungal infection caused by *Beauveria bassiana* and range of human pathogens in mosquitoes such as ( Osborne *et al*, 2009; Hedges *et al*, 2008 Glaser & Meola, 2010, Teixeira *et al*, 2008, Panteleev *et al*, 2007).

*Wolbachia* can interfere with a wide range of disease causing microorganisms in paratransfected mosquitoes (Kambris *et al*, 2009) and nematodes, viruses like Chikungunya (CHIKV; Moreira *et al*, 2009a; Bian *et al*, 2010 ) and DENV, including the avian and rodent malaria parasites (Moreira *et al*, 2009a) and *P. berghei* (Kambris *et al*, 2010).

wMelPop-CLA provides greater protection against West Nile virus in *C. quinquefasciatus* mosquitoes compared to normal *Wolbachia pipientis* (Glaser & Meola, 2010, Moreira *et al*, 2009a).

### **Mechanism of wolbachia protection**

*Wolbachia* mediated mechanism of pathogen interference remains unclear. Although, *Wolbachia* is known to cause induction of antimicrobial peptides and pre-activation of the innate immune response in the insect (Kambris *et al*, 2010; Moreira *et al*, 2009a; Kambris *et al*, 2009). The presence of wMelPop-CLA *Wolbachia* in *A. aegypti* also led to the expression of several immune effectors molecules (cecropin, defensin etc.) Moreira *et al*, 2009a).

### **RECENT TRIALS:**

The trial, conducted in Yogyakarta, Indonesia, demonstrated that the release of mosquitoes modified to carry a bacterium called *Wolbachia*, which stops reduced the cases of dengue fever in the city (77%) (Utarini, Adi *et al*, 2021).



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## MATERIALS AND METHODS

Following equipment's were handled during the work

Laminar Air Flow, Binocular Microscope, Thermal cycler PCR, Weighing machine, Autoclave, Nanodrop, Water bath, Centrifuge (Fixed angle rotor), Spinfuge, Vortex machine, Microwave, Electrophoretic Chamber with Gel Casting tray, Gel documentation system, -20 Deg deep freezer

### **Fly culture:**

#### **Reagents required:**

##### **For media preparation:**

- For 100ml media:  
Agar agar - 3 gms  
Corn flour -13.3 gms  
Yeast Extract -1.33 gms  
Methyl Paraben - 0.2 gms  
Mix fruit juice -100 ml

##### **For Tetracyclin treatment:**

- 0.25 mg/ml and 0.5 mg/ml Tetracycline in 30ml media:

##### **Stock - 25mg/ml**

0.25 mg/ml = 0.3 ml in 30ml

0.50 mg/ml = 0.6 ml in 30ml

##### **For Dissection:**

- Distilled water, 70% ethanol

##### **For DNA Isolation:**

- 6 M NaCl,



- 20% SDS (Sodium Dodecyl Sulphate)
- STE Buffer:
  - EDTA - 2mM
  - Tris HCL - 10mM
  - NaCl - 0.4M, pH-8
- TE Buffer:
  - Tris -10mM
  - EDTA - 1mM
- Proteinase k
- Isopropanol
- 70% ethanol
- Distilled water
- For PCR:
  - Master mix (puregene/genexy) - 12.5  $\mu$ l
  - Nuclease free water - 9.5  $\mu$ l
  - Forward primer - 1  $\mu$ l
  - Reverse primer - 1  $\mu$ l
  - Template -2  $\mu$ l
- For Gel Electrophoresis:
  - 1X TBE Tris borate EDTA: for 2 litres
    - Tris base - 21.6 gms
    - Boric acid - 11gms
    - Tris EDTA - 8 ml (0.5 M)
    - Distilled water - 2 Ltrs

- Bromophenol Blue:

Tris HCL – 10mM

Bromophenol blue – 0.03%

Xylene cynol – 0.03%

Glycerol -- 60%

EDTA – 60mM

- Agarose (1.5% in TBE)

**Media Preparation:** Add all the contents of media were poured in a conical flask and mixed. Once the contents are mixed, liquid media was poured in glass bottles for isofemale line generation and fly rearing. Plug all the bottles with cotton plug and cover them with aluminium foil. Media was then autoclaved for further use.

- a) For tetracycline pouring 25-30 pores were made in the media using a sterile needle.
- b) 0.3 ml tetracycline was poured for 0.25mg/ml final concentration and 0.6 ml for 0.5 mg/ml final concentration.

#### ❖ PREPARATION OF FEMALE ISOLINES AND FLY REARING:

- a) Flies were caught from local locations using flasks with fruits as traps.
  - b) Flies were separated from fruit bottles to a new empty bottle and sedated using ether.
  - c) Flies were visualized under stereomicroscope and female flies were separated.
  - d) Gravid females were transferred for isofemale line preparation to new bottles containing media.
- a) Adult hatching time was observed.



❖ **Generating generations of flies on Tetracycline media**

- b) *Drosophila melanogaster* flies have been transferred to fresh media bottles containing 0.25 and 0.5 mg/ml tetracycline and labeled as Parents with date.
- c) After 7 days when new flies are about to hatch, parents were transferred to another bottle and pupa were allowed to hatch.
- d) Again after 7 days when new adults are about to appear older parents were transferred to other bottle for 1<sup>st</sup> generation. 0.25 Tetracycline and 0.5 Tetracycline 1<sup>st</sup> generation.
- e) As above steps were followed up till 3<sup>rd</sup> generation appear.

❖ **DISSECTION OF FLY ABDOMEN:**

Following items were used during this work - Eppendorf tubes, surgical blades, petridishes, small cylindrical and large cuboidal glass bottles, PCR tubes, micropestle, pipettes -2 micro ltr, 15 micro ltr, 100 micro ltr and 200 micro ltr., graduated falcon tubes, conical flask, Forceps and Needle, Syringe, Aluminium foil

- a) Samples were taken from respective generation i.e Parents, parents 0.25 tetracycline, parents 0.5 tetracycline, 1<sup>st</sup> gen 0.25 tetracycline and 0.5 tetracycline, 2<sup>nd</sup> gen 0.25 tetracycline and 0.5 tetracycline, 3<sup>rd</sup> gen 0.25 tetracycline and 0.5 tetracycline.
- b) From each bottle 10-15 flies were transferred to graduated falcon tube and sedated using diethyl ether.
- c) Flies were washed in falcon tubes with 1ml 70% ethanol.
- d) After, flies were transferred to Petri dishes and distilled water was added to the flies to avoid drying up.
- e) Carefully the abdomen of flies was dissected using surgical blade under stereomicroscope.

- f) The abdomens were transferred to 100 $\mu$ l of 70% ethanol in Eppendorf's.
- g) Tubes were labeled carefully and stored in 4°C.

❖ **DNA ISOLATION FROM ABDOMEN:**

- a) 2-10 dissected abdomen were taken in 100  $\mu$ l of STE buffer in an Eppendorf's.
- b) Using a micro pestle, the abdomens were crushed to break the tissues inside laminar air flow.
- c) After micro pestle grinding, volume of the tubes was raised to 350 $\mu$ l.
- d) 40  $\mu$ l of 20% SDS solution was added to the tubes.
- e) Then 16  $\mu$ l of proteinase K(10mg/ml) was added to the tubes.
- f) The tubes were kept in 55°C for 1.30 hrs.
- g) Removal of the tubes from water bath and vortexing for 30 seconds was done.
- h) After vortexing, the tubes were centrifuged at 12500g for 5 min.
- i) Addition 300 $\mu$ l 6M NaCl to the supernatant obtained after centrifugation.
- j) Vortexing of the tubes for another 30 seconds and then centrifugation for 20 min at 12500g was done after the addition of NaCl.
- k) The clear supernatant appeared without debris.
- l) To the supernatant equal amount of isopropanol was added in 1:1 ratio and incubated overnight.
- m) After incubation, the tubes were centrifuged at 12500g for 20 min.
- n) Isopropanol was discarded and the tubes were inverted on tissue paper to air dry.
- o) Now 100 $\mu$ l of 70% ethanol was added and again the tubes were centrifuged for 5 min at 12500g.
- p) Supernatant was removed and the pellet was allowed to air dry.



q) After air drying, the pellets were dissolved in 50 $\mu$ l TE.

❖ **PCR AMPLIFICATION:**

Following items were used during this work.

- 1) Eppendorf tubes
  - 2) Surgical blades
  - 3) Petri dishes
  - 4) Small cylindrical and large cuboidal glass bottles
  - 5) PCR tubes
  - 6) Micro pestle
  - 7) Pipettes -2 micro ltr, 15 micro ltr, 100 micro ltr and 200 micro ltr.
  - 8) Graduated falcon tubes
  - 9) Conical flask
  - 10) Forceps and Needle
  - 11) Syringe
  - 12) Fruits
  - 13) Aluminum foil
  - 14) Gel Electrophoresis chamber
  - 15) ABI Thermal Cycler
- a) According to the number of samples all the reagents for PCR were mixed i.e master mix, nuclease free water, forward and reverse primers in an Eppendorf and labeled.
  - b) The mixture was vortexed for 30 sec and then centrifuged it in 2100 rpm for 30 sec.
  - c) 23 $\mu$ l of mixture was transferred to PCR tubes and labelled accordingly.
  - d) Now 2 $\mu$ l of DNA samples were transferred to respective tubes.

- e) PCR tubes containing DNA and master mix were spinfuged for seconds.
- f) The tubes were put in Thermocycler (ABI) to run PCR After setting Program.
- g) After PCR the were removed tubes from thermocycler and spinfuged for another 30 seconds.

❖ **GEL ELECTROPHORESIS OF PCR PRODUCT:**

- a) The PCR products were spinfuged for 30 sec after removing from thermocycler.
- b) 1.5% of agarose gel was made in 40ml TBE buffer.
- c) 15 $\mu$ l EtBr was added in the agarose and casted in a gel casting tray making wells using combs.
- d) As the gel got solidified, it was placed in gel electrophoresis chamber filled with TBE.
- e) 8 $\mu$ l of PCR products were loaded accordingly with bromophenol blue in wells.
- f) 2 $\mu$ l ladder was loaded and the power supply was switched on.
- g) Bubbles can be seen in the edges of the chamber.
- h) The samples were allowed to run till they reached the desired length of the tray.
- i) The power supply was switched off and the bands in the gel were visualized under UV in GelDoc.
- j) The readings of the bands appearing were taken.



## RESULTS

- To prepare female isolines, *Drosophila* flies were trapped from the premises of ICMR-NIRTH.
- After selecting gravid females, total 11 Isolines were prepared i.e Iso 1, Iso 2, Iso 3, Iso 4, Iso 5, Iso 6, Iso 7, Iso 8, Iso 9, Iso 10, Iso 11.
- After preparing 11 isolines only 5 isolines were successfully generated from Iso 1, Iso 2, Iso 3, Iso 5, Iso 6 after 9-11 days.



**Fig 7: Female Isolines**

- **Characteristics of Isoline Species:**
  1. **Isoline 1:** It had two claws at the end of its forearms but no combs.
  2. **Isoline 2:** It had two sharp claws and one pair of combs in its forearms, one of the pair had 6 bristle while the other had 8, there were two more bristles a little below forearm. It was identified as *Drosophila bipectinata*.



**Fig 8: Isoline 2**

3. **Isoline 3:** The upper body of the fly had two parallel lines in white and single claw at the end of forearm. It was identified as *Drosophila zaprionus*.
4. **Isoline 5:** The fly had hair like structures on its forearms and two claws at the end of forearm.



**Fig 9: Isoline 5**

5. **Isoline 6:** It had one pair of combs in its forearms, one of the pairs had 7 bristles while the other had 8 bristles, there were two more bristles below forearms and two claws. It was identified as a sub species of *Drosophila bipectinata*.



**Fig 10: Isoline 6**



**Table 2: Hatching time of eggs till adults:**

S.no	Aliquot no.	Date of Egging	Date of Adult appearance	Days in no.
1.	Isoline 1	23/3/21	1/4/21	10 <sup>th</sup> day
2.	Isoline 2	20/3/21	28/3/21	9 <sup>th</sup> day
3.	Isoline 3	20/3/21	30/3/21	11 <sup>th</sup> day
4.	Isoline 5	20/3/21	28/3/21	9 <sup>th</sup> day
5.	Isoline6	20/3/21	28/3/21	9 <sup>th</sup> day

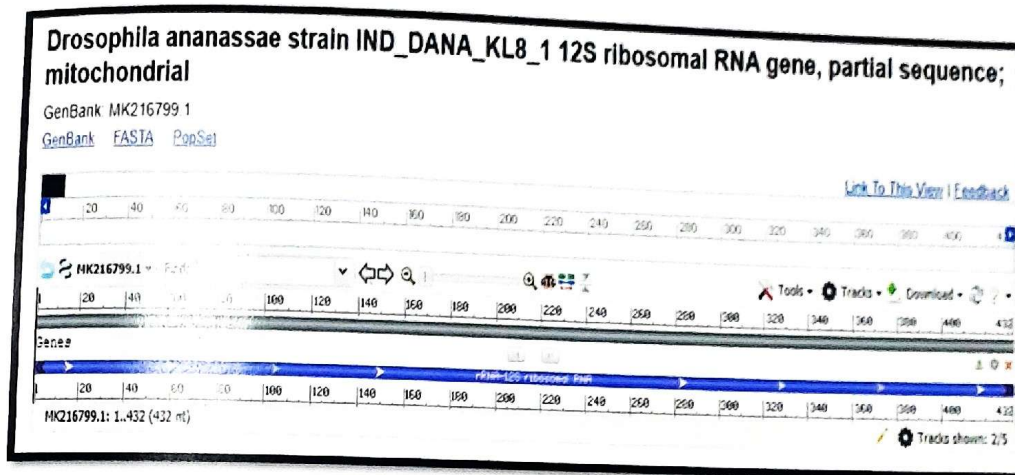
- ❖ The given sample of *Drosophila melanogaster* flies were reared and maintained for three generations including parents under 0.25 mg/ml and 0.5 mg/ml Tetracycline diet. After the abdomen were dissected and DNA was isolated from them, the DNA was subjected to PCR for all the samples i.e parents (untreated), parents 0.25 and 0.5 Tetracycline treated, 1<sup>st</sup> generation 0.25 and 0.5 tetracycline treated, 2<sup>nd</sup> generation 0.25 and 0.5 tetracycline treated, 3<sup>rd</sup> generation 0.25 and 0.5 tetracycline treated. PCR was conducted using primers of Wspec, WSP 81, ftsZ and ORF 7 genes to check clearance of Wolbachia and phage by their surface protein genes.

**Fig 11: *Drosophila* fly culture**

❖ **BLAST RESULTS OF PRIMERS USED :**

Prior to the amplification and detection of insect, Wolbachia and phage specific genes, the primers were blasted using BLAST tool of NCBI to know the location, position and size of genes going to be used. following are the blast results of primers used:

A. **12SrRNA:** This amplifies a region of 400bp insect specific gene.

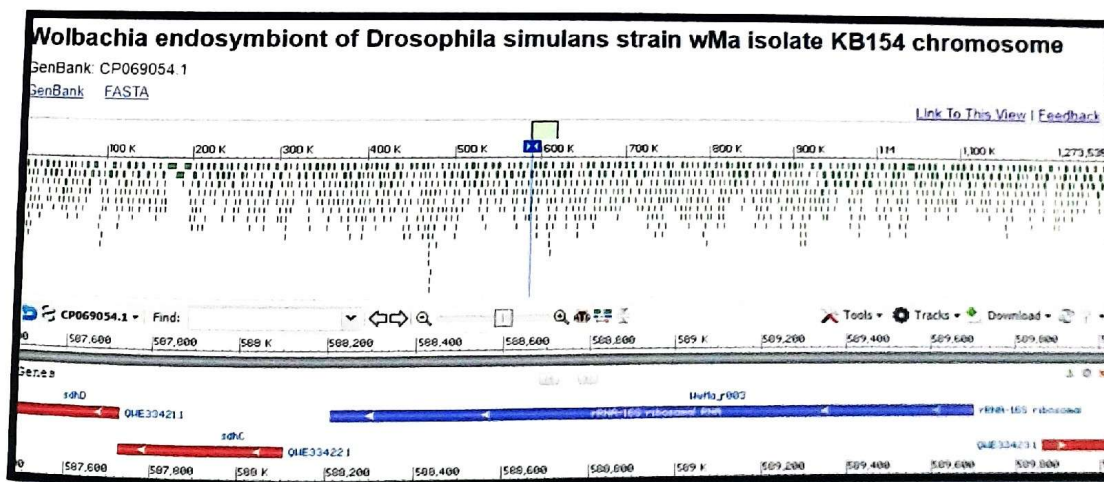


**Fig 12: Blast result of 12SrRNA**

B. **Wspec:** The primers used for this amplifies a Wolbachia specific gene of 438bp.

Forward primer F: CATACTATTCTGAAGGGATAG

Reverse primer R: AGCTTCGAGTGAAACCAATTC



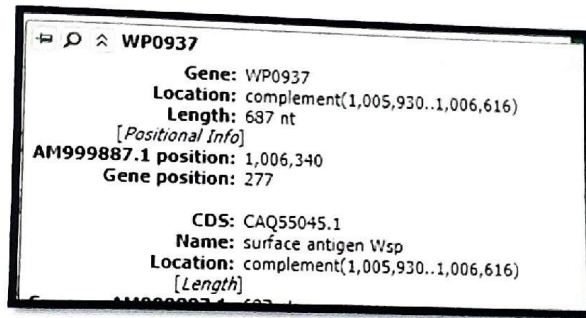
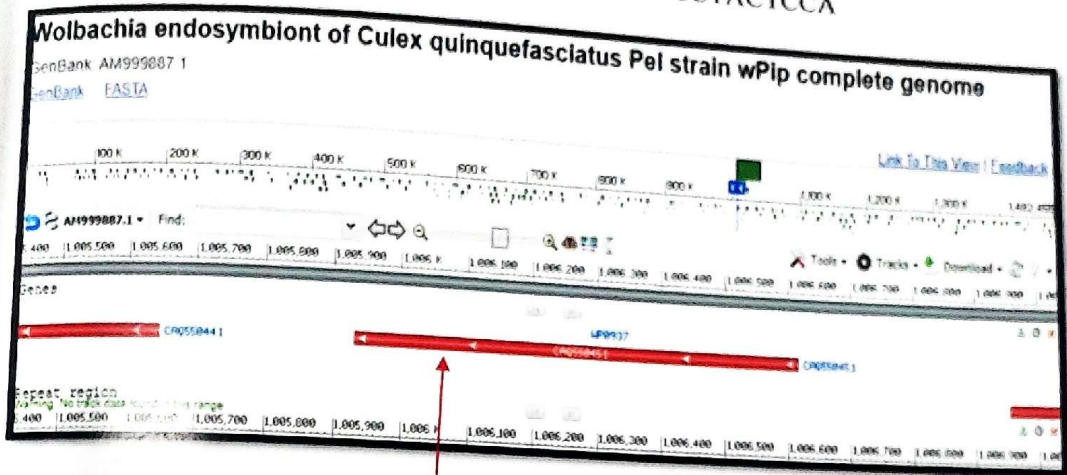
**Fig 13: Blast result of Wspec primer**



C. **WSP81:** This amplifies a Wolbachia specific surface protein gene of 600 bp.

Forward primer F: TGGTCCAATAAGTGATGAAGAAAC

Reverse primer R: AAAAATTAACGCTACTCCA

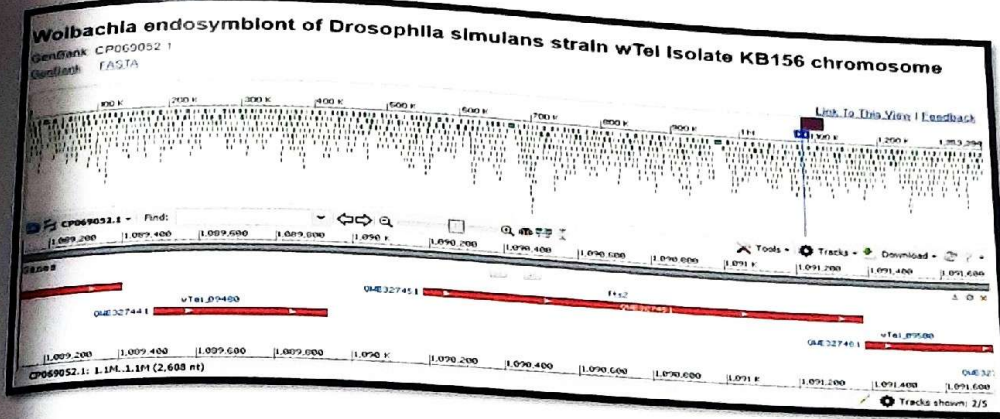


**Fig 14: Blast result of WSP81**

D. **FtsZ:** This also amplifies a Wolbachia specific surface protein of 200 bp.

Forward primer F: TTTTGTGTCGCAAATACCG

Reverse primer R: CCATTCCTGCTGTGATGAAA

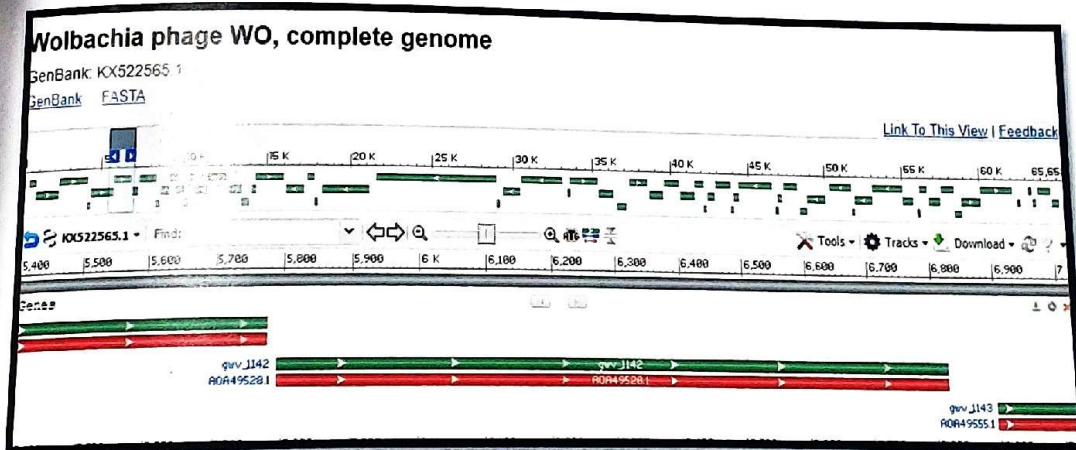


**Fig 15: Blast result of FtsZ**

E. **Orf7:** This primer is specific for capsid protein gene of wo phage of 400 bp.

Forward primer F: CCCACATGAGCCAATGACGTCTG

Reverse primer R: CGTTCGCTCTGCAAGTAACTCCATTAAAC



**Fig 16: Blast result of Orf7**

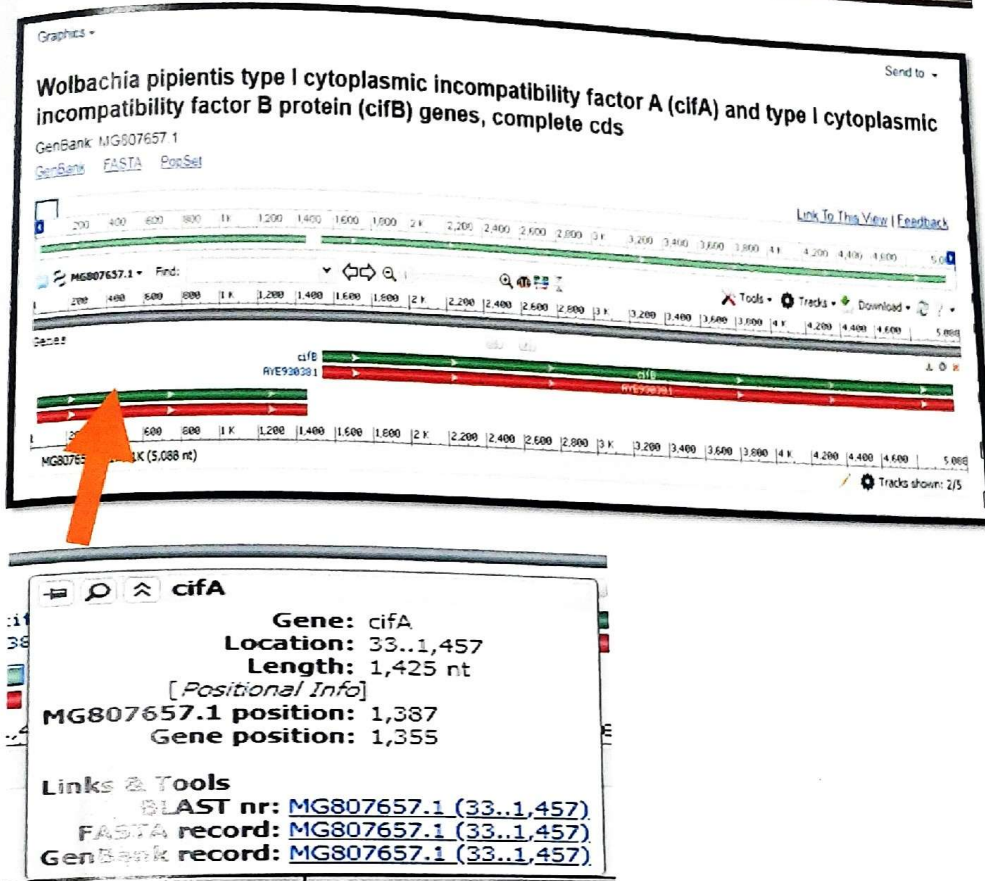
➤ CifA: This gene is present upstream of CifB and is 1425 nt in length for the PCR of

CifA primers used is:

F:ATAAAGGCGTTTCAGCAGGA

R:AGCAAAGCGTTCACATTCC





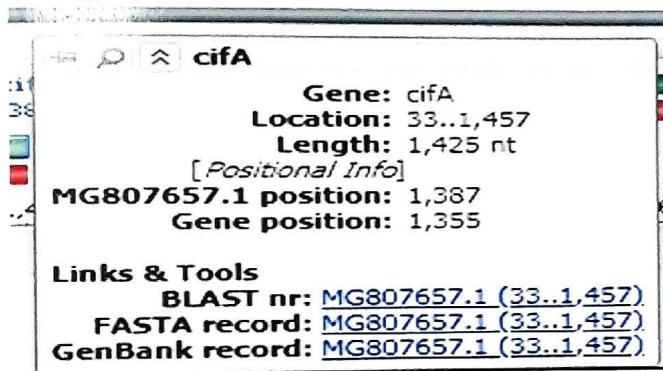
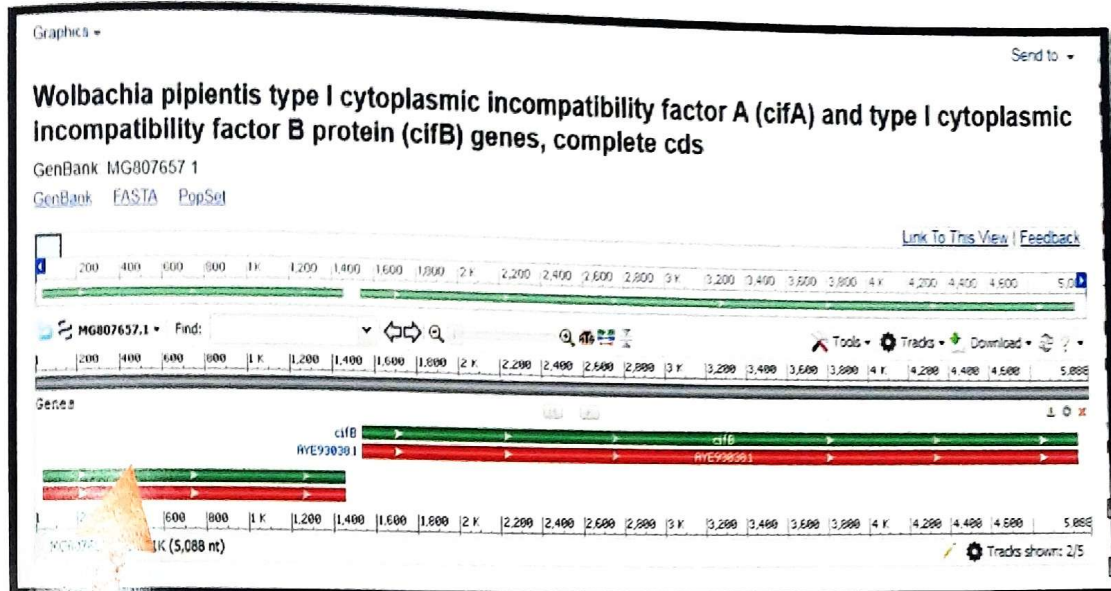
**Fig 17: Blast result of Cif A**

➤ CifB: CifB is around 3501nt in length and it binds at around 1533 and 5033 bp.

Primers used for PCR are as follows:

F:TACGGGAAGTTTCATGCACA

R:TTGCCAGCCATCATTATAA



**Fig 17: Blast result of Cif A**

➤ CifB: CifB is around 3501nt in length and it binds at around 1533 and 5033 bp.

Primers used for PCR are as follows:

F:TACGGGAAGTTTCATGCACA

R:TTGCCAGCCATCATTATAA



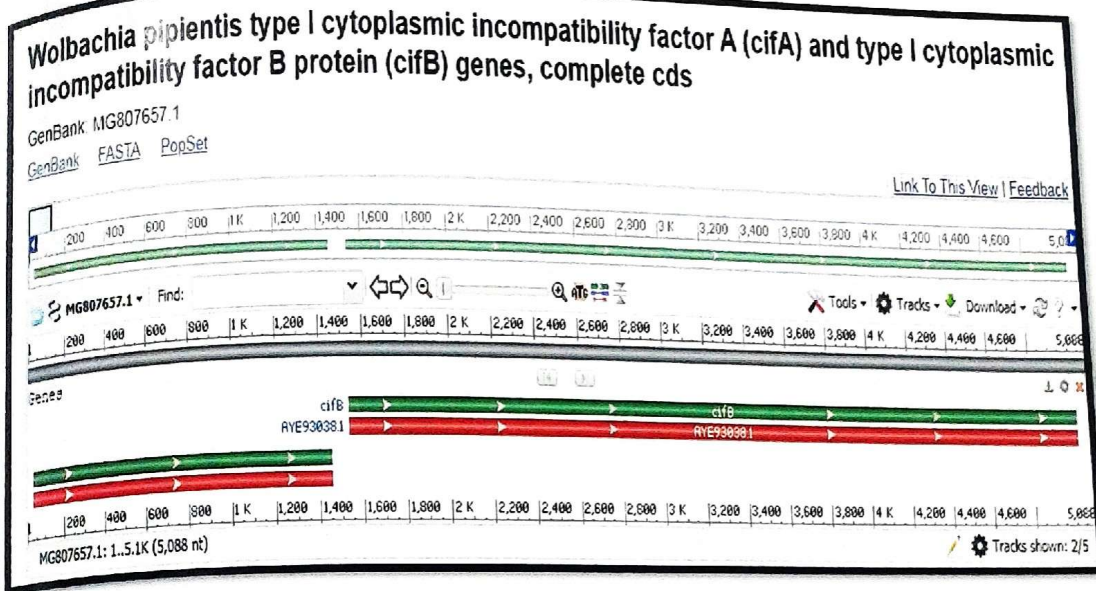


Fig 18: Blast result of CifB

❖ **RESULTS OF GEL ELECTROPHORESIS :**

I. **For 12S rRNA :** This gave +ve results for Isoline 1, 2, 3, 6 and 10 (0.5 tetracycline 1<sup>st</sup> gen) and strong bands of 400 bp can be seen.

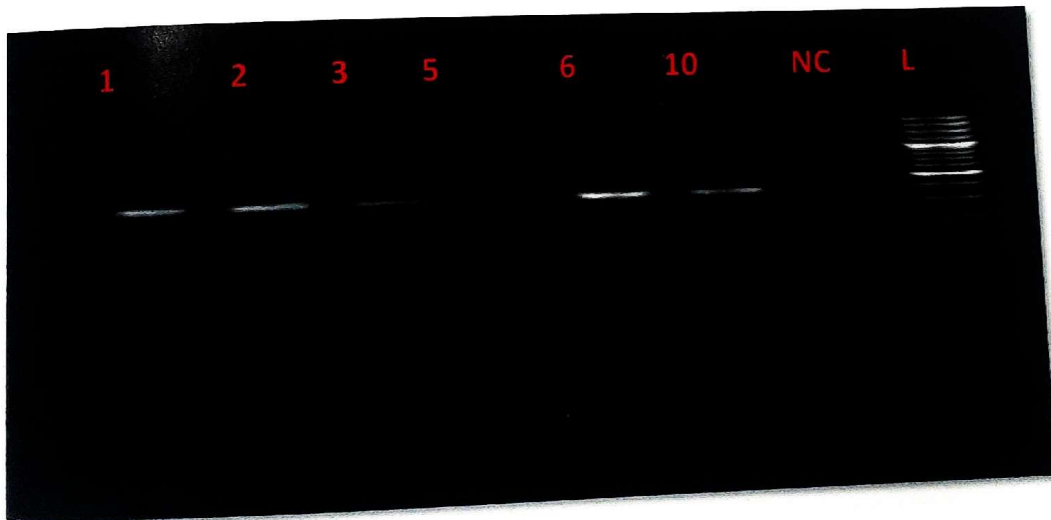


Fig 19: Gel run of 12sRNA PCR products

(Lane 1 - Isoline 1, Lane 2 - Isoline 2, Lane 3 - Isoline 3, Lane 4 - Isoline 5, Lane 6 - Parents 0.25 Tetracycline, Lane 10 - 2<sup>nd</sup> gen 0.25 Tetracycline, Lane 16 - Negative Control NC, Lane L - 100bp Ladder)

- II. **For W<sub>1</sub>sec :** It was showing band for iso 1 i.e +ve whereas for iso 2, 5, 6 it was not showing any band i.e -ve. For parents (untreated) it was showing an intense band, but from 0.25 tetracycline and 0.5 tetracycline treated parents the intensity of band started



ng and it finally disappeared in 0.5 tetracycline 3<sup>rd</sup> generation. The intense band were around 446 bp.

(Lane 1 - Isoline 1, Lane 2 - Isoline 2, Lane 3 - Isoline 3, Lane 4 - Isoline 5, Lane 5 - Isoline 6, Lane 6 - Parents 0.25 Tetracycline, Lane 7 - Parents 0.5 Tetracycline, Lane 8 - 1<sup>st</sup> gen 0.25 Tetracycline, Lane 9 - 1<sup>st</sup> gen 0.5 Tetracycline, Lane 10 - 2<sup>nd</sup> gen 0.25 Tetracycline, Lane 11 - 2<sup>nd</sup> gen 0.5 Tetracycline, Lane 12 - 2<sup>nd</sup> gen 0.5 Tetracycline, Lane 13 - 3<sup>rd</sup> gen 0.25 Tetracycline, Lane 14 - 3<sup>rd</sup> gen 0.5 Tetracycline, Lane 15 - Parents untreated, Lane 16 - Negative Control NC, Lane L - 100bp Ladder)

- III. **For WSP 81:** For this it was giving a +ve result for Isoline 1 but the band was very light, whereas for Iso 2, 5,6 it was -ve. Untreated parents had an intense band of around 600 bp, 0.25 and 0.5 tetracycline treated parents were also giving bands at around 600bp but the band produced by 1<sup>st</sup> 0.25 tetracycline was a lighter band. For 2<sup>nd</sup> and 3<sup>rd</sup> 0.25 and 0.5 tetracycline treated flies it was -ve i.e no band.





**Fig 21: Gel run of WSP81 PCR products**

(Lane 1 - Isoline 1, Lane 2 - Isoline 2, Lane 3 - Isoline 3, Lane 4 - Isoline 5, Lane 5 - Isoline 6, Lane 6 - Parents 0.25 Tetracycline, Lane 7 - Parents 0.5 Tetracycline, Lane 8 - 1<sup>st</sup> gen 0.25 Tetracycline, Lane 9 - 1<sup>st</sup> gen 0.5 Tetracycline, Lane 10 - 2<sup>nd</sup> gen 0.25 Tetracycline, Lane 11 - 2<sup>nd</sup> gen 0.5 Tetracycline, Lane 12 - 2<sup>nd</sup> gen 0.5 Tetracycline, Lane 13 - 3<sup>rd</sup> gen 0.25 Tetracycline, Lane 14 - 3<sup>rd</sup> gen 0.5 Tetracycline, Lane 15 - Parents untreated, Lane 16 - Negative Control NC, Lane L - 100bp Ladder)

- V. **For ftsZ :** For this also there was a strong band for untreated parents and a lighter band for 0.25 and 0.5 tetracycline treated parents. however, there was a lighter band for 0.25 tetracycline treated 1<sup>st</sup> generation as compared to treated parents. It was -ve result for rest of the generations.

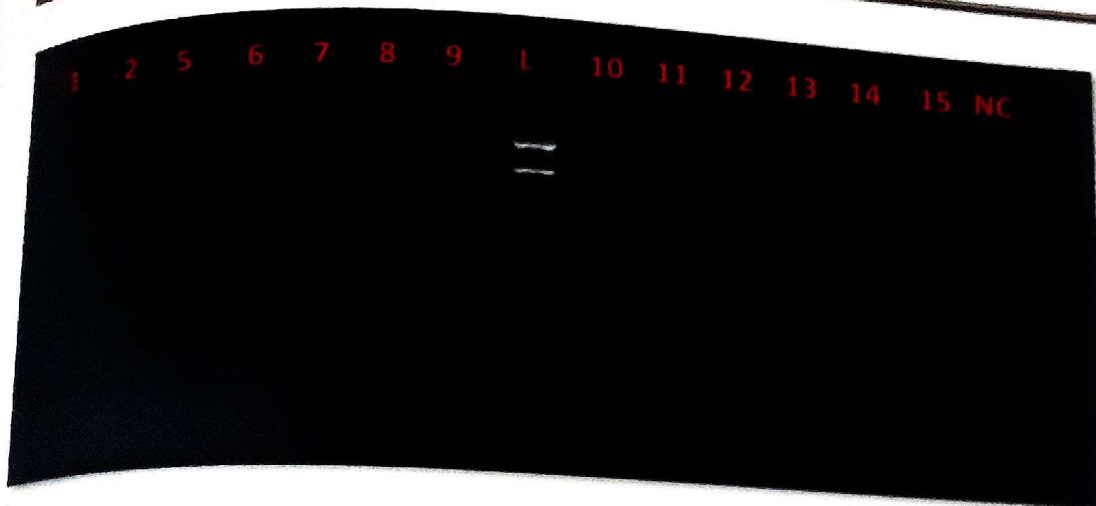


**Fig 22: Gel run of FtsZ PCR products**

(Lane 1 - Isoline 1, Lane 2 - Isoline 2, Lane 3 - Isoline 3, Lane 4 - Isoline 5, Lane 5 - Isoline 6, Lane 6 - Parents 0.25 Tetracycline, Lane 7 - Parents 0.5 Tetracycline, Lane 8 - 1<sup>st</sup> gen 0.25 Tetracycline, Lane 9 - 1<sup>st</sup> gen 0.5 Tetracycline, Lane 10 - 2<sup>nd</sup> gen 0.25 Tetracycline, Lane 11 - 2<sup>nd</sup> gen 0.5 Tetracycline, Lane 12 - 2<sup>nd</sup> gen 0.5 Tetracycline, Lane 13 - 3<sup>rd</sup> gen 0.25 Tetracycline, Lane 14 - 3<sup>rd</sup> gen 0.5 Tetracycline, Lane 15 - Parents untreated, Lane 16 - Negative Control NC, Lane L - 100bp Ladder)

- V. **For Orf7:** Untreated parents for WO phage gave a high intensity strong band whereas there were a little lighter band for tetracycline treated parents and a subsequently lighter band for 1<sup>st</sup> tetracycline treated generation. There was no band for rest of the generations of tetracycline treated flies.





**Fig 23: Gel run of Orf7 PCR products**

(Lane 1 - Isoline 1, Lane 2 - Isoline 2, Lane 3 - Isoline 3, Lane 4 - Isoline 5, Lane 5 - Isoline 6, Lane 6 - Parents 0.25 Tetracycline, Lane 7 - Parents 0.5 Tetracycline, Lane 8 - 1<sup>st</sup> gen 0.25 Tetracycline, Lane 9 - 1<sup>st</sup> gen 0.5 Tetracycline, Lane 10 - 2<sup>nd</sup> gen 0.25 Tetracycline, Lane 11 - 2<sup>nd</sup> gen 0.5 Tetracycline, Lane 12 - 2<sup>nd</sup> gen 0.5 Tetracycline, Lane 13 - 3<sup>rd</sup> gen 0.25 Tetracycline, Lane 14 - 3<sup>rd</sup> gen 0.5 Tetracycline, Lane 15 - Parents untreated, Lane 16 - Negative Control NC, Lane L - 100bp Ladder)

VI. **CifA and CifB:** The primers used for screening CifA amplified a segment of 160 bp whereas for CifB it amplified a segment of 185 bp.



**Fig 24: Gel run of CifA and CifB PCR products**

( Lane for CifA – 160bp, Lane for CifB – 180bp (both containing untreated parents sample), NC – Negative Control, Ladder L- 100bp (right to NC))

❖ **RESULTS OF GEL ELECTROPHORESIS:**

- VII. **For WSPEC 16S rRNA:** It was showing +ve band for isofemale line 1 at 440 BP size whereas for isofemale line 2, 3, 5, 6 there was no band. For parents (untreated) it was showing an intense band, bands were also showing good intensity from 0.25 mg/ml tetracycline and 0.5 tetracycline treated parents the intensity of band started decreasing and it finally disappeared in 0.5 tetracycline 3<sup>rd</sup> generation. The intense band were around 440 bp.
- VIII. **For WSP 81:** For this it was giving a +ve result for Isoline 1 but the band was very light, whereas for Iso 2, 5,6 it was –ve. Untreated parents had an intense band of around 600 bp, 0.25mg/ml and 0.5 mg/ml tetracycline treated parents were also giving bands at around 600bp but the band produced by 1<sup>st</sup> generation 0.25 mg/ml tetracycline was a lighter band and what about 0.5 ml/ml. for 2<sup>nd</sup> and 3<sup>rd</sup> 0.25and 0.5 tetracycline treated flies it was –ve i.e no band.
- IX. **For ftsZ :** For this also there was a strong band for untreated parents and a lighter band for 0.25 and 0.5 tetracycline treated parents. however, there was a lighter band for 0.25 treated 1<sup>st</sup> generation as compared to treated parents. It was –ve result for rest of the generations.
- X. **For Orf7:** Untreated parents for WO phage gave a high intensity strong band whereas there were a little lighter band for tetracycline treated parents and a subsequently lighter band for 1<sup>st</sup> tetracycline treated generation. There was no band for rest of the generations of tetracycline treated flies.
- XI. **For 12SrRNA:** As it was an insect specific gene, it was positive for all isolines and given sample except Isoline5 which may be an error.



## DISCUSSION

- Through the experimental analysis, it can be interpreted that as the host i.e *Drosophila melanogaster* is treated with antibiotic Tetracycline, the Wolbachia infection gets cleared up at third generation.
- From the results of PCR and Gel electrophoresis, it was interpreted that isolate 1 has Wolbachia infection as it was clearly indicated by the primers of Wspec and WSP81.
- Out of 6 successfully generated isolines only one had Wolbachia infection i.e 16.6% in the generated isolate population in our work, In Bloomington *Drosophila* Stock Centre 30% of laboratory stocks were infected with Wolbachia.
- This sort of experiment was previously done using tetracycline and rifampicin to check the clearance and to establish a comparative data on clearance of Wolbachia of the host (Miller, Wolfgang J et al., 2010).
- Phage is an integral part of Wolbachia genome as it is absent in Wolbachia uninfected host, present in *D. ananassae* and *D. melanogaster*. (Kopal Singhal and Sujata Mohanty\*, 2019).
- In Kopal Singhal and Sujata Mohanty\*, 2019, it was stated that there was a complete sequence of CifA of 474 aa in all Wolbachia genome whereas Cifb having 1173 aa was limited in wMel. In wRi CifB segment had a mutation in 637nt (T\*C) position resulting in a change of codon to stop codon TGA which resulted in two sequence of CifB having 200 and 900 aa. This can rescue the bidirectional CI induced by wMel.
- In this work, tetracycline was used in two different concentrations i.e 0.25 and 0.5 mg/ml over parents, 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> generations to study the effect of antibiotic on Wolbachia in its associated phage in *Drosophila* host.
- As the tetracycline treatment starts, the survival environment and conditions of bacteria starts changing with each generation and its machinery starts deteriorating.

- Wolbachia somehow manages to keep itself alive by 2<sup>nd</sup> generation but gets cleared up by low concentration of tetracycline 0.25mg/ml in 3<sup>rd</sup> generation. As the survival of Wolbachia becomes difficult in presence of antibiotics and its physiological mechanism might be a start collapsing it becomes vulnerable, it is no longer to be able to hosts phage inside it making phage unable to replicate and sustain.
- After this hatch rates can be studied from the offsprings of Wolbachia cleared males and Wolbachia carrying female and/or Wolbachia cleared females and Wolbachia carrying males to give evidence of maternal transmission of bacteria.
- Attempt to clear Wolbachia infection can also be further proceeded by analyzing the effect of different antibiotics like ampicillin, rifamycin, clindamycin on different concentrations for more specific quantitative and comparative data.
- After the Wolbachia and phage gets cleared up in the flies, partially Wolbachia cleared flies can be reared in the absence of antibiotic to check the possibility of the reappearance of Wolbachia. It would be further interesting to clear phage infection from Wolbachia.
- As Wolbachia has phage and phage has the ability of incorporating its genome in the host, further genomic analysis can be done to explore the possibility of tripartite association of Phage-Host-Wolbachia.
- As the main idea behind Wolbachia technology (transferring Wolbachia from one host and transfer in mosquito) is population suppression or population replacement of vectors of medical importance, it can be significantly applied in all mosquito borne diseases like zika, malaria etc. for field analysis.



### CONCLUSION

- From the results and discussions, it is concluded that as the fruit fly i.e *Drosophila melanogaster* is kept on tetracycline diet for few generations, its Wolbachia infection gets cleared subsequently thereby clearing the phage infection alongwith it.
- Amongst the markers used i.e WSpec, WSP 81, ftzZ and Orf7 the bands produced by WSpec and WSP81 were intense as compared to ftsZ indicating that WSpec is the best marker to check the clearance of Wolbachia, WSP81 being the second in line.
- Therefore, as the Wolbachia infection gets cleared under the influence of tetracycline phage also gets cleared up, which can be best detected by Wspec and Orf7.

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**(AUTONOMOUS), JABALPUR(M.P.)**

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College with Potential for Excellence (CPE) by UGC

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# **SAMPLE PROJECT REPORTS**

## **2020-21**

## **FACULTY OF ARTS**



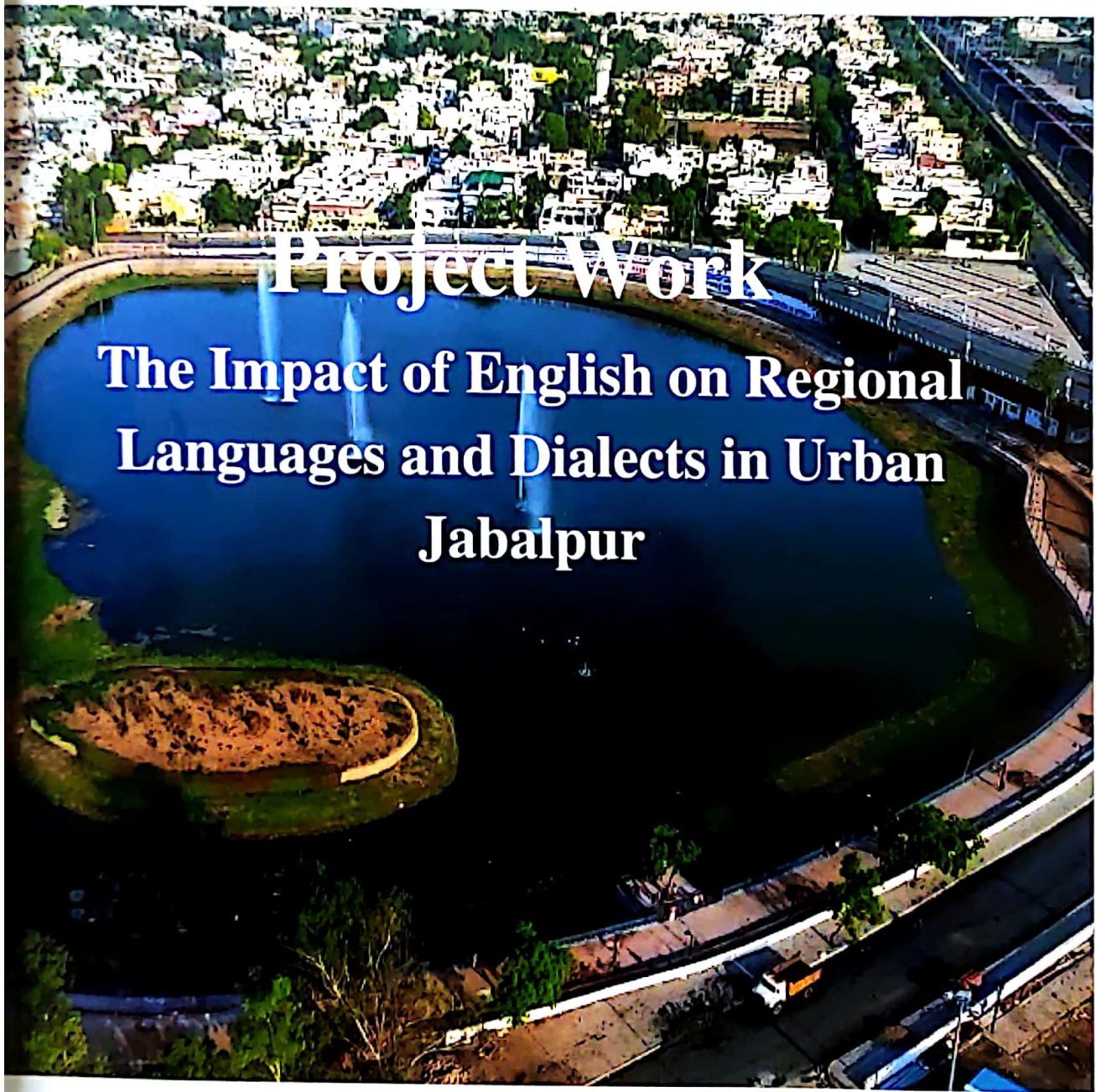
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## **Project Work**

### **The Impact of English on Regional Languages and Dialects in Urban Jabalpur**

Submitted by  
**Shikha Dubey**  
B.A. III Sem  
Roll no - 2192351

Under the guidance of:  
**Dr. Mrs. Niharika Singh**  
Assistant Professor  
Department of English



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# Declaration from

## the Student

I Siddhat Dubey, hereby declare that the submitted project titled 'The Impact of English on Regional Languages and Dialects of Urban Jabalpur' has been made originally by me, and the following survey is also conducted by me. The information given in this project report is a result of a long research using different websites as a reference only, they are not copied from any website, book, legal/illegal source, video or documentary.

Siddhat P. Dubey

Signature of the Supervisor.

Sneha

Signature



# Acknowledgements

I will like to thank my parents for supporting as well as for financing my survey. I give my acknowledgement to the reverend institute of St. Aloysius College, Jabalpur for giving me the opportunity to conduct this survey. My special thanks to Dr. Mrs. Neelanjana Pathak [Head of the Department], this survey would never be possible without her guidance. Then I acknowledge the supervisor of this project Dr. Mrs. Niharika Singh for her guidance and support at every step. Finally, I will like to thank the lovely and kind hearted citizens of Jabalpur districts for actively taking part in this general survey. I thank all those people who were directly or indirectly involve in the entire process.

GRATITUDE to ALL. 😊

Siddhat Prasad Dubey



## Characteristics of a Project

Every project involves some activity. But every activity cannot be called a project. A project has some characteristics:

1] Definite Time Duration ⇒ Every project has to begin at some time and has to meet a deadline.

In other words, every project has a definite time. An activity cannot be called a project if people are working on it for a long time.

2] Uniqueness ⇒ Projects are not conducted to achieve regular goals. They are conducted to get a result which is uncommon in daily life.

3] Resource Factor ⇒ Project could be big or small, low-budget or mega budget. But every project involves the use of resources, such as: Capital, Knowledge, human resources.

4] Risk Factor ⇒ One of the most important characteristics of a project that is never free from the risk of failure. People involve in a project prepare themselves mentally that they may not get success.



## Types of a Project

Human life is a collection of goals. Personally and Professionally we make goals in our lives and put our efforts to achieve them. Projects are of different kinds :

- 1) Personal or Professional Projects  $\Rightarrow$  Marriage, building a house and planning a family will come under personal projects. Whereas, developing a design, or achieving a significant manufacturing status will be professional Projects.
- 2) Personal and Social Projects  $\Rightarrow$  Taking a loan from a bank to complete the education will come under personal project. But the project undertaken by the government for the sake of the people will come under social project. Social projects are large in magnitude.
- 3) Individual and Group Projects  $\Rightarrow$  A project can be taken by a single person or a large group of people ; it entirely depends upon the magnitude of the project and its scope. For example : preparing for exams is an individual project but working to increase factory manufacturing capacity is a group project.



## Importance of a Project

Projects are important because they are a group of actions performed to achieve goals, often for a collective good.

They achieve goals ⇒ We often make goals which cannot be achieved by the actions of daily life. They require special attention, more time and large efforts.

Team and Time Management ⇒ Conducting projects are important in a company, because it brings chances for the employees to show their talent, for the leaders to learn how to manage time and a team.

Personal and Social Good ⇒ Projects are important both from personal as well from social aspects.

Personally, they are helpful for achieving goals and to fulfill the needs. From the social aspect, projects are important because they improve the quality of living in a society. Successful projects inspire people to adapt the tendency to take risk and bring better results in life.



## Introduction

In the year 2011, David Bradley had conducted a worldwide survey titled 'Survey of Language Endangerment' on the behalf of the University of London. The report was published in 2014, and the facts were horrifying. On the basis of the available data, it has been estimated that 90% languages of the world will get extinct in the beginning of 22<sup>nd</sup> century. This will happen due to the growing domination of global languages. People are getting connected with each other. And while doing this, they are constantly adapting the global languages such as English, Mandarin, French, Spanish, and neglecting their local languages with some speed. Countries like India, Nigeria, Papua New Guinea, Brazil etc. will be mostly affected.

India, where we live, is one of the most diverse countries as far as the diversity in languages is concerned. But these languages and dialects are facing a grim reality of extinction. The reason is that Indian social mind has been dominated and fascinated by the charm and opportunities of English language. Anyway, English is being seen as a danger for the survival of local languages and dialects. Hence, I have chosen this topic for my general survey for the project this year.



# Aims & Objectives

My Aim to conduct this survey is to find out how much English language has affected the regional languages and dialects of the urban areas of Jabalpur district.

My objectives  $\rightarrow$  In order to find the root of the problem, I am looking forward to apply these methods.  
These methods are:

1] Research Papers  $\rightarrow$  I will make a hypothesis, and on the basis of that, I will go through various research papers by writers.

2] On-field Survey  $\rightarrow$  I will conduct a field survey among the citizen of age group 18 to 25, to find out the solution of the problem after analysing the public opinion.

3] Other Methods  $\rightarrow$  I will also take the interview of renowned scholars to find the solution and to deepen my understanding about the topic.



# Section - II

## Methodology

### Language : Definitions and Characteristics

Language is the most important tool humans have ever created. To understand what a language is; let us look at some definitions:

According to Noam Chomsky, "A language is a set [finite or infinite] of sentences, each finite in length and constructed out of a finite set of elements"

According to Edward Sapir, "A purely human and non-instinctive method of communicating ideas, emotions and desires by means of voluntarily produced symbols"

Characteristics	Applications
1 Organised system of signs and symbols	Primary source of communication
2 Arbitrary and Dynamic	Expands the culture.



## Dialects

Dialect is a branch of a language developed over a course of time because of social isolation, dialects are different from their parent language both in written and spoken form. There are many factors responsible for the formation of a dialect. Some reasons are social isolation, economic reasons and sometimes political reasons.

### Characteristics of a Dialect

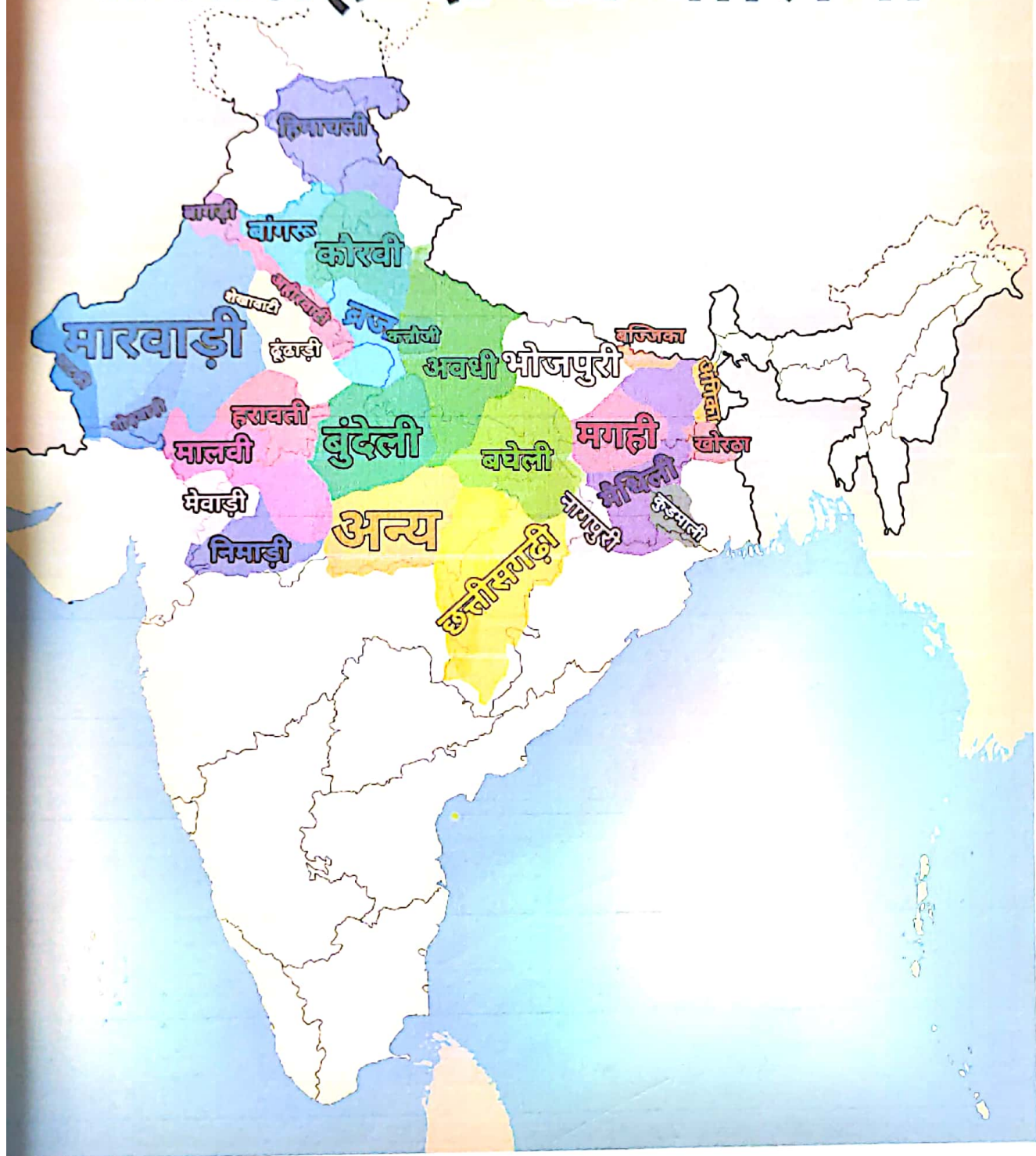
- 1] Dialects are associated with a small area or a group of people. They use the same grammatical structure as their parent language.
- 2] Dialects represent the unique culture of a community. Dialects can also assimilate some new words or phrases which do not exist in the parent language.

### Main Regional Dialects of Jabalpur District

Jabalpur is one of the major cities of Madhya Pradesh. It is one of the major centres cultural and economic activities. The main language of Jabalpur is Hindi. Among many dialects of Hindi, Bundeli and Bagheli are the prominent dialects.



# भारत: हिन्दी की बोलियां



DIFFERENT DIALECT OF Hindi in India.



## BUNDELI DIALECT

Bundeli or Bundelkhandi is one of the dialects of Hindi widely spoken in the Bundelkhand region of central India. It belongs to the Indo-Aryan language group and part of the western-Hindi branch of India.

### Types of Bundeli Dialects

Linguist Abraham Geerson has divided Bundeli into four groups.

- (i) Standard Bundeli
- (ii) Northeast Bundeli [Closely related to Bagheli].
- (iii) Northwest-Bundeli [Similar to Braj Bhasha]
- (iv) Southern Bundeli.

## BAGHELI DIALECT

Bagheli is also one of the dialects of Hindi belonging to the Eastern Hindi-subgroup. Avadhi is closely related to this dialect.

Like Bundeli, Bagheli also has three varieties.

- (i) Pure Bagheli
- (ii) West-Mixed Bagheli
- (iii) Southern-Broken Bagheli.



English had come to India like a guest, and even after spending 250 years in this country, it is still considered as a foreigner. But this guest seems to exterminate the native members of the family. Because of the growing trend of adopting English as a language of communication, native languages in India are facing a grim reality. The population of people speaking these languages has been declining. According to the census of 1951:

The number of people using English as a language was only 0.9 million. According to the new reports, the number are more than 450 million.

When we talk about the region of Jabalpur, it is a Hindi speaking land where 80% of people either speak standard Hindi or they use Bagheli and Bundeli dialects for communication.

According to the census report 2001, the population of Bundeli speaking people was 3,007,000, and of Bagheli speaking people was 2,865,000. But according to the census report of 2011, there is a steep decline in the population of native speakers in both the languages. According to the report, the population of Bagheli speaking people has fall into 2,426,000, and of Bundeli speaking people has fall into 1,25,264. This is the worst case of language decline recorded in the ~~are~~ state of Madhya Pradesh.



# Language & Globalisation

Globalisation, as most of the people pretend, is not a new concept.

Ever since humans have explored the planet and established civilisations at different parts of the globe, people living in these civilisations have been connecting with each other for infinite reasons.

Then why globalisation has been considered as the gift of the 20<sup>th</sup> century?

Because in 20<sup>th</sup> century, human connectivity touched new dimensions, and when 21<sup>st</sup> century arrived, humans got so connected to each other in every aspect like never before.

Let us understand what globalisation actually means. According to Faber and Faber magazine:

"Globalisation is a term used to describe the inter-connection between people of different culture and nationality to share the resources, knowledge and skills to make life better"



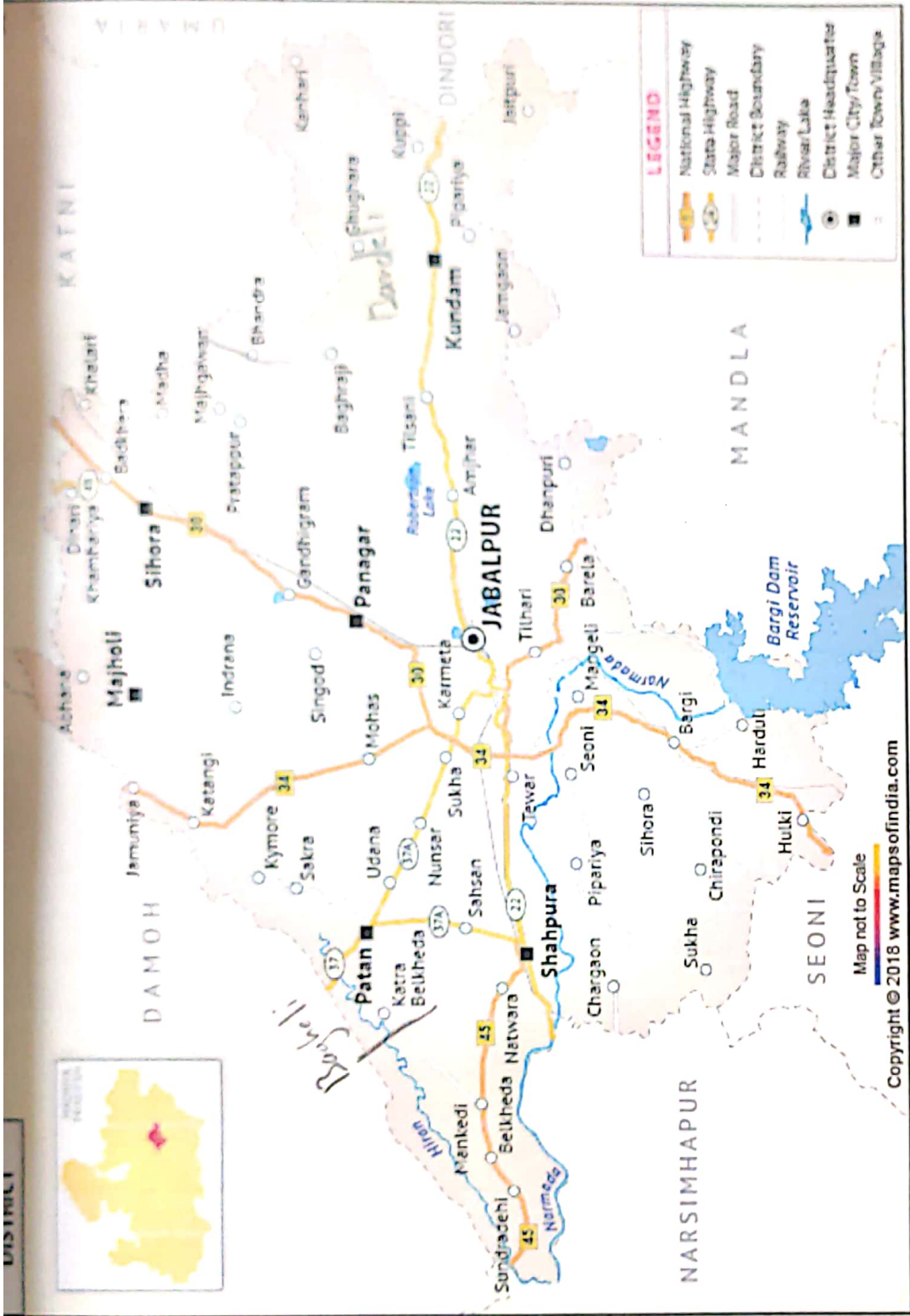
Hence, globalisation diminishes the cultural barriers and allows people to come closer and grow mutual understanding and make a large network of different cultures, ethnicities, language and ideas which leads to the formation of what we call 'The World Brain'

Internet has brought this increase in the process of globalisation in 21<sup>st</sup> century. This internet technology and other factors gave rise to the concept of a 'Global language'. A global language is a language which acts as a lingua franca between people who belong to different cultures. These languages work as a bridge, or a common platform where two or more people can share their thoughts.

Because of globalisation, languages like Mandarin, French, Italian, Hindi, Arabic etc. got the chance to become global languages. But the language which got the biggest piece of cake was English. English is the third most natively spoken language in the world and the most widely spoken second language. There are so many reasons how English got the upper hand over all the languages in the world. But we will talk about the relationship between English and the other Indian languages.



glory of America. In order to make themselves suitable for the job, they start to follow American culture blindly. In this process, they leave their culture as well as their native language.



District of Jabalpur.



### 3 Social Attitude

This is a pathetic mentality of the people living in this city. If they see anyone talking in his/her native language, they develop a sense of disgust for that person. They start ignoring that person from their respective circle. Because English is not just a language in India; it is considered as a social status symbol. This attitude of the people is responsible for the decline of the native languages.

### 4 Misinterpretation of Culture

Because of their business propaganda, some people spend lots of money to promote these native language and culture as savage, full of superstitions and out dated. Due to this misunderstanding, people are forced to leave their culture and native language. They also do not get much respect when they speak their native tongue in front of someone. All these reasons lead to the rapid population decline of the native language speakers.



3 Internet Revolution → Almost all the biggest technology companies and social media platforms have their headquarters in countries like U.S.A and Britain. In fact, the default language of our laptops and computers is English. This is the reason; people want to adapt this language because it has a vast number of employment opportunities more than any language of the world.

4) The Global Village Theory → In 1960s, Canadian thinker Marshall McLuhan coined the term 'Global Village' for the first time.

According to him, global village means the world will become unified, and people will get connected to each other so much that they will be able to exchange their ideas and cultures with each other. Due to the dominance of English, people around the world want to become a part of the first world, and they are eager to do anything for this. Even if it means leaving native language and culture behind.

Besides these global causes, there are some local reasons too:



## LOCAL CAUSES

1] Better Opportunities → Jabalpur is a centre of many cultural and economic activities. People from neighbouring districts like Narsinghpur, Mandla, Seoni, Balaghat etc, come for better education and employment opportunities, and engage in various activities. To get better opportunities, the people [especially the youth] try to learn English language. They join coaching classes and educational institutions to make themselves eligible for the upcoming chances. In this process, they tend to avoid speaking Bagheli and Bandeli dialect.

2] Cultural Inferiority → When the people belong to the rural area see their urban companions talking to each other in English, they start to develop an inferiority complex inside them. Same thing happens to those urban people who see the foreigners talking in English on the Internet. Due to this, people start neglecting their native dialects and move towards English.





# THE Interview



To know about this topic and the causes lead to it, I took the interview of Dr. Arun Shukla. Dr. Shukla is a renowned scholar of Hindi language, and he has spent many years in the research on the native dialects of Madhya Pradesh. He has been with the state government towards the preservation and promotion of Bundeli dialect in Mahakushal region. Currently, he is the Head of Department of the Hindi faculty in Mahakushal Arts and Commerce College Jabalpur.



Topic ..... 21 .....

Date : ... 24-01-21 ...

Respected Sir, do I have your permission to start the interview?

Yes. Off. Course.

Sir, which dialects of Hindi are the prominent ones in Jabalpur?

Jabalpur is a multicultural district. This city has a large population of Hindi-speaking people. The dialects of Hindi which are used in this city belongs to ~~the~~ both Eastern and Western Hindi sub-groups. Mainly Bundeli and Bagheli are the prominent ones.

What impact English language has ~~cause~~ had on these dialects over the years?

The impact is mostly negative; especially in the urban area. I see the young college students are showing off their English speaking skills, just to pretend they belong to the modern society. And when it comes to speak their regional dialects, they often hesitate.

If the youngsters are preferring English over Hindi for communication, what are the major causes do you see behind it?

A The biggest cause behind are the employment opportunities.



These people are very talented, but still they do not get much attention unless they have a good command over English language. The second reason is social. English has become a status symbol in India. People do not see it just a language, they often relate it to their pride. This pathetic mentality works as a social pressure for the students. As a result, they develop this thought that if they would continue speaking their own language, they would not get the same respect which English speakers get.

5 Do you think this trend of giving preference to English over regional languages will eventually lead to the extinction of these regional languages?

Ans Well I do not think. Because there are still millions of people living in Maharashtra region who still use these dialects as their primary source of language. I am an optimistic person. I hope these languages will not get extinct in the near future. It is true that they have been severely affected by English language, but there is still hope.

6 What is the importance of these regional languages?

Ans Their importance is limitless.



Because they act like a mirror door from which, a person can know about the rural culture. If you travel to the village, you will find people using their dialects as their only means of communication.

Their entire life cycle revolves around them. The festivals they celebrate, the prayers they offer to their gods, the 'Sanskars' they perform: like marriage, naming ceremony or even funeral rituals, all these traditions are followed by people. From the economic perspective, these people use their languages to sell their agricultural goods, and trade with urban people in their own languages.

What steps should be taken by the government to preserve these dialects?

Let me tell you, the government has already taken some significant steps. The rule of giving education in regional languages has been put in the 'New Education Policy' by the government. Our hon'ble chief minister has started state wise grand festivals and fairs to promote these local languages. So, the government has done what it could have done. Now it's time for the people to come forward and save these languages.

Tell us something about the important steps taken by Mahakanshal College to promote the regional languages.

Every year, our college conducts 'Samohic Allah Gaan': a group song



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function in the month of February. In this function, the students of our college perform solo or group songs related to the folk culture of Madhya Pradesh. We also celebrate the festival of Holi, where the students sing 'Faag'; the traditional songs of our culture. Besides this, we celebrate the festival of 'Basant Panchami' where our college conducts regional song and dance competitions.

As a professor of Hindi, what is your message to the youth of this city about the importance of regional dialects?

My message is simple. A country cannot be developed while dis-respecting, neglecting and forgetting <sup>its</sup> their own language & its own culture. The knowledge of Hindi is as important as the knowledge of English.





## Section III

# Hypothesis

Before conducting any survey, you need to have a base point.  
Hypothesis acts as those base point.

Hypothesis is a proposed explanation or assumption of a going phenomenon which needs to be proved using different methods.

Hypothesis is important, because it provides a base for further investigation. A researcher makes a hypothesis about any object or event, and directs the research either to find the actual truth. If the actual fact about the topic is found out by the researcher matches with a proposed hypothesis, then that Hypothesis will be successful, or vice versa.

My hypothesis about this topic is:

"English has had a severe negative impact on regional languages and dialects in the urban areas of Jabalpur"



# THE Questionnaire.

## General Information

Topic of the Project → "Impact of English on Regional Language and Dialects in Urban Jabalpur"

Structure of the Questionnaire → 13 questions with multiple choices.

Mode of the survey → Off-line mode → General survey?  
On-line mode → Google forms

No. of Samples taken → 82.

By off line survey → 20

By online survey = 62

Age Groups of the people who took part of the  
in the survey → 18 to 30 years.

Areas chosen for the general survey → Civic Centre, JBP  
Bhanuvar dal Park, JBP

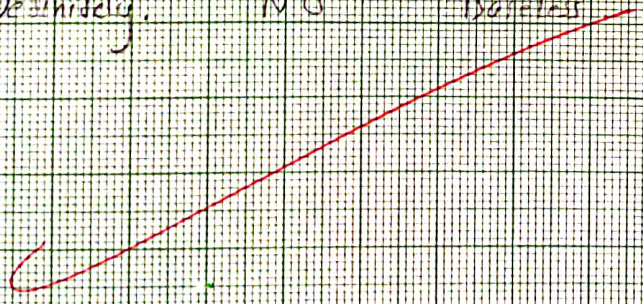
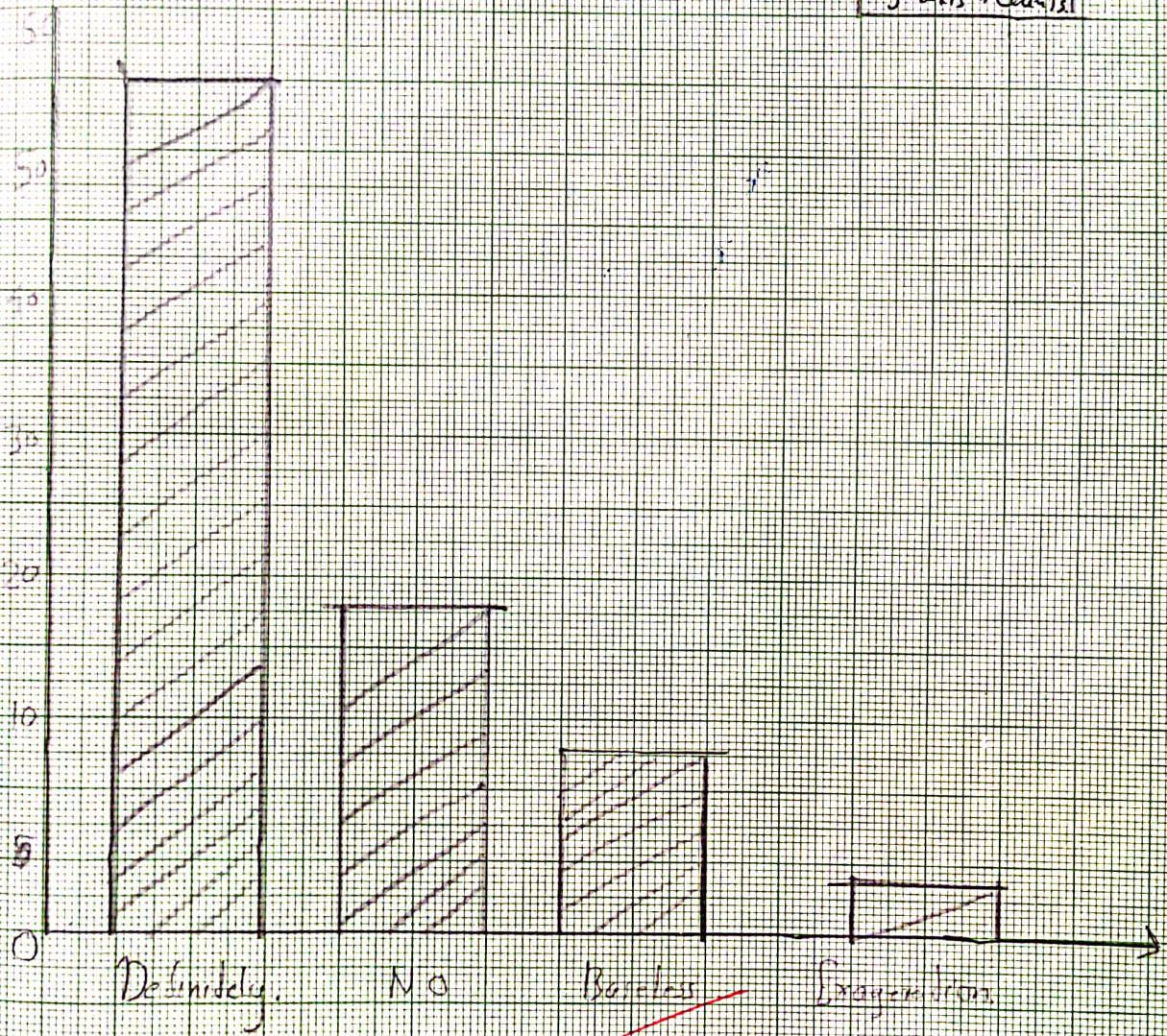
Duration of the survey → From 11<sup>th</sup> Jan to 20<sup>th</sup> Jan 2021



# Graphical Representation of some special Questions

## Graphical Presentation of Question No 10.

X-axis - Option  
Y-axis - Count





## Questionnaire for the survey

Sample Copy 1

Q1) How many languages do you speak?

- A) One     B) Two    C) Three    D) More than Three

Q2) How much percentage of knowledge of English is required to make a successful career?

- A) 100per     B) 75per    C) 50per    D) 25per

Q3) From which area of Jabalpur do you belong?

- A) From urban area    B) From rural area  
C) From another city    D) From another state

Q4) Besides standard Hindi, how many dialects of Hindi can you speak?

- A) Bagheli dialect     B) Bundeli dialect  
C) Begheli, Bundeli and more    D) None of these

Q5) The proficiency in English is helpful in,

- A) In professional life    B) In personal life  
 C) Both a and b    D) Neither a and b

Q6) What makes people coming from rural areas suffer in English language in city??

- A) Lack of English knowledge    B) Fear of making mistakes  
 C) Not having confidence    D) All of the above

Q7) Why people avoid use of regional language to show them modern ?

- A) Societal Pressure    B) Hesitation  
C) Will not get respect     D) All of the above



Q8) Where do you usually prefer to speak your regional language?

A) At workplace B) With family C) Nowhere **D) Everywhere.**

9) The youth prefer western media instead of regional media for entertainment.

**A) Yes** B) No C) Both D) Neither

Q10) Regional languages are facing a threat of extinction due to the dominance of English?

**A) Definitely** B) A big No  
C) Baseless argument D) Over exaggeration

Q11) Do you think regional languages deserve to be saved from extinction?

**A) Yes** B) No  
C) Partially D) No idea

Q12) What steps are required to enhance the reach of regional languages?

A) They should be used at working places  
B) The government should make rules to promote them  
**C) Large amount of literature and cinema should be produced**  
D) All of the above

Q13) What is the importance of regional languages?

A) Mirror of culture B) Personal identity  
C) Better way of communication **D) All of the above**

Q8) Where do you usually prefer to speak your regional language?

- A) At workplace B) With family C) Nowhere  D) Everywhere.

9) The youth prefer western media instead of regional media for entertainment.

- A) Yes B) No C) Both D) Neither

Q10) Regional languages are facing a threat of extinction due to the dominance of English?

- A) Definitely B) A big No  
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Q12) What steps are required to enhance the reach of regional languages?

- A) They should be used at working places  
B) The government should make rules to promote them  
C) Large amount of literature and cinema should be produced  
 D) All of the above

Q13) What is the importance of regional languages?

- A) Mirror of culture  B) Personal identity  
C) Better way of communication D) All of the above



## Questionnaire for the survey *Sample copy, 2*

Q1) How many languages do you speak?

- A) One     B) Two    C) Three    D) More than Three

Q2) How much percentage of knowledge of English is required to make a successful career?

- A) 100per     B) 75per    C) 50per    D) 25per

Q3) From which area of Jabalpur do you belong?

- A) From urban area    B) From rural area  
C) From another city    D) From another state

4) Besides standard Hindi, how many dialects of Hindi can you speak?

- A) Bagheli dialect    B) Bundeli dialect  
C) Begheli, Bundeli and more     D) None of these

Q5) The proficiency in English is helpful in,

- A) In professional life    B) In personal life  
 C) Both a and b    D) Neither a and b

Q6) What makes people coming from rural areas suffer in English language in city??

- A) Lack of English knowledge     B) Fear of making mistakes  
C) Not having confidence    D) All of the above

Q7) Why people avoid use of regional language to show them modern ?

- A) Societal Pressure     B) Hesitation  
C) Will not get respect    D) All of the above

## Questionnaire for the survey *Sample copy:3*

Q1) How many languages do you speak?

- A) One      B) Two       C) Three      D) More than Three

Q2) How much percentage of knowledge of English is required to make a successful career?

- A) 100per       B) 75per      C) 50per      D) 25per

Q3) From which area of Jabalpur do you belong?

- A) From urban area       B) From rural area  
C) From another city      D) From another state

4) Besides standard Hindi, how many dialects of Hindi can you speak?

- A) Bagheli dialect      B) Bundeli dialect  
C) Begheli, Bundeli and more      D) None of these

Q5) The proficiency in English is helpful in,

- A) In professional life      B) In personal life  
 C) Both a and b      D) Neither a and b

Q6) What makes people coming from rural areas suffer in English language in city??

- A) Lack of English knowledge      B) Fear of making mistakes  
 C) Not having confidence      D) All of the above

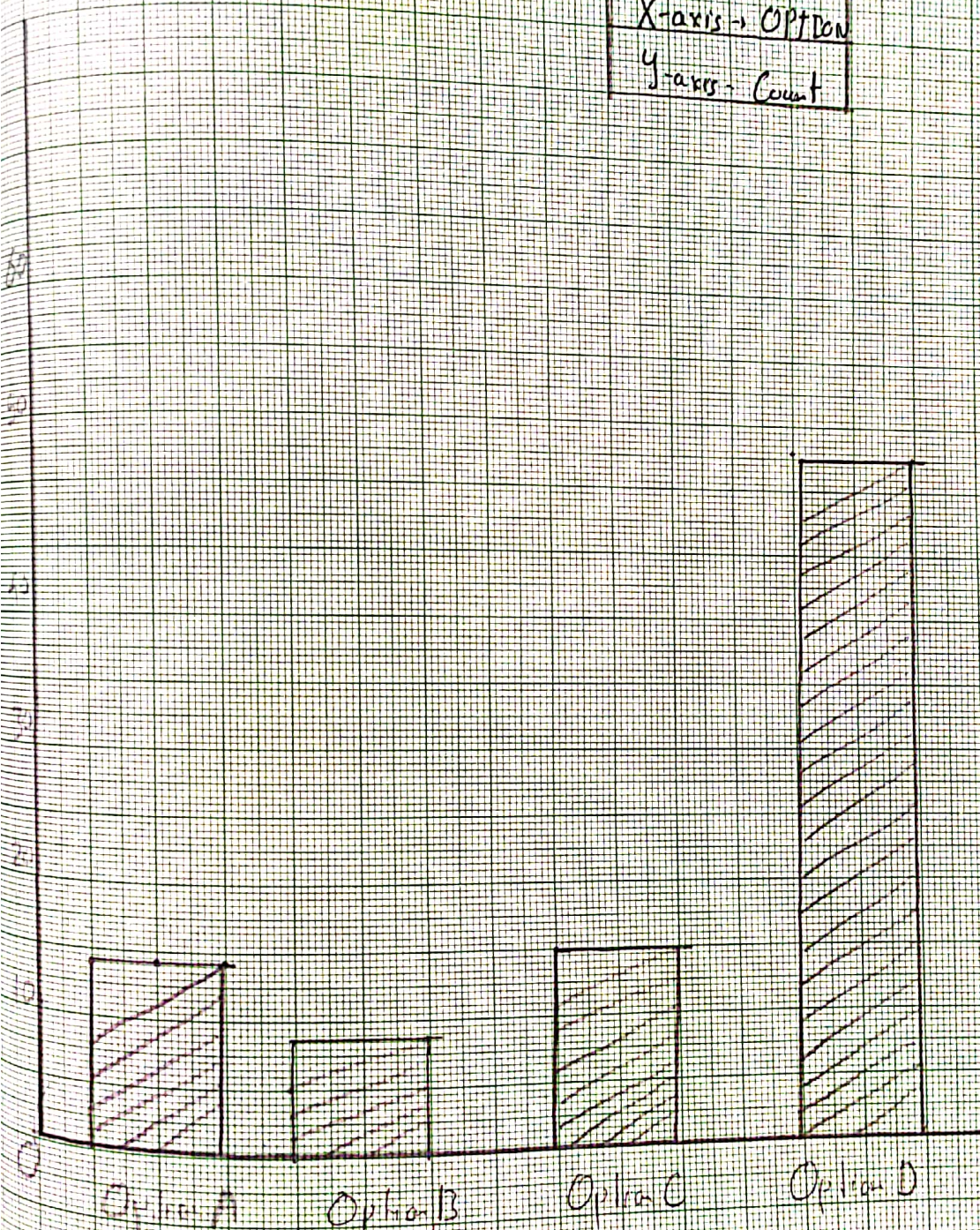
Q7) Why people avoid use of regional language to show them modern ?

- A) Societal Pressure      B) Hesitation  
C) Will not get respect       D) All of the above



Graphical Representation of Question No 12

X-axis → Option  
Y-axis → Count



Teacher's Signature .....



Topic .....

# Observations Of the Survey

1 How many languages do you speak?

Option Responses	Option A	Option B	Option C	Option D
	14	52	13	3

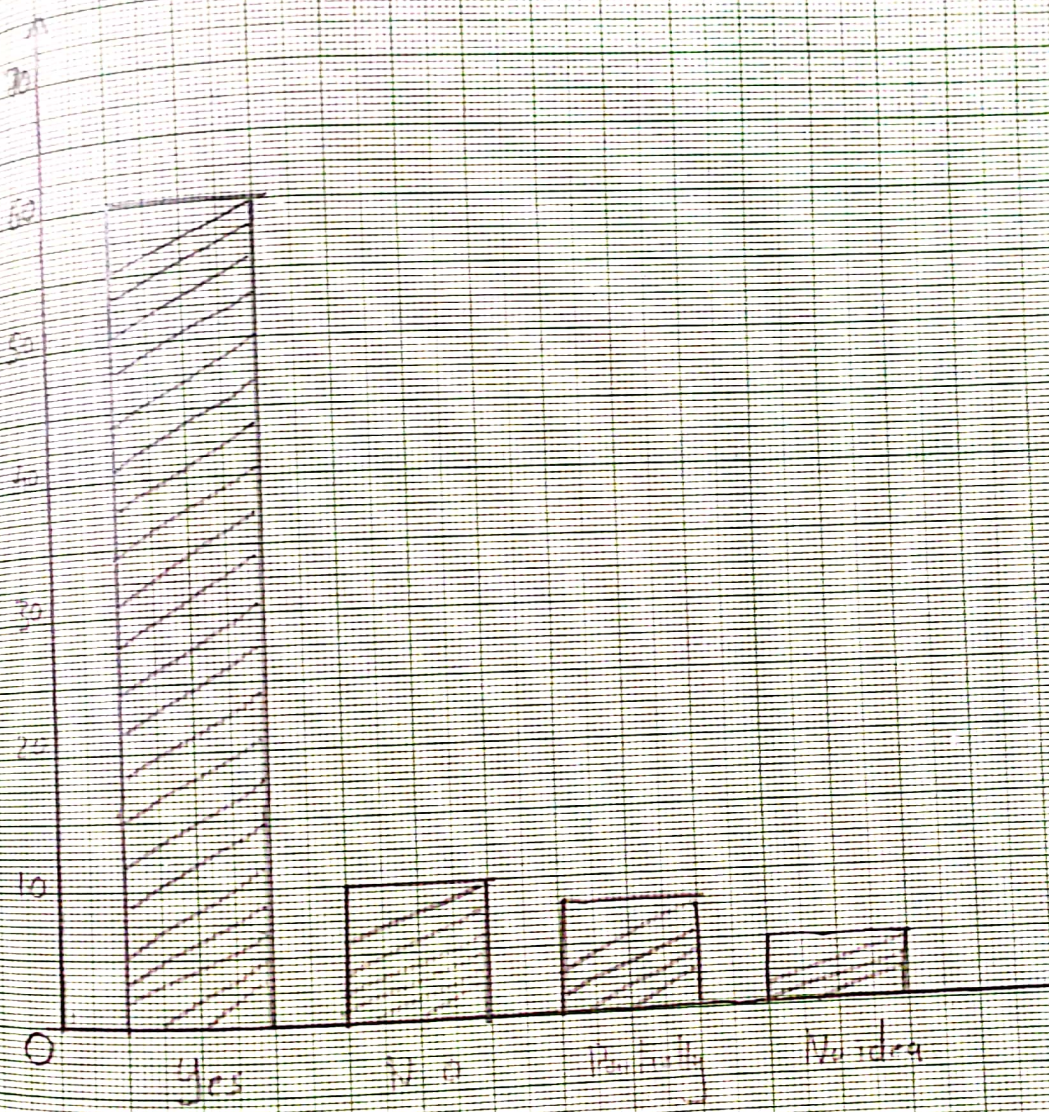
2 How much percentage of Knowledge of English is required to make a successful career?

Option Responses	Option A	Option B	Option C	Option D
	20	50	10	2



# Graphical Representation of special Question No. 11

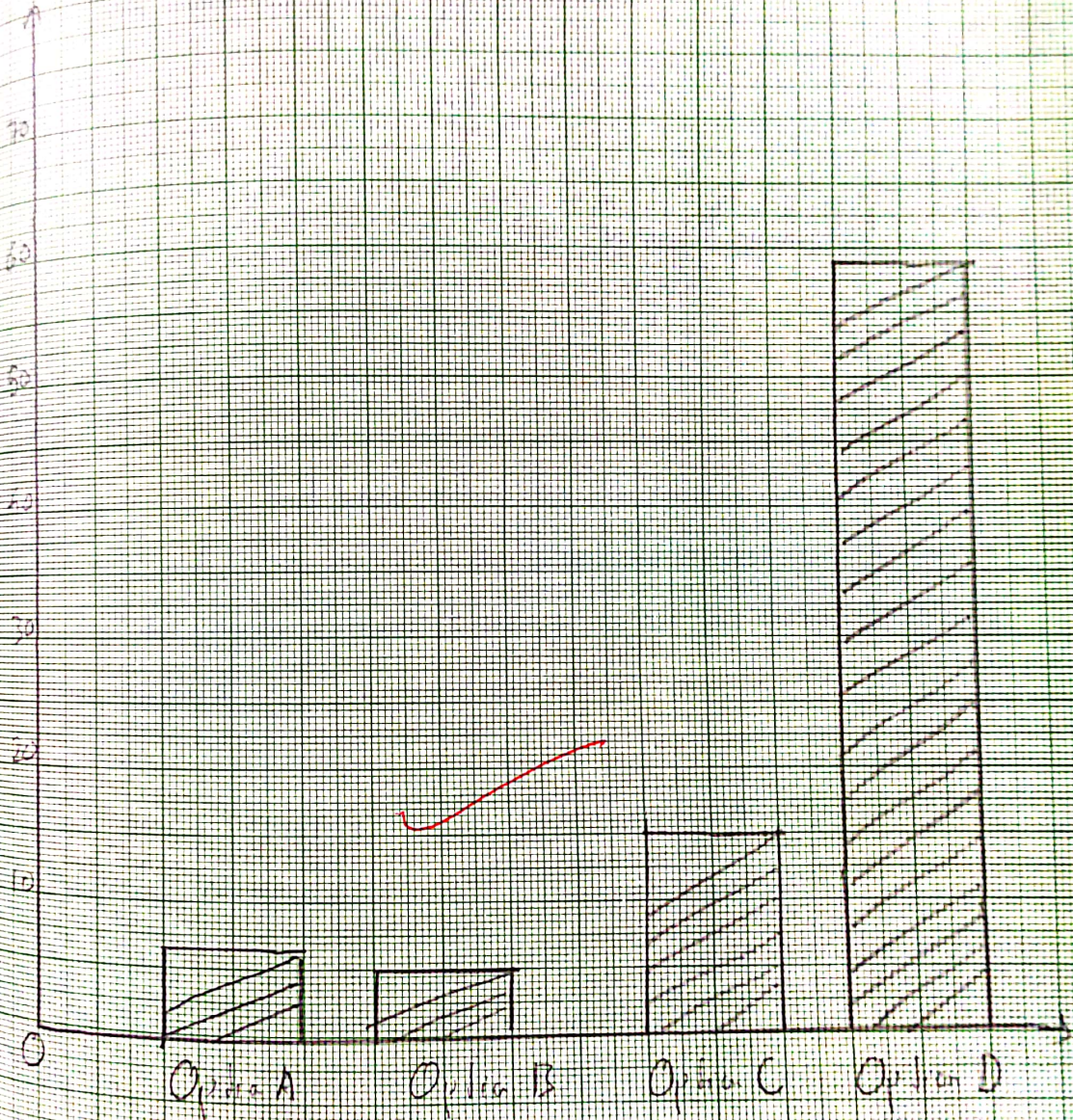
X-axis - Option  
Y-axis - Count.





# Graphical Representation of Question No 13.

X-axis  $\rightarrow$  Options  
Y-axis - Counts



Teacher's Signature



# Analysis

of

## The Survey Conducted.

1 How many languages do you speak?

Analysis - This question had been asked to 82 people. 14 people voted for option A, 52 people have voted for option B, 13 people voted for option C and 3 people voted for option D. Hence, the majority of the people can speak only two languages.

2 How much percentage of knowledge of English is required for a successful career?

Analysis - Out of 82, 20 people went for option A, 50 people went for option B, 10 people went for option C and only 2 went for option D.

3 From which area of Jabalpur do you belong?



Analysis: Out of 82, 40 people belong to the urban area of Jabalpur.  
It means the majority of the people were urban dwellers.

4 Besides standard Hindi, how many dialects can you speak.

Analysis: Out of 82, 52 people voted that they cannot speak any dialect.

5 The proficiency in English is helpful in.

Analysis: Out of 82, 52 people have voted that English is useful in both personal and in professional life.

6 What makes people from rural area suffer in English?

Analysis: 49 people have responded that all the factors mentioned are responsible for the problem.

7 Why people avoid the use of regional languages?

Analysis: 34 people have responded that all the factors are responsible.

8 Where do you usually prefer to speak your regional language?



Analysis 41 people said that they speak regional language with family.

9 The youth prefers western media instead of regional media.

Analysis 40 people said that they use western media over regional media.

10 Are the regional languages facing the threat of extinction?

Analysis 55 people voted yes.

11 Do you think regional languages must be saved from extinction?

Analysis 60 people out of 82 [nearly 80%] of the people think that regional languages must be saved from extinction.

12 What steps are required to enhance the use of regional languages?

Analysis 47 people said that all the mentioned steps must be taken.

13 What is the importance of regional languages?

Analysis 58 people have voted that all the mentioned ~~important~~ options come under the importance of the regional languages.



# S.W.O.C

This project has been an awesome venture for me. I went through various challenges, and the experiences I gained were precious.

So, here are the list of following strengths and weaknesses I found about myself:

## Strengths

My greatest strength was my patience level. People do not give their responses easily in a survey. So I kept a lot of patience while collecting the data. Another strength are my communication skills. I had to have a conversation of people different social classes. I have become more confident about my speaking skills.

## Weaknesses

The only weakness I found is my poor skill of writing. When I was writing the theory for this project, I had all the knowledge which I had gathered about this topic through research,



But when I sat down to write the theory part, I got the realisation about my weakness of poor writing. I had to work very hard for preparing a suitable content.

## Opportunities.

There are some opportunities which might be helpful in generating employment for the people. One of them is open the teaching institute for the students to give them knowledge and training in their own regional languages. There are opportunities of employment in regional cinema also.

- (i) People will be attracted if good content will be made in local cinema
- (ii) Employment opportunities for local artists and people.
- (iii) Helpful in promotion and expansion of regional languages.

## Challenges.

If there are opportunities; there are some challenges also:

- (i) The first challenge will be to promote the use of regional languages in urban areas; especially at working places.
- (ii) Making a regional cinema will be a huge challenge. Because people working in this field have lost the confidence of making a good content.



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## YouTube channels and books.

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- (ii) Knowledge Train [Channel] and TechMoodly
- (iii) Rajesh Tiwari / Jabalpur Dayheli [Channel]
- (iv) Language Belongement, Book by David Bradley.



Thank You