

Volume 1: Oct, 2021- Dec, 2021

ISSN 2278-5787(Online)

# International Journal of **TECHNICAL** RESEARCH



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GLOBAL  
**UNIVERSITY**

(APPROVED BY UGC AS PER SECTION 2F OF UGC ACT - 1956)

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**Effect of Heat Treatment Process on Mechanical Properties of Mild Steel**Anup Singh<sup>1</sup>, Anil Kumar<sup>2</sup>, Rajesh Nandal<sup>3</sup>, Neeraj Kumar<sup>3</sup>Department of Mechanical Engineering, Om Sterling Global University,  
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**Abstract**

Heat treatment is critical to control the mechanical/physical properties of mild steels under the recrystallization temperature (830°C), which is performed during annealing as required for mechanical properties. This process is carried out according to a closed annealing cycle process under the recrystallization temperature mentioned above. Different heat sources are used during processing. This process increases ductility and reduces hardness to make it perform better and reduces internal stresses that have formed during cold rolling.

**Keyword:** Mild steel Coils, furnace, Automation for controlling process and cooling water.

**1. Introduction**

The difficulty of the heat treatment is to maintain a good surface finish and mechanical properties without loss of material, reduce the value of costs and very familiar with the environment and consumption in the process. The main annealing function is to increase longitude and reduce hardness.

During the cold rolling industry, this material is carried out up to 80 μL on both sides of the high rolling force that increases these high voltages up to 80 ° on both sides of the sheet and increases the hardness, and very low ductility, so this material has no efficiency in the industrial field. Other applications, a very high friction in the rolling of the hydrin are produced by loads between the bearing sheets during the roller and the roller during the running sheet. The cooling water is therefore used to reduce carbon-containing coolant friction and mixtures with coal are generated during the rollers. The leaf creates a layer on the surface. This can be removed by normal friction; it is only in the annealing process. Therefore, this process is very important for the mechanical properties and surface finish. When a metal is plastically deformed, displacement of atoms in the material occurs. In particular, dislocation occurs through or with metal particles. Displacements overlap and the density of dislocations in the material increases. The proliferation of overlapping dislocations makes movement of other dislocations more difficult. In addition, the yield strength of the metal actually increases after the yield strength of the metal actually increases after the material has been plastically deformed. In addition, the elastic region also increases, and the plastic deformation requires new increased yield strength, the ductility of the metal decreases after hard deformation, and the metal becomes harder. Thanks to the aforementioned reinforcement, it is clear that the mechanical properties of metals can be controlled by work hardening. A common method of work hardening is called cold work. The change in a metal by cold work can be reversed by bringing the metal to the apart temperature for a specific number of times. This is called the annealing process.

Cold working is the plastic deformation of material at temperatures below its recrystallization temperature. The recrystallization temperature of a material is the temperature at which new particles with low deviance densities must replace those with high deviance densities. Cold working is a strengthening mechanism through strain hardening, but cold working is also useful for forming materials. In this experiment metal specimens were cold

rolled, a form of cold working in which metal specimen forced through two rolls that have a gap between each other. Cold rolling is often used commercially in order to produce sheet metal, plate and bars. When metal is cold rolled, it is plastically deformed as it is forced between two rolls of rolling mill the metal is compressed by the rolls and the plastic deformation is along the rolling direction, unlike a tensile test, no necking occurs in the metal. A measure of how much cold work a material received is needed if an investigation into mechanical property change is desired. The change in cross-section area of a metal specimen that underwent cold work is one means of measurement. Metals cold worked in order to change their shape. A material loses ductility when it is cold worked or moreover, cold rolled. If one wishes to partially or fully restore a cold worked material to its original properties, one can anneal the material to its original properties. Annealing is performed by heating a material; in this instance, the material is metal. There are three stages of annealing and each stage produces different results. The three stages of annealing are recovery, recrystallization, and grain growth.

## 2. Literature Review

**A. Jeneczek et al. (2021)** stated final step was Vickers HV10 hardness measurement. These measurements confirmed previous results. The heat from additional stitches affected the steel by significantly decreasing the hardness by 80–100 HV10. The results of experiments showed that the heat from pad welds provided micro structural changes in heat-affected zones and a decrease in the susceptibility to cold cracking, which results in improvement in the weld ability of HSLA steel in wet welding conditions

**A.K.Nath et al. (2017)** found Solution annealing was found to reduce anisotropy in mechanical properties through the homogenization of microstructure. Higher aging temperature and longer soaking time doesn't have significant impact on different mechanical properties but deteriorates the corrosion properties. Solution annealing before aging is recommended for the homogeneity in microstructure.

**Fullen. Met et al. (2018):** This study evaluated the microstructure of SLM specimens of Inconel 718 after various heat treatments and compared the resulting effect on the quasi-static mechanical properties.

**Jhanget al. (2013)** In this paper, two different heat treatment processes of a 9% Ni steel for large liquefied natural gas storage tanks were performed in an industrial heating furnace. The former was a special heat treatment process consisting of quenching and intercritical quenching and tempering (Q-IQ-T). The latter was a heat treatment process only consisting of quenching and tempering. Mechanical properties were measured by tensile testing and charpy impact testing, and the microstructure was analyzed by optical microscopy, transmission electron microscopy.

**Todd, Robert H et al. (1994)** written by a team of educators with unmatched experience, in collaboration with a consortium of industrial representatives from Black and Decker, Boeing, Caterpillar, General Motors, Grumman, Tektronix, Texas Instruments, Westinghouse, and Xerox, Manufacturing Processes Reference Guide provides thorough descriptions of over 125 of the most important processes available to industry today. This important resource encompasses the entire spectrum of manufacturing, from "Abrasive Jet Machining" to "Wire Drawing." Used with Fundamental Principles of Manufacturing Processes, the two books provide all the information needed to identify the ideal process for a specific manufacturing requirement.

**Waily. M et al. (2020)** when a comparison was made for normal frequency and platelet response it gave an acceptable percentage of error. Therefore, the results showed an improvement of the mechanical and dynamic properties for aluminium alloys, and that heat treatment gives acceptable results, due to the improvement of these properties that reach up to 20%.

**X. Z. Honget et al. (2020)** showed that when the tempering temperature was 620 °C, the specimens had the highest micro-hardness (383 HV) and tensile properties (966 MPa, 14.37%), and its elongation was about 150% higher than deposited specimen. This study provided an experimental and theoretical basis for the development of the subsequent heat treatment process for low alloy steel laser additive manufacturing.

**Y.W.Yuonget al. (2020)** it is found that as-built samples have anisotropy properties while heat treated samples displayed isotropic properties. As-built SLM CoCrMo specimens demonstrated approximately twice the yield strength (YS) and ultimate tensile strength (UTS) as compared to ASTM F75 standard for cast CoCrMo alloys.

### 3. Methodology

After cold rolling, the strips coming out of the rolling mill would have been stretched and hardened, making it unsuitable for any forming or drawing.

These coils (Metal used in roll formation) must be heated at certain temperature to get proper characteristics of ductility, yield, elongation, softness, and draw ability. The cold rolling coils are generally annealed in single stack bell type annealing furnace. In your case of ferritic steel maximum annealing temperature is 710°C.

Following sequential operation are adopted for annealing.

Charging, → Clamping → Tightness test → Purging → Heating and soaking → cooling → Post Anneal purging → Unclamping.

As shown in fig1: as process as shown in different colour code as per standard colour code.

In circle overview of the base is shown in the computer screen which show the base details-



**Fig1: Base wise parameters overview**

Including heating temperature increasing or decreasing with set point, time taken to complete the total cycle and hydrogen flow rate in m<sup>3</sup>/hr. inside the inner cover.

#### 3.1 Charging

The coils should be stacked with the center of the coils in line with the axis of the furnace i.e., staking should be absolutely concentric so that uniform gap is obtained between the coils and inner cover, intermediate convector place such that the orientation of the vanes on the upper side is counter to the direction of rotation of the base fan. As shown in fig 1 which charge is ready for clamping.

#### 3.2 Clamping

After stacking coils on the base with necessary intermediate convector the inner cover is positioned and clamped against the base by hydraulic swing clamp cylinders. The charge space now become gas tight because of solid silicon seal between the inner cover flange and base.

Note: –

- Ensure all the cylinders are clamped properly.
- Ensure that water supply to the base fan motor and base is open.
- Ensure that cooling water to the decantation is open.
- Connect the water supply hoses for inner cover water jacket inlet form base seal circuit and inner water jacket outlet to discharge funnel for return of water to sump.
- Ensure water flow switch is working properly.

As shown in fig 1 bottom black color hydraulic will hold the inner cover for safe and properly heating of inside coil stack in hydrogen environment

### **3.3. Tightness test**

After clamping nitrogen gas outlet line are closed first and nitrogen inlet line is opened for three minutes to achieve uniform pressure 250- 400 mmWc inside the inner cover. After that inlet valve is closed and the fall in base pressure is monitored up to three minutes in case the fall in base pressure exceed 50mmWc in three minutes. The cycle will abort and not process to the next sequence check the base assembly connecting points or joints sealing between inner cover and base and check physically if any outlet valves are open, rectify the same before restarting the tightness test.

- Ensure Nitrogen pressure is sufficient.
- Ensure pressure drop of the base is with in specific limit.

### **3.4. Purging**

After the completion of tightness test both the nitrogen gas inlet and nitrogen outlet are open for purging of the base for safety reasons purging is carried out to remove oxygen content inside the inner, preventing air mixture with flammable process atmosphere in the charge space. During purging the nitrogen flow will be 60-90 Nm<sup>3</sup>/hr. purging is terminated when the calculated time is over the oxygen content measure inside the inner cover is less than 0.50%.

When the purging starts the base fan motor will start automatically after that base fan motor start as temperature of annealing atmosphere increase during process with replacement of the cleaner nitrogen gas with hydrogen gas and stopped after past purging a current limit is set in VVVF drive which control the base fan speed.

After purging is completed the nitrogen atmosphere inside the inner cover is replaced by hydrogen atmosphere.

Note: -

- Before purging sequence, the base fan motor will be purged with nitrogen for three minutes.
- Ensure that oxygen prop provided in the outlet line of the gas is working properly.

### **3.5. Heating and socking**

After the charge space is filled with nitrogen gas and nitrogen mixture the heating hood is placed on the annealing base as shown in fig

The heating and socking of the coils are performed as per present data the specific condition.

Note: -

- Connect the plug of power and control supply of heating hood to the respective socket on the base panel.
- Connect the RLNG gas pipe line couplet to the adopter provided on coming line near the base and ensure that couplet is seated properly with adopter.

Heating hood is made up 10Nos of burners with properly fitted spark plug and RLNG gas pipes line arrangement to give properly fuel supply from the supply source this arrangement is in very safe environment.

There are two pipes line with yellow color pipes give the supply of RLNG and second blue pipes line give the circulation of air flow with help blower fan shown in right side of the furnace.

This combination of air supply and gas supply give the properly air fuel ratio for properly heating efficiency.

### 3.6. Cooling

After heating and soaking the heating hood is removed from the base for natural cooling, when the gas temperature reaches below 600°C the cooling starts. Water spraying is started when the temperature drops down to 350°C till the end of cooling cycle.

When the temperature has dropped to the present discharging temperature the nitrogen inlet valve is opened and charge space is purged again, after this cooling hood is removed from the base.

The cooling sequence is carried out in the cooling hood which is placed after removing the heating hood or furnace.

In this arrangement there are two types of cooling take place 1<sup>st</sup> one air cooling which is done with the help of two side blower fan from the normal air. And 2<sup>nd</sup> water cooling is done at last when temperature remains nearly 300°C. With the flow rate of water 80m<sup>3</sup>/hr. approximate time take by cooling is 16 to 20 hours but mostly depend of the cycle higher temperature and capacity of material.

### 3.7. Unclamping

After the cooling hood is removed from the base, the hydraulic swing clamp cylinders are released to remove the inner cover the coils are then discharge from the base and the base is now ready for the next charge.

All the sequence of all running basis are shown in a single computer screen which shows all parameter related to temperature, pressure time taken by charge, flow of hydrogen nitrogen and RLNG, water and others all parameters. As shown in the computer screen in fig 2.



**Fig 2: All technical parameter bases wise**

In this fig all parameter is settled with the help system operation data which give the automation operation of all valve motors and others movements of running instruments through the electrical signal and software.

By feeding all entry as per required temperature pressure and volume of gases this screen is also known as the process data output.

#### ***Time and Temperature graph***

For properly maintaining all the flow rate graph is shown on the screen which give all details of flow rate in annealing base process.

## **4. Results and Discussion**

### ***Technical specification***

This annealing installation using hydrogen as a proactive gas is supplied with following technical specification.

#### ***Charge details-***

- Coil OD - 2000mm
- Coil ID - 500/610mm
- Coil width -12500mm max
- Maximum coil weight - 24.1 MT
- Stack height -5300mm
- Maximum charge weight -108 MT

#### ***Utility and storage requirements: -***

##### **1. *Hydrogen: -***

- Hydrogen purity - 99.99%
- Oxygen -3ppm max
- Dew Point -Better than -70°
- Flow rate -40Nm3/hr. avg.
- Pressure recommended -4 kg /cm2
- Storage -80Nm3

##### **2. *Nitrogen: -***

- Nitrogen purity -99%
- Hydrogen -1 %
- Oxygen -10ppm max.
- Dew points -better than -60°
- Flow rate -100Nm3/hr. avg.

#### ***Experimental analysis:-***

**Fig3: full assembly of Vickers hardness testing machine**



**Table 1: Observation table of temperature grade wise**

S. No	Base no.	Material Grade	Thickness of coils (mm)	Maximum Temp (°C)	Total time taken (hours)	Soaking time (hours)
1	5	DD	1.20	610	49	10
2	2	D	1.00	600	47.5	8
3	3	EDD	1.55	640	55	11
4	6	D	1.10	590	46	8
5	1	DD	1.18	600	48	8

**Table 2: Observation of hardness before Annealing**

Coil No	Thickness(mm)	Width (mm)	Minimum Hardness (VPN)	Maximum Hardness (VPN)
2515	0.80	650	250	260
2055	0.80	680	270	285
2889	1.10	712	280	282
2269	1.20	590	282	290
2125	1.00	600	289	289

**Table 3: Observations of hardness after annealing**

Coil No	Thickness (mm)	Width (mm)	Minimum Hardness (VPN)	Maximum Hardness (VPN)
2515	0.80	650	95	102
2055	0.80	680	90	99
2889	1.10	712	70	82
2269	1.20	590	79	86
2125	1.00	600	88	92

**Ultimate tensile strength (UTS)**

S. No	Size (mm)	T.S (MPA)	Y.S (MPA)	EL% (G.L 50mm)
1	1.20 X 487	294	188	46.8 %
2	1.20 X 558	285	175	57.98%
3	1.00 X 755	290	180	49.45%

**ECV (Erichsen Cupping Value): -**

S.no	Size	Grade	ECV(mm)	Before Annealing ECV
1	1.20 x 487	EDD	11.35mm	8.50 mm
2	1.20 x588	EDD	11.10mm	7.80 mm
3	1.00 x 755	DD	10.25mm	6.00 mm

**5. Conclusion**

From above experiment value it is justified that there are increases in ductility of material after annealing process because in all mechanical and physical properties change takes place and material become workable after annealing process that is result in only possible after mechanical properties changes take place after doing annealing. There are changes that take places in: - Hardness 282 VPN to 102 VPN, Elongation changes nil to 57.98%, ECV 7.80mm to 11.10mm

Hence, result in formation of material after annealing process become more workable, machinable and more draw ability as per required in industries.

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**RELATIONSHIP BETWEEN WORKPLACE OSTRACISM AND JOB PERFORMANCE:  
REVISITING LITERATURE**

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**Abstract**

Ostracism is pervasive and inescapable part of human lives. The experience caused by ostracism in personal and professional lives is very painful. It deteriorates the well-being and performance of individual. Hence, it occupies an important place in the workplace as it deteriorates employees' performance and well-being as well. The extent to which employees are perceived by their coworkers as being neglected or withdrawn is a prominent topic of discussion in the workplace. The main purpose of this review paper is to determine the relation between workplace ostracism and job performance. The current paper is based on a comprehensive evaluation of the literature that included a number of empirical as well as theoretical studies on ostracism. The findings of this study could be used as a starting point for more research into how organizations can lessen the risk of "social exclusion" within their ranks, which leads to poor performance.

**Keywords:** Workplace Ostracism, Employee, Workplace, Job performance.

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**Introduction**

Work Ostracism is a condition in which a person is marginalize, disregarded, or excluded from a group. This covers situations in which an employee feels overlooked or side-lined by their co-workers in their place of employment. It is distressing and usual human phenomena experienced by many (Ferris et al., 2008). We are social creatures and it can therefore be profoundly hurtful to be lonely or forgotten. It is even more so if our isolation is the product of the decisions of others (Robinson et al., 2013). Human being has fundamental need: to belong, to maintain self-esteem, to have control over one's social environment and to live life in a meaningful way. Ostracism imperils this fundamental need of an individual (Williams 2007). It affects the sense of identity of an individual by attempting to exclude the individual from the group (Ferris et al., 2008). It has been known as workplace ostracism, when social ostracism is introduced into the management sphere (Mao et al., 2017). Findings reveal that most of the antecedents and outcomes are related to dispositional traits, ability and skill of an individual (Wu et al., 2011 Chang et al., 2019). Some studies categorize outcomes of workplace ostracism as antisocial and prosocial in behavioral terms (Robinson et al., 2013) and a small part of study reveal that victim may behave in a passive manner which indicate self-protection and avoidance tendency (Mao et al., 2017).

**Workplace ostracism and job performance:**

It is a mentally unpleasant and painful experience that impairs an individual's capacity to "self-regulate", growing the chance of consequences such as nervousness and deprived performance in one's work. At some point during the ostracism event, the person's "attentional resources" are spent into rumination over the events that led to the ostracism. If an employer does not provide enough employment resources, it is probable that an

employee's incentive to execute work-related duties will be reduced. As a consequence of a drop in work effectiveness as a result of a depletion of self-regulatory resources, a reduction in in-role job performance occurs, which is negative to the organization. People who fear "workplace ostracism" may become emotionally exhausted and unable to perform their obligations and responsibilities. Employees who have been subjected to harassment are more likely to believe that they are members of the out-group rather than the in-group. Employees' sense of belonging and organizational affiliation might be diminished when they are the focus of workplace ostracism. When a person has low levels of organizational identification, they are more likely to be perceived as "less trustworthy, honest, and cooperative," which can have a negative impact on their present job performance. Apart from that, conflicts can rise when persons have different values and interests, as well as beliefs, which can interfere with their task performance and cause deviation in individuals' objectives and interests. In addition, conflicts can arise when individuals exhibit in-role job behavior and performance that is detrimental to the organization

### **Relation between Workplace Ostracism and Job Performance**

Employees' energy depletion when confronted with negative work events, such as being shunned, can become so distracting that it impairs their capacity to complete job requirements (Abbas et al., 2014; Hobfoll, 2001; Ng and Feldman, 2012). According to research, workplace ostracism is linked to poorer levels of satisfaction and commitment, as well as higher levels of anxiety, despair, and intention to leave. (Ferris et al., 2008). Workplace ostracism is likely to harm employee job performance in addition to deteriorating psychological well-being and job attitudes. To begin with, workplace ostracism jeopardizes an employee's basic human requirements and depletes psychological resources. (Hobfoll, 1989; Williams, 2001). When people are stressed at work, they are more prone to devote their energy to negative activities like worrying and agonizing rather than helpful behaviors that could help them complete their jobs successfully. (Jamal, 1985; McCarthy et al., 2016). Second, workplace ostracism "severs" attack employees' social links to other members of the firm. (Williams, 2001). As a result of the social isolation associated with workplace ostracism, employees are unable to acquire access to information that they may require to solve problems in their everyday employment (Jones et al., 2009). Because vital work-related information and resources are frequently embodied in social ties, employees with limited social ties are more likely to have less opportunities to obtain this critical information and resources, resulting in lower job performance. (Seibert, Kraimer and Liden, 2001).

### **Objective of the study**

To highlight the relationship between workplace ostracism and job performance on the basis of thorough review of earlier studies related with the topic.

### **Research Methodology**

The current paper is based on a comprehensive evaluation of the literature that included a number of empirical as well as theoretical studies on ostracism. The study's goal is to discover if there is a link between ostracism and poor work performance. The studies were found in databases such as Emerald, Elsevier, and SAGE, among others. The studies were found through a keyword search for "ostracism."

**Review of literature:**

("Zhao, Qingxia, He, Sheard, & Wan, 2016) studied *Workplace ostracism and knowledge hiding in service organizations*" With the arrival of the information economy age, service organizations can only live and thrive if they are always innovating in their services. "Service innovation" not only helps to build consumer confidence in service organizations, but it also serves as an unstoppable engine for the growth of businesses. When it comes to this procedure, transmission of information is essential. To put it another way, one of the most important ways to improve the performance of service innovation organizations is through the effective exchange of information.

("Zhao, Peng, & Sheard, 2013) studied *Workplace ostracism and hospitality employees counterproductive work behaviors*": In this paper, we examine proactive personality and political abilities. According to academic study, workplace ostracism is a widespread and global phenomenon that happens across organizations and countries. Ostracism is defined as the exclusion of others and the ignorance of the behavior. Consequently, an ostracizing workplace might diminish employees' chances of forming social connections, which are critical for influencing their "psychological health, behavior, and even their performance" on the job.

("Hashmi, 2019) studied *Relationship between organizational culture and knowledge hiding in software industry: Mediating role of workplace ostracism and workplace incivility*" Knowledge management in businesses is currently regarded to be a competitive advantage for companies in this age of the digital economy since it distinguishes them from their competitors. Knowledge management in firms has been identified as an important competitive advantage for enterprises. It is believed that information transfer among employees is essential for service innovation and client confidence building; yet, people in the service sector are reluctant to share their expertise and prefer to keep it hidden.

("Khalid, Iqbal, & Hashmi, 2020) studied *Impact of workplace ostracism on knowledge hoarding: mediating role of defensive silence and moderating role of experiential avoidance*" and in a knowledge-driven economy, it was discovered that enterprises make use of their employees' skills and knowledge to make worth for their investors. Effective information transmission not only aids in the development of an organization, but it also plays a critical part in the establishment and maintenance of a sustained organizational competitive advantage. Members of organizations, on the other hand, are subject to a phenomenon of significant significance in which they do not deliberately exchange info and host it.

("Fatima, 2008) studied *Impact of Workplace Ostracism on Counter Productive Work Behaviors: Mediating Role of Job Satisfaction*" And discovered that work is one of the most important aspects of a being's life. You devote a decent sum of your time to your organization's activities. Because of this, the development of strong interpersonal relationships among them has become a must in their professional life. The organizations have now joined together to form a network of relationships. Using this network, both people and their corporation may achieve a variety of outcomes. According to literature, the greater the strength of the network of linkages, the greater the grade of business efficiency.

("Huertas-valdivia, Faculty, & Faculty, 2019) studied *Counteracting Workplace Ostracism In Hospitality With Psychological Empowerment The hotel*" industry was notorious for periodic overwork, a lack of compensation,

and a lack of decision-making authority at the bottom of the ranked pyramid — all of which had a negative impact on the work environment and performance on a regular basis. Because it involves emotional labor, the hospitality sector is also a high-stress industry. Employees must attempt to maintain excellent behavior when serving clients, regardless of how they are feeling at the time.

("Jalil, Hassan, Naseer, Ikram, & Campus, 2021) studied *Workplace Spirituality and Organizational Citizenship Behavior: A Mediating and Moderating Role of Organizational Commitment and Workplace Ostracism*" And it was established that work is a critical component of the majority of people's lives since individuals spend a substantial portion of their time at work in the modern epoch. Their place of employment and their organizations, which serve as substitutes for their family, friends, and local community groups, serve as the primary focal points. The supervisor should be conscious that employees are more than just a cost to the company; they also have feelings and requirements, as well as a need to feel good about whatever it is that they perform.

("Clercq, 2018) studied *Workplace ostracism and job performance: Roles of self-efficacy and job level*" and discovered that staffs are unable to whole their job responsibilities due to the existence of stressful, adverse conditions at their places of employment. It is critical to understand employees' capacity to achieve the goals of their organizations since this ability leads to positive employee attitudes, such as corporate participation and job satisfaction, and lessens the likelihood of employees selling their company. There have been numerous studies that highlight the importance of positive work characteristics that indicate organizational support for working consequences; however, it is also important to understand the "dark side of organizations, which includes the risk of misconduct that causes stress and difficulty in the workplace".

("Sarwar, Abdullah, Hafeez, & Chughtai, 2020) studied *How Does Workplace Ostracism Lead to Service Sabotage Behavior in Nurses: A Conservation of Resources Perspective*" It has been determined that "workplace ostracism" is said as a situation in which an individual believes that his or her colleagues have disregarded, ostracized, or restricted him or her from expressing his or her feelings. Employees' experiences of exclusion have been documented in a number of studies, including this one. "Insulation, separation, leaving the room" at the time of another person's admission, "avoiding eye contact", not responding to a colleague's pleasantries, and transferring someone to a remote area are all examples of workplace racism, according to the Occupational Safety and Health Administration. "Ostracism in the workplace is a subtle" form of maltreatment that goes unnoticed.

("Riaz, Xu, & Hussain, 2019) studied *Workplace Ostracism and Knowledge Hiding: The Mediating Role of Job Tension*" Furthermore, it was said that one of the most important factors in achieving business success is the rising importance of knowledge-sharing. Many experts have emphasized the significance of this phenomenon in terms of fostering innovation and boosting the performance of industrial organizations in recent years. Despite the fact that these studies advocate for the sharing of information, employees do not choose to provide access to knowledge that has been designated as "hidden." According to the definition, this is "an individual's purposeful attempt to retain or dissimulate the knowledge sought."

**Hypothesis:** There is negative relationship between workplace ostracism and job performance.

### **Managerial Implications**

The findings of this study have significant implications for HR practitioners and team managers. The study highlights that workplace ostracism is an interpersonal stressor and needs to be identified and resolved on the first place. Findings of this research will help HR practitioners in understanding that it is very important for organizations to build a higher quality leader-member relationship, so that there will be no room left for ostracism and victim will receive an atmosphere where they can satisfy their fundamental need to belong. Moreover, the findings suggest that management should create a preventive work environment to take corrective measures well in advance.

### **Conclusion and Future Research Direction**

The present study has focused on relation between workplace ostracism and job performance. The review of the literature highlight that the power of being ignored is very huge and destructive for victim as well as for organization. This study also guides future researchers in understanding the antecedents and outcomes which have been explored by other researchers and also suggests possible future avenues. More studies need to be explored on behaviors causing ostracism at workplace. Studies are required on understanding ostracism from the subject's (the one who initiate ostracism) and audience's viewpoint. More studies are required from the context of developing countries as the major findings that were part of our review were from China.

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**Impact of Technology on Education and Human Life**

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**Abstract:-**

Technology has upraised the field of education. The importance of technology in school cannot be disregarded. With the help of computer in education it is easier for teacher to impart knowledge and for students to gain output. Technology incorporates a positive influence on education and at constant time might also posture negative effect. As you've got seen, technology has additional positive than negative outcomes. It helps kids learn in several forms, it permits them to interact in several activities, and it enriches their education by permitting them to collaborate with folks from everywhere the world. Technology is everywhere, and it permits us to remain connected to one another. It serves for several functions, and even if not everybody has access to that, there are some actions that may be enforced to unravel these issues. They will be resolved by human activity with the child's folks, and educating lecturers on a way to incorporate quality time with their schoolroom by E-learning. Using Technology allow you to automate task setup reminder, gather receipts and track investment, compare price and more as positive impact as well as overuse of Technology may have significant impact on developing children and teenagers.

**Keywords: Disregarded, impart, automate, E-learning, upraised.**

**Introduction:-**

The age of 21<sup>st</sup> century is often considered as an era of technology. Technology today play a very important role in our life. It is seen as a basis of development of an economy. An economy without the use of Technology can never upraise in today's scenario. This is because Technology makes our life easier, make our work informal and less time consuming the transmission of information becomes very easy and suitable, as well as effective. E-learning is an important tool for learner. Government has taken steps to develop an internet economy with significant government funded initiatives launched in the area of public administration E-government, online payment, E-health and E-learning.

**Impact of Technology on Education:-**

Welcome to the fashionable age of education. The utilization of technology has become a part of our daily routine. We tend to use it everyday once we speak on our cellphones, take selfies, video chat, play with apps, send emails, you name it. Technology has been embedded in North American country and has return an extended manner from once it initial started. it's evolved into one thing that students have become additional conversant in by mistreatment it as faculty and reception. Today, we tend to see students mistreatment their tablets, laptops and in some cases phones to assist perceive material higher.

**Positive Outcomes:-**

There are several positive outcomes that technology has on students. First, it prepares them for the longer term. Technology is on going, and its evolution has returned in an extended manner. Since technology has become a significant facet in our lives, we will guarantee that it'll still evolve. Exposing students to technology at a young age, can provide them a stronger understanding of where it's going, how it's evolving, and prepare them for the longer term. Secondly, technology motivates kids to be bold. Kids will relate to technology as a result of {they are unit they're} being exposed to that reception moreover after they are observant tv, taking part in video games, or fiddling with their folks phone. {they are unit they're} additionally being exposed to technology in school after they are taking part in games on the pc whereas learning their vocabulary, or functioning on science. Kids realize it fascinating and fun as a result of they see it as taking part in a game. Lastly, technology exposes kids to totally different learning experiences.

Using technology in school rooms has the potential to form augmented student motivation, augmented social interactions, positive outcomes, increased student learning, and increased student engagement. Technology is capable of unlocking keys of learning with all students.

#### **Negative Impacts:-**

Technology doesn't solely have positive outcomes, however it additionally has negative outcomes that are unit joined to the education of youngsters within the K-12 system. One in all the negative outcomes of mistreatment an excessive amount of technology with students is that the time spent per kid and therefore the quality. It's believed that lecturers pay less time with students. There have already been some queries on the quantity of your time that a coach spends on a student, currently there are unit additional issues that lecturers can pay even less time with their students. This cause believe that the standard of the time spent per kid additionally decreases. consistent with Kimmons, the research worker over by stating that lecturers ought to target the standard of instruction that's being schooled in colleges. If lecturers focus additional on the standard of education in colleges, kids would have a stronger chance to urge ahead.

Another issue that technology has on kids, is that the excessive quantity of screen time a baby is exposed to an excessive amount of exposure to the media will cause psychological feature issues. consistent with Tiffani Pittman, and Trudi Gaines, students in third grade have the psychological feature Associate in Nursing fine-motor skills necessary to start to use technology in subtle ways that are unit at an age once their experiences with technology might have a long-lasting impact.

#### **Positive Impact of technology on human life:-**

The development and adoption of technology have helped societies raise productivity, inclusivity of services and improve overall well-being. wherever school advancements have helped the most?

#### **Healthcare & eudemonia advancements**

Technology possesses a colossal potential to boost health and tending systems as we all know them. From AI-powered clinical drug trials through enabling preventative patients' watching up to eudemonia solutions like wearables. we've seen school minding the gap in tending within the pandemic. Telemedicine apps square

measure the primary step to creating tending a lot of evenhanded and accessible for all, despite their socioeconomic standing.

### **Equal opportunities**

The universal worth behind technology is transferral equality to product and services and minimizing socioeconomic gaps among societies and folks. As delineate higher than, school makes health and education on the market to a lot of individuals, creating it easier to be told and acquire care, despite their background.

### **Negative impact of technology on human life:-**

The negative impact of school on society involves mass-made product, with most frequently blamed: social media. a large number of analysis has been created on the subject wherever social media is listed as variety one place with info, hate speech, and harassment on the one hand, and an area going individuals isolated and depressed on the opposite.

### **Fake news & info**

Fake news and info are with United States of America for quite a while, however with the school advancements moving chop-chop, individuals notice it arduous to stay up with what's true and what's not.

61% of the Edelman measuring instrument 2020 admitted that the pace of modification in school is simply too quick. fifty seven of them suppose digital media platforms they use square measure contaminated with unreliable info. And once the Cambridge Analytical scandal, seventy six of individuals worry that faux news is being employed as a weapon to polarize and radicalize.

### **Conclusion:-**

Technology may be a versatile and valuable tool for teaching and learning and turning into the simplest way of life. The foremost vital factor is that lecturers got to be ready to use these technologies effectively. Faculties will use technology effectively and for the welfare of scholars, lecturers and society, it should be done. Hencetechnology plays negative and positive impact on education and human life

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**The Portrayal of Culture in the trilogy of Chinua Achebe**

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**Abstract**

The African Subcontinent has been the area of sublime richness in biodiversity as well as literature. The literary flame has been kindled by the legend of African Writings, the crafty and masterful author with the pen in hand, Chinua Achebe. He is basically famous for his trilogy, which includes his three most famous works Things Fall Apart, Arrow of God, No Longer at Ease and Arrow of God. These three works portray the culture of Africa in the true sense where the themes of Colonization, Racism, War between tribals, Identity Conflict etc. have been the most talked about. The basic purpose of this research paper is to portray the culture which is shown in the trilogy of Chinua Achebe. He is deeply rooted in the culture and his almost every novel contains the issues of exploitation and identity conflict. My purpose of this research paper is to trace out the instances where the cultural effects have been enlightened upon. I have tried to create an even contrast of the positive and negative effects of culture and how this culture affects the internal mindset of the native people. For example the novel Things Fall Apart, starts from the famous lines from the poem 'The Second Coming' by Yeats, where it has been stated that there is no one to lead, and metaphorically speaking Achebe is talking about the glorious days, but now the situations have changed and the center is unable to hold itself. Through this research paper my aim would be to bring the unknown metaphorical meanings forward, connecting the indigenous culture to the outside culture and to deconstruct the instances which happen in the novels keeping as base, the background of the things going in the novel on paper, and in Achebe's mindset too. He wants the readers to feel the glory on one side and the pain, the people of African Subcontinent have been through for generations through colonial domination, both at the same time.

**Keywords:** Race, Conflict, Struggle, Identity, Colony.

**Research Methodology**

The research would be a qualitative and descriptive one in which a structural and critical mindset is necessary. A thorough reading of the texts would be done and after that the first draft is prepared. After the reading, the important cultural points are highlighted and the specific theories are being applied in order to reach a logical and meaningful conclusion in the end.

**Analysis and Discussion**

Chinua Achebe's Magnum Opus lies in his trilogy. Things Fall Apart was published in 1958 depicts the life of Okonkwo in the Umuofia Clan. He is a renowned wrestler in his clan and his legacy was established when he defeated Amalinze the Cat. It is a story of love as well as emotion. In a settlement the clan wins a fifteen year old boy. Later on in the novel when Okonkwo beats his youngest wife, the peace of sacred week is dismantled, he even performs some sacrifices to restore the purity but of no avail. Another instance which is stated in the novel is the coming of the locusts every seven years. The Nigerian people too have their own harvest festivals;

like in India there is Baisakhi, which is also a cultural depiction of things. The Nigerian people celebrate it by singing traditional tribal songs. Later on when Okonkwo's daughter falls ill, he gathers some traditional medicinal leaves and the death of Ezeudu too is a ceremonial affair. A traditional funeral ceremony is being organized and the instrument ekwe is blared loud, as a symbol of death of a clansman. It is mentioned that killing is a crime against the earth goddess and to repent for it. The impact of colonization is traced when Mr. Brown comes in the village and objects that their gods are false. In those times objection against gods and blasphemy was feared much because the clan people thought that it would bring famine and floods. Brown wanted to change the religion of the clan to Christianity but falls ill. An egwugwu is unmasked which is equal to killing an ancestral spirit, as Achebe writes it, as a result the egwugwu burns Smith's Church to the ground. Later when the leaders are arrested, Okonkwo kills the main Englishman and hangs himself when Smith's men come to arrest him. Thus we can see *Things Fall Apart* is a story worth remembering for its gripping storyline and narrative technique of Achebe.

The second novel that I am going to analyze here is *No longer at Ease*. It begins as follows

We returned to our places, these kingdoms,

But no longer at ease herein the old dispensation,

With an alien people clutching their Gods.

I should be glad of another death.

Which metaphorically brings out the impact of colonization that when we the native people go outside for studies or some other purposes they feel nostalgic about their own land and often put behind bars because they are a minority community there? The novel starts when Obi Okonkwo is on a trial in England, and it is mentioned that the members of UPU (Umuofia Progressive Union) have sent Obi to England to study law so that he may act as their representative against the colonial British Rule. When Obi returns to Nigeria and starts his job at the scholarship board, he is offered bribe and later on sexual favors which he clearly rejects. The Igbo Community is a sacred community in Nigeria and it is a sin to marry against the members of the clan. Obi develops love for Clara who is an outcaste. They cannot marry because Obi's mother's wish was not to see both of them married as it is against tradition. Obi told Clara, she breaks off the engagement and tells Obi that she is pregnant, which is another sin according to the clan rules, that mixing the blood of the clan with someone outside of the clan was a spiritual sin and Obi arranges an abortion. The abortion is a success but due to the expenses there Obi fails to pay back the loans to UPU. To pay back the debts he begins taking bribes as his mother was no more too and he literally had no money left even to buy a funeral cloth. Therefore he gets caught in a sting operation and taken for a trial in the end. The novel traces out the fact that the Nigerian people who are considered to be pious and pure on their own land due to the effects of the upbringing that if they do a sin, then the gods will punish them. But from England they learnt to do the crimes and taking bribes. So all in all Achebe tries to frame out or we can say chalk out the negative impact of the Colonial Rule on the native people of Nigeria and the African Subcontinent on a larger scale.

The third novel also portrays the effect of external forces and its impact on the internal peace of the Clan and they begin to disrespect their own leader Izeulu. When an Anglo-Nigerian Officer John Goodcountry comes to their land and offers them to accept Christianity, Izeulu refuses the offer and he is put into prison as a consequence. When he comes out of the prison, the villagers request him to pay an offering to Ulu, the god of harvest but he denies as it was the will of the Ulu. As a result the Yams rot and Goodcountry takes full advantage of the situation and says Christian Gods will give your Yams immunity. Later on while performing a ceremonial ritual, Ezeulu's son Obika dies and the villagers lost their faith completely in Ezeulu and Ulu and embrace Christianity. Thus the influence of outside culture is shown here, leaving the traditional values and customs behind, which were of the uttermost importance to them earlier someday.

### **Conclusion**

Chinua Achebe tries his level best to present an unbiased viewpoint and the things as they are. The native culture brings in traditional virtues, but the external culture brings knowledge, and when knowledge is mixed with reason, these clan traditions and spiritual rituals are diminished. People think that they have learned a lot, and they try to overrule the traditional and native values which should not be the case. Achebe's trilogy teaches us to gain knowledge, which is good thing but, this knowledge should be used for the betterment of their traditional rituals and to forget your own values for the sake of knowledge is a clear injustice. Achebe tried to maintain an equilibrium showing us a mirror of what external forces can do to internal values. One should gain the good from others but must not forget the goodness and the values that our own land has given us. When the knowledge interferes with our culture and values, our downfall is written on the wall that is dead sure.

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**IMPACTS OF TECHNOLOGY ON EDUCATION**

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**ABSTRACT**

Education plays a pivotal role in the human development. It steers the process of learning that facilitates new dimensions of thoughts. These thoughts further keep the ball rolling for more constructive ideas and ensure an elevation in the graph of innovation. However, on account of the changes coming to the fore, it was on the verge of retrogression unless technology emerged as a real saviour and re-established the bond between a learner and the learning. Not only does technology streamline the holistic development, but also sideline the glitches in all the arenas including education. This paper is an attempt to highlight all the aspects of Education where technology has impacted ostentatiously.

Keywords: Education; pivotal; elevation; innovation; technology; ostentatiously.

**INTRODUCTION**

Education is the stepping stone to the success. It facilitates the holistic development of an individual at the outset and the whole nation at large. The incorporation of technology in this field has added feathers to its cap. Where the boredom of monotonous lectures was deteriorating the level of education, technology emerged as a beacon that increases the engagement of the learner making this process child centric. Several researches by the educators and the stakeholders have emphasized upon this aspect of extensive learning through the assimilation of technology to meet the ends of a 21<sup>st</sup> century learner. Today we talk about 'Experiential Learning' where students are given the charge and they learn by their maximum involvement. Dr Serhat Kurt also describes the concept of experiential learning given by American educational theorist David Allen Kolb who said, "*the process whereby knowledge is created through the transformation of experience*" (Kolb, 1984). Dr Kurt writes, "*It is important not to limit learning experiences to the stage that you perceive them to be.*"

**IMPACT OF TECHNOLOGY ON EDUCATION**

In the pursuance of current scenario, it is evident that technological advances are changing the world in ways that could not have been imagined. The emergence of advanced digital innovations has provided new opportunities to connect and learn, and has begun influencing every aspect of human life. From children to the aged, all have shown greater ability to adapt and adopt digital devices and innovations, which augurs well for the future. They use these devices and apps for a variety of functions, including self-expression, communication, networking, research, entertainment, and much more. As a result of technology, every opportunity is at their disposal which they can avail to strengthen their learning practices and align themselves to the future requirements. Therefore, latest National Educational Policy (NEP, 2020) also emphasises upon the integration of technology in teaching – learning process. According to a report by MaitreeBaral, "*Through the technology forum, the policy envisages that, technological advancements will be integrated into all levels of education to improve classroom process.*" For making the students ready to face the challenges in future, it's mandatory to upgrade them with the latest skills. So, it ascertains that teachers as well the schools update themselves with all the latest resources. At the same time, it also highlights the necessity of teachers' professional growth so as to make them tech savvy as, not only does technology cater the needs of the students in various disciplines but also endows them with information required to meet all the purposes. In another report on New National

Education Policy, AmandeepShukla has mentioned that it intends the extensive use of technology *“to reduce human interface to ensure efficiency and transparency in their work.”*

Children with diverse needs are distinctly benefitted by the amalgamation of technology in an opulent manner. It enables these children to get access to the lessons being imparted by many dedicated teachers worldwide. This saves their energy too giving them plenty of time to explore more, acquire more and retain more. Now, rather than merely kicking their heels, they can seize their days and polish their innate skills.

### **COVID-19 GLITCH**

The emergence of this quandary of Covid-19 has brought along with it certain fears, apprehensions, anxieties and stress of all kinds. Where the teachers are struggling to safeguard this pious deed, the parents try to cope-up with the challenge of channelizing their wards' energy and give them a right direction. Undoubtedly, technology has come to the rescue of all and has added charm to the zestful pines amidst this raging furore. Teachers have become the warriors and left no stone unturned in order to remain connected with their students in these hours of crisis. UNESCO's latest education report says, *“During this unprecedented health crisis, most teachers were found to have positive attitudes and beliefs about integrating technology in education, even though they perceived a lack of professional skills.”*

Due to this upsurge, all the educators have changed their course of action and everything is shifted from 'Offline' to 'Online' and vice versa. Be it curricular, co-curricular or extra-curricular every possible efforts is made to execute the plans idyllically. Certainly, they have exerted themselves beyond their limits to make learning a significant experience for the students. By adopting different means, they have spared no effort to recreate a virtual platform where the students feel themselves walking over the moon.

### **CHALLENGES**

The internet has enabled children to become active social agents and to mobilise for social, ecological and other causes. They are increasingly able to project their voices with unprecedented reach. But the confidence with digital technology can also be misleading. Through this unshackled gateway many other pernicious consequences have been ensued by and large. There are considerable negative effects of digital technology and cyber bullying is one of the significant ones that may impact their academic performance, infringes their social as well as personal relationships, and mental health. It has also proved to a glitch to all those who were untouched to this hi-tech platform so far. Underlining the challenges of Indian Education System in his article, Dr D P Sharma has mentioned, *“Today, we observe that there are many barriers to the pathway way of this blended teaching-learning and that is ‘lack of technology savvy community’.”*

Moreover, not every student has got access to digital devices or a proper network, therefore, has missed this quintessential process of his/her development. The CSR Journal in the Annual Status of Education Report 2021 on the *‘Impact of Pandemic on Learning’* has revealed, *“Almost a third of all children in Classes I and II did not have a smartphone available at home.”* This situation is an eye opening experience for a developing country like India where this *digital divide* has impacted the future of our students as well as the whole nation creating a massive gap in their learning and catching up with their peers.

On the other hand, it was also observed that some students do have access to this virtual platform have not attended online classes diligently. This aloof attitude of the learners can't be overlooked as it encumbers the potential of the youth the nation is going to have in the upcoming years. It is also evident that many students have restrained their learning to what is being taught on virtual platforms and have stopped taking pains to

confirm their credibility from the books. In such a case, it's a perennial truth that it requires a great sense of responsibility at both the ends – the teacher as well as the learner. In a report on Covid-19 challenges faced by the schools, DrRukmaniBanerji and DrWilimaWadhwa have written, “a majority of the teachers facing challenges in teaching said that children were unable to catch up with the curriculum (65.4%)” They have also mentioned that due to the *fluidity of the current situation* the task of imparting education has become very challenging.

Besides being lethargic, the students have also developed a habit to stay glued to their screens day in and day out restricting all the physical activities. With such a perplexity, it has obstructed the natural growth of an individual.

## CONCLUSION

No doubt the intervention of technology in the education sector has been an uplifting experience. Be it a kindergarten school or university, technology has served the purpose of education to a large extent. Due to this dynamic technology countless doors are widely opened for any to every sort of learning as per one's convenience. In addition to providing them a never ending learning process, this hi-tech platform has multiplied the number of opportunities where the students can do a bang up job and exhibit their talent worldwide. With such unanimous efforts, we may envisage the productive growth of our nation and ascertain the ultimate aim of education by removing barriers, reducing complexities and providing the necessary guidance in all the arenas so that they do not miss out among this large innovative world.

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**BLACK COMMUNITY IN TONY MORRISON'S "SULA", "SONG OF SOLOMON" AND "THE BLUEST EYE".**

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***ABSTRACT***

Using the novels, *The Bluest Eye*, *Sula* and *Song of Solomon*, the purpose of this study is to examine Toni Morrison's characters in the setting of the black community with emphasis on gender, participation in society and the class differences which exist within the black collective. All of the characters in the narratives exist in communities which are defined by the racial barriers formed by the surrounding white societies. Due to her concern with the inter-relatedness of race, gender and class as they are lived by the individuals, Morrison gives her characters physical and psychological qualities which enhance their chances for survival and fulfillment, thus leading to the survival of the black community. Through her characters in *The Bluest Eye*, *Sula* and *Song of Solomon*, Toni Morrison portrays the black community with reference to blackness and the inner struggles of the individual as well as the class differences and social structures within the collective. It can be concluded that the black community is an important part of today's society as the contemporary individual must embrace his/her culture and heritage, which is found in the unity of the collective. The purpose of this paper is to study the conceptual analysis in the novels of Toni Morrison – *The Bluest Eye*, *Sula* and the *Song of Solomon*.

Toni Morrison has dealt with the themes of gender identity, racial tension, sexism, and lustful desire, violence, oppression and sacrifice in all her novels. The subject of gender identity in African-American culture, slavery has become an unfortunate issue of the past and still haunts the present. Two major reason of suppression in that culture is being black and a woman. Women strive hard to assert their identity as human beings. Whites or any man could not relinquish the racist opportunity or the gender rights. The conflict between the black and the white communities, the victimization of the blacks by the dominant whites, the violence and bloodshed within the black communities have been presented nowhere so effectively in the entire American fiction. Though all her works are suffused with violence, Morrison has dealt with violence in each novel in a unique way.

***KEYWORDS***

Gender; Social identity; Experience; Feminism; Racial Oppression; Sexual initiation; Reality; Women and Femininity; Black Feminism; Intersectionality; Patriarchy; Love; Sex; Tragedy; Equality; Human Frailty.

***INTRODUCTION***

This research deals with the antecedents of black people through the elected novels as follows:

Toni Morrison's, "SULA", "SONG OF SOLOMON" and "THE BLUEST EYE".

Toni Morrison, the first African-American woman to win the Nobel Prize for Literature (1993), uses her novels as an expression of her concern with the inter-relatedness of race, gender and class as it is lived by individuals. Each of Morrison's works, *The Bluest Eye* (1970), *Sula* (1973), *Song of Solomon* (1977), *Tar Baby* (1981), *Beloved* (1987), *Jazz* (1992), *Paradise* (1998), *Love* (2003), and *A Mercy* (2008) provides insights into the complexity of the black community. The general shared focus in her fictional narratives is the sociopolitical

struggle that has historically characterized the African-American experience. All the characters in Morrison's novels exist in communities that are defined by the racial barriers formed by the surrounding white society. These barriers are both topological and psychological. The dominant white society violates, denies and sets the rules for these borders causing black communities to suffer from confusion and anxiety. On the one hand, Morrison's characters have physical and psychological qualities which enhance their chances for survival and fulfillment, thus leading to the survival of the black community. On the other, just "being black" in her novels does not promote unity within the community as there also exists racialization and class differences within the black collective.

Further, critics argue that while Morrison's earlier works, *The Bluest Eye*, *Sula* and *Song of Solomon* are decidedly modernist in theme, plot and method; her later novels represent the postmodern movement of twentieth century literature. All three narratives examine the individual's consciousness and reality and thus identify a new affiliation to his or her history. This is often accomplished by exploring the same occurrence through different perspectives.

The present research focuses on how racism and patriarchy influenced the development and formation of black female identity in Toni Morrison's novels, namely *The Bluest Eye* and *Sula*. Morrison's novels represent the way racial and gender stereotypes affect the quest for individual identity and selfhood establishment of the black female. Thus, the chief aim of this study is to develop a strong understanding of the different crucial aspects that influence the female character's identity realization. The study employs Black Feminist theory to examine the black female harsh experiences in a society dominated by white supremacy and communalism.

#### ***AIMS AND OBJECTIVES***

- Bring out the physical, mental and psychological outlook of the blacks during black feminism.
- To study the major affairs that led to the Black feminism.
- Recount the past circumstances of black women and make a contrast to the present in order to bring enhancement in their status.
- To create a new, liberal, productive and self-reliant African woman within the heterogeneous cultures of Africa.
- To study that modified culture which affects women in different societies.

#### ***THE NOVELS IN BRIEF***

##### ***"SULA"***

*Sula* is a 1973 novel. The novel begins when the construction of a golf course is announced, the site being the destroyed remnants of what used to be the Bottom.

The Bottom is a black neighborhood on the hill above the fictional town of Medallion, Ohio. In the first section of the novel, the origin story of the Bottom is revealed as well as how it got its name: a white farmer promised freedom and a piece of Bottom land to his slave if he would perform some difficult chores for him. Upon completion, the farmer regrets his end of the bargain. Freedom was easy, the farmer had no objection to that, but

he did not want to give up the land. He tells the slave he was very sorry that he had to give him valley land, for he had hoped to give him a piece of the bottom land. The slave said he thought valley land was bottom land, to which the master said land on the hill, not the valley, was bottom land, rich and fertile" (Morrison 5). This is obviously untrue, but it is the story that black people told to illuminate the fact that white people's racism and lies have created this topsy turvy world in which up is down and down is up. "The white people lived on the rich valley floor... and the blacks populated the hills above it, taking small consolation in the fact that every day they could literally look down on the white folks.

The story is organized by chronological chapters labeled with years. In "1919," the first named character, handsome Shadrack, a previous resident of the Bottom, returns from World War I a shattered man, suffering from shell shock or PTSD and unable to accept the world he used to belong in. Living in the outskirts of town and attempting to create order in his life, he develops methods such as keeping his shack in hospital-grade neatness. Another method is the invention of National Suicide Day, which exists on January 3rd to counter and compartmentalize the constant death he saw at war, and is essentially invitation for anyone that plans to die within the next year, to die on that day. Never assimilating, he curses even at children and whites, has regular acts of indecency, but also does odd jobs and sells fish to the townspeople and is begrudgingly woven into the urban fabric, which is this town's version of acceptance.

In "1920" and "1921," the narrator contrasts the families of the children Nel Wright and Sula Peace, who both grow up with no father figure. Nel, the product of a mother knee deep in social conventions, grows up in a stable home. Nel is initially torn between the rigid conventionality of her mother Helene Wright, who dislikes Sula's family instantly, and her inherent curiosity with the world, which she discovers on a trip. Her vow to venture out when she is older is juxtaposed by the reader being informed that not once did she leave the Bottom after that trip. This experience ultimately prompts Nel to begin a friendship with Sula. The Peace family is the opposite: she lives with her grandmother Eva and her mother Hannah, both of whom are seen by the town as eccentric, loose, yet Hannah was genuinely loved by all men, and Eva was very respected by all women. Their house serves as a home for three informally adopted boys and a steady stream of boarders. The extremely strained relationship between Hannah and Eva is revealed.

Despite their differences, Sula and Nel become fiercely attached to each other in adolescent friendship. They share every part of their lives. This includes a memory of an accidental traumatic event; One day, they playfully swing a neighborhood boy, Chicken Little, around by his hands. Sula loses her grip and he falls into a nearby river and drowns. They do not tell anyone of the event, and though Sula grieves with guilt, Nel feels a light happiness, which is implicitly revealed to be unspoken pride, because she has secretly decided that the event is Sula's fault and that she does not share the blame at all. What complicates things is Shadrack's shack, which has a direct view of the incident. To find out if he saw, Sula visits it alone and is surprised at its orderliness, but she is unable to ask the question through her tears. He comforts her and she runs away, accidentally leaving her belt, which Shadrack hangs on his wall as a sole ornament and memorandum of his only visitor.

One day, Hannah tries to light a fire outside and her dress catches fire. Eva sees this happening from upstairs and jumps out the window in an attempt to smother the flames to save her daughter's life. An ambulance comes, but Hannah dies en route to the hospital, and her mother is injured as well. The incident proves Eva's fierce love for her daughter despite previous tension. Sula, however, had stood on the porch and watched her mother burn.

Other residents of the Bottom suggest perhaps Sula was stunned by the incident, but Eva believes she stood and watched because she was "interested".

Nel chooses to marry, which implicitly breaks the bond of the girls who promised to share everything. Sula follows a wildly divergent path and lives a life of ardent independence and total disregard for social conventions. Shortly after Nel's wedding, Sula leaves the Bottom for a period of 10 years. She has many affairs and attends college. When she returns to the Bottom and to Nel, now a conventional wife and mother, they reconcile briefly.

The rest of the town, however, regard Sula as the very personification of evil for her blatant disregard of social conventions. Their hatred in part rests upon Sula's affairs with the husbands of townspeople, though Hannah did this very thing with much less criticism. The hate is crystallized when the husbands start a rumor that Sula slept with white men, successfully turning the whole town against her, though it is implied at the end that Sula was not hurt by anyone's opinions except Nel's. Ironically, the community's labeling of Sula as evil actually improves their own lives, as her presence in the community gives them the impetus to live harmoniously with one another, as well as treat each other better. For instance, Sula's affairs give the wives a reason to soothe the bruised egos of their husbands, while Sula's lack of family at her age is scorned by all the women and causes them to be better mothers. What confuses the town even more is how Shadrack, who treats everyone poorly, always treats Sula with chivalry.

The final nail in the coffin of their friendship is an affair Sula has with Nel's husband, Jude, who subsequently abandons Nel. Just before Sula dies in 1940, they reconcile half-heartedly. With Sula's death, the harmony that had reigned in the town quickly dissolves, as the couples begin bickering again and the women complain about motherhood again. Sula dies alone, and the community doesn't even attend her funeral. Shadrack, whose PTSD has faded enough for loneliness to crawl back in, is the only one saddened by her death.

Nel never remarries and instead smothers her children, repeating every one of her mother's mistakes. The Bottom slowly dissolves after Sula's death, becoming a different place. Nel visits Eva out of cordiality in 1965 in a home for old people, where Eva tells her that she knew about her and Sula drowning Chicken Little. Nel replies that the blame was just on Sula, but later realizes that the girls shared everything back then.

Nel says goodbye to Sula at her gravestone, finally realizing that all this time she thought she was missing Jude, when really it was Sula, and cries in grief as she recalls the years spent without her.

### ***“THE BLUEST EYE”***

*The Bluest Eye*, published in 1970, is the first novel written by Toni Morrison. The novel takes place in Lorain, Ohio (Morrison's hometown), and tells the story of a young African-American girl named Pecola who grew up following the Great Depression. Set in 1941, the story tells that she is consistently regarded as "ugly" due to her mannerisms and dark skin. As a result, she develops an inferiority complex, which fuels her desire for the blue eyes she equates with "whiteness".

The novel is told from Claudia MacTeer's point of view. She is the daughter of Pecola's foster parents at different stages in her life. In addition, there is an omniscient third-person narrative that includes inset narratives

in the first person. The book's controversial topics of racism, incest, and child molestation have led to numerous attempts to ban the novel from schools and libraries.

In Lorain, Ohio, nine-year-old Claudia MacTeer and her 10-year-old sister Frieda live with their parents, a tenant named Mr. Henry, and Pecola Breedlove, a temporary foster child whose house was burned down by her unstable, alcoholic, and sexually abusive father. Pecola is a quiet, passive young girl who grows up with little money and whose parents are constantly fighting, both verbally and physically. Pecola is continually reminded of what an "ugly" girl she is by members of her neighborhood and school community. In an attempt to beautify herself, Pecola wishes for blue eyes. Additionally, most chapters' titles are extracts from the *Dick and Jane* paragraph in the novel's prologue, presenting a white family that may be contrasted with Pecola's. The chapter titles contain sudden repetition of words or phrases, many cut-off words, and no interword separations.

The novel, through flashbacks, explores the younger years of both of Pecola's parents, Cholly and Pauline, and their struggles as African Americans in a largely White Anglo-Saxon Protestant community. Pauline now works as a servant for a wealthier white family. One day in the novel's present time, while Pecola is doing dishes, drunk Cholly rapes her. His motives are largely confusing, seemingly a combination of both love and hate. After raping her a second time, he flees, leaving her pregnant.

Claudia and Frieda are the only two in the community that hopes for Pecola's child to survive in the coming months. Consequently, they give up the money they had been saving to buy a bicycle, instead planting marigold seeds with the superstitious belief that if the flowers bloom, Pecola's baby will survive. The marigolds never bloom, and Pecola's child, who is born prematurely, dies. In the aftermath, a dialogue is presented between two sides of Pecola's deluded imagination, in which she indicates conflicting feelings about her rape by her father. In this internal conversation, Pecola speaks as though her wish for blue eyes has been granted, and believes that the changed behavior of those around her is due to her new eyes, rather than the news of her rape or her increasingly strange behavior.

Claudia, as narrator a final time, describes the recent phenomenon of Pecola's insanity and suggests that Cholly (who has since died) may have shown Pecola the only love he could by raping her. Claudia laments on her belief that the whole community, herself included, has used Pecola as a scapegoat to make themselves feel prettier and happier.

### ***"SONG OF SOLOMON"***

*Song of Solomon* is a 1977 novel by American author Toni Morrison, her third to be published. It follows the life of Macon "Milkman" Dead III, an African-American man living in Michigan, from birth to adulthood. This novel won the National Book Critics Circle Award, was chosen for Oprah Winfrey's popular book club, and was cited by the Swedish Academy in awarding Morrison the 1993 Nobel Prize in literature.

*Song of Solomon* opens with the death of Robert Smith, an insurance agent and member of The Seven Days, an organization that kills white people in retaliation for the racial killing of black people. Smith's attempt at flight and his subsequent death function as the symbolic heralding of the birth of Macon "Milkman" Dead III. A crowd of people gather to watch the attempted flight, including Milkman's mother, Ruth, his two sisters First Corinthians and Magdalene (called Lena), his aunt Pilate, and his friend later in life, Guitar. The appearance of

Smith on the roof causes Ruth to go into labor. In the chaos that follows, the hospital admits her and she delivers her son, Macon Dead III—the first African-American child born in the hospital.

The novel picks up again with Macon Dead III when he is four years old: he grows stifled, alienated, and disinterested in his home life in Southside. Ruth still breastfeeds him, in an escape from her repetitive life and loveless marriage. One day, she is seen by one of Macon Dead Jr's employees, who nicknames the boy "Milkman".

Pilate, a bootlegger and quasi witch, becomes a central figure as Milkman grows through adolescence and into his thirties. She was highly influential in Milkman's birth, having brewed a "love potion" to coerce her brother into conceiving Milkman. Traveling up from Pennsylvania, Macon Dead Jr. was successful in managing real estate and marrying Ruth, the daughter of the only black doctor in town. Their father, an illiterate farmer, is swindled into giving up his land, and subsequently murdered when he refuses to move. Fleeing, Macon and Pilate come across a cave that contains bags of gold after killing a white man. Pilate does not allow Macon to take the gold, in fear of trouble from killing a white man, and Macon resents her for the missed opportunity. The two siblings parted ways shortly after. Pilate wanders, working in New York State as a migrant worker and again in Virginia, continually ousted by communities for her absence of a navel. She eventually settles on an island off the coast of Virginia and becomes pregnant with her daughter Reba. She roams for about twenty years, until Reba becomes pregnant with Hagar. Deciding that Hagar needs her extended family, Pilate moves her daughter and granddaughter to Michigan to be near her brother Macon. For Milkman, while in his teens, Pilate becomes the first glimpse into his family's past. He also forms a sexual connection with his cousin Hagar.

Milkman's relationship with his family is strained, particularly towards his father. He has very little connection with his sisters and "Part One" of the novel ends with Lena admonishing Milkman. Macon's resentment for Ruth comes from his perception that she had an obsessive, sexual relationship with her father and her daily attempts at emasculating him. Ruth, however, maintains that the scene that Macon describes to Milkman is exaggerated by Macon, and that she was merely kissing her father's hands, a part of him that was unaffected by the illness that killed him. Additionally, Milkman becomes alienated from Hagar. He eventually spurns Hagar and she becomes obsessed with him, attempting to kill him once a month, but never following through.

Milkman is equally alienated from the community of Southside. This alienation manifests chiefly in his relationship with Guitar, a member of the Seven Days.

Milkman eventually mentions to Macon the bag that hangs from the ceiling of Pilate's modest home. The bag is heavy and Pilate mentions that it contains her "inheritance." Macon interprets "inheritance" to mean the gold that was left behind in the cave, assuming Pilate returned to the cave and claimed the gold for her own. Macon then sends Milkman and Guitar on a "quest" to steal the bag from Pilate. Milkman and Guitar succeed, but are arrested by the police after they discover the bag contains human bones. Macon Dead and Pilate go to the police station to free the two young men. Macon attempts to use his influence and money to persuade the police to release the men, but ultimately it is Pilate who frees them by acting like a worn-out, subservient, old woman. For Guitar, Pilate's performance elicits hatred and deepens his misogyny.

"Part Two" of the novel positions Milkman making a journey south to Pennsylvania in search of the gold that must still be in the cave. There he meets the Reverend Cooper who knew Milkman's father. Cooper shares tales

of Macon Dead that surprise Milkman and begin the connection between Milkman and his past. He eventually finds the land where his grandfather lived and an old house that stands upon it. There he encounters Circe, an impossibly old ex-servant of the Butler family who has outlived their last descendant. She relates the tale of Macon Dead Sr.'s body washing up from his grave and being moved to the cave where his children found the gold. She also tells Milkman of a Native American woman named Sing and a black man whom she married named Jake. Milkman leaves and finds the cave, but no gold, and only one human skeleton where there should be two. He deduces that Pilate must have retrieved the gold and taken it to Virginia where they had ancestors, so he sets off in search of it.

Milkman stumbles across Shalimar, Virginia, by accident. While out hunting with older men from Shalimar, Milkman is attacked by Guitar, who has followed him to Virginia. Guitar is under the impression that Milkman has taken the gold, and thus wants revenge. Struggling, Milkman discharges his gun, scaring away Guitar; he does not tell the hunters about the encounter.

Shortly thereafter, Milkman is told of the Byrd house. There he can find a woman, Susan, who might connect the fragments of Milkman's ancestry. Once more, the woman named Sing is brought up. When Milkman goes to the Byrd house, he is offered little information. He leaves the house, wary that Guitar is stalking him, but promises to visit again. He encounters Guitar again, who claims that Milkman took the gold for himself. Milkman is unable to convince him otherwise.

The following day, Milkman sees the children of the town playing and singing the "Song of Solomon." Milkman remembers that Pilate sang a similar song, and begins to piece together what little he knows about his family history and the history of the song. Eventually, it dawns on him that the song is about his family. He later returns to the Byrd house and confirms his suspicions through Susan. After this, he heads back to Michigan to find Pilate.

While Milkman is gone in Virginia, Hagar has sunk into a terrible depression from him having spurned her. She eventually catches a glimpse of herself in a mirror and comes alive again, thinking that if she fixes herself up Milkman would want her. Pilate and Reba scrape up money and Hagar spends it on dresses, makeup, and a haircut. The effort amounts to little, and Hagar succumbs to her grief. A collection is taken up by the community to bury Hagar, and Pilate sings a mournful song at her granddaughter's funeral.

Milkman thinks it only appropriate that Macon Dead Sr. be laid to rest in his ancestral home in Shalimar. Milkman finds Pilate at her home, and she knocks him unconscious for the grief that caused her granddaughter to die. When he comes to, Milkman convinces her to travel with him to Virginia and bury her father. They make the journey and bury Macon Dead Sr. overlooking the ravine. After placing the bones in the grave, Pilate is killed by a gunshot from Guitar, intended for Milkman. The novel ends with Milkman leaping toward Guitar. The outcome is left unresolved, but finally it seems that Milkman has learned to "fly".

### **ANALYSIS**

*Sula* (1974) is Toni Morrison's second published novel. Like *The Bluest Eye*, the novel is a story of two girls coming of age. As children, the two girls in question, Sula Peace and Nel Wright, function as two halves of a whole, often seeming to complete each other in opposition.

As they reach and achieve maturity, the differences in the girls' responses to the pressure to conform to the norms of their community separate them and split their bond, which is not reconciled until the end of the novel. Sula confronts issues of loyalty, family, assimilation, innocence, gender, and sexuality, but is at its heart an examination of the priorities that determine the character, quality, and relationships of a woman's lifetime.

Like Morrison's first two novels, *The Bluest Eye* and *Sula*, *Song of Solomon* (1977) is a coming of age story. Unlike her first two novels, *Song of Solomon* centrally is the saga of a young man. In fact, *Song of Solomon* is the first of Morrison's novels to have a male as a primary protagonist.

*Song of Solomon* draws on diverse mythological traditions, particularly biblical, Greco-Roman, and African to create a uniquely African-American narrative. The story requires the reader to participate in order to piece together the seemingly incompatible elements of the story to make a sensible and meaningful whole.

Milkman, the primary character in *Song of Solomon*, is a self-absorbed, petulant, and rootless man who begins a self-interested quest for financial gain and ends up discovering the story of his family. Through the process of learning about his history, Milkman matures, learns responsibility, transcends his own selfishness, and creates a meaningful existence for himself embedded in an embrace of his family history. *Song of Solomon* won the National Book Critics Circle Award in 1977. Morrison credits the success of *Song of Solomon* with her self-identification as a writer.

## **CONCLUSION**

In conclusion, the characters in *The Bluest Eye*, *Sula*, and *Song of Solomon* are shown in the setting of a society which is constantly weighed down by the heritage of slavery and racial brutality and is profoundly rooted in customs that have formed and influenced the African-American culture. Toni Morrison portrays the black community with regards to blackism and the inner struggles of the individual as well as the class differences and social structures within the collectivity. Morrison also emphasizes the importance of the black society as every contemporary individual must negotiate his/her culture and heritage, which are found in the unity of the community. The characters of Claudia, Sula, and Milkman form their present identities through the understanding of their African-American heritage and achieve individual fulfillment within the collectivity. The author guides us toward the conclusion that by honoring a mixed heritage and constantly challenging racial interpretations over a period of time, at personal, as well as social and cultural levels, new racial identities and meanings will be formed, both within and outside the black community.

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## अमृताशेरगिलकीअमरकृतियाँ।

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### विषय

### सार

अमृताकाजीवनमहाकाव्यहै।हमेंलगतहैकिभारतीयकलाकाइतिहासपूरीतरहसेअलगहोता, यहबहुतअधिकसमृद्धहोता।भारतीयआधुनिककलाकीजननीअमृतामरणोपरांतभीभारतीयआधुनिककलाकासमर्थनकरना जारीरखतीहै।उनकेजीवनकेबारेमेंकईरंगीनउपाख्यानहैं।जिन्होंनेइतिहासमेंएकअमिटछविबनाई। इन्हीकलाकारोंमेंसेएकथी – प्रसिद्धभारतीयचित्रकारअमृताशेरगिल ।आगेचलकरअमृताशेरगिलहीभारतीयआधुनिककलाकीजननीबन गई । उनकाजीवनऔरउनकासमयआनेवालीकलाकारपीढ़ियोंकेलिएसदाहीप्रेरणास्त्रोतबनेगा । .

### विस्तार

पश्चिमीदृश्यकलाकीदुनियामेंहमेशासेहीपुरुषोंकादबदबारहाहै।परन्तुभारतीयआधुनिककलाखुदकोपश्चिमीकलासेअलगकर तीहै, क्योंकिइसकीशुरुआतहीउसशानदारमहिलाकलाकारसेहुईहैं, जोआगेचलकरभारतीयआधुनिककलाकीजननीबन गई, उन्हेंहरकोईअमृताशेरगिलकेनामसेजानताहै।अमृताकेदादादाराजासूरतसिंहमहाराजारणजीतसिंहकेक्षत्रपथे। औरइसीलिएउनकेपिताश्रीउमरावसिंहशेरगिलपंजाबकीकईरियासतोंसेताल्लुकरखतेथे।वेएकराष्ट्रवादीथेऔरफोटोग्राफीमेंभी उनकीबड़ीहीरुचिथी।उन्होंनेअपनाजीवनउच्चकुलीनजीवनशैलीमेंजीतेहुए, क्रिकेट, शतरंजखेलनेऔरफोटोग्राफीमेंखुदकोशामिलकरनेमेंबिताया।अमृताकीमांमैरिएनटोनेटहंगरीकीएकयहूदीओपेरागायिकाथी, जिनकासंबंधबहुतसमृद्धपृष्ठभूमिसेथा।उमरावऔरमैरी1912मेंलाहौरमेंएकपार्टीमेंमिलेऔरशादीकरयहजोड़ाहंगरीचलागया ।अमृताकाजन्म1913मेंहुआऔरएकसालबाद1914मेंउनकीबहनइंदिराकाजन्महुआ।दोनोंबहनोंकाएकबहुतहीसमृद्धऔरखुश हालबचपनरहा।आजहमारेपासउनकेबचपनकेबहुतसारेफोटोग्राफीदस्तावेजहैंक्योंकिउनकेपिताएकफोटोग्राफरथेऔरकहाजा येतोवास्तवमेंवेभारतकेपहलेआधुनिकफोटोग्राफरथे।1921में, शेरगिलपरिवारनेशिमलाकेसमरहिलमेंहोम (HOLME)नामकाएकघरखरीदा।यहाँअमृताऔरइंदिराकेलिएनिजीशिक्षकोंकोरखागया, इनसेदोनोंबहनोंनेसंगीतऔरपेंटिंगकेगुरसीखे।अमृताजल्दीहीपियानोऔरवायलिनबजानेमेंबहुतकुशलहोगईऔरयहांतक किशिमलाकेगेटीथिएटरमेंसंगीतकार्यक्रमदेनाशुरूकरदिया।अमृताकोशिमलाकेएककॉन्वेंटस्कूलमेंदखिलादिलवायागया।ले किन11सालकीउम्रमेंहीउन्हेंकॉन्वेंटसेनिकालदियागयाक्योंकिअमृतानेमदरननकेसामनेस्वीकारकियाकीकिवहएकनास्तिक

है। हम कल्पना कर सकते हैं कि अमृता उस छोटी सी उम्र में कितनी साहसी रहती होगी।

अमृता ने इस दौरान शिमला में कई पेंटिंग की। उन्होंने अपने परिवार,

नौकरों और दोस्तों के चित्र बनाए हैं और ये चित्र चित्रकारी की उम्र में ही खूबियों से सरोबर थे जो उन्हें पहले से ही उच्च स्तर के चित्रकार का दर्जा दे चुके थे। वह एक मानव शरीर के रूप को पूर्ण आत्म विश्वास के साथ खिंची गई रेखाओं के साथ एक असल व्यक्ति में बदलने में सक्षम थीं।

शिमला में उनकी माँ मैरी एक इटालियन मूर्तिकार के संपर्क में आईं। ये मूर्तिकार जब

1924

में वापिस इटली गया तो अमृता की माँ ने अमृता को उच्च कोटि की कला शिक्षा हेतु इटली भेज दिया। यहाँ अमृता को महान इतालवी

लवी मास्टर्स के कार्यों को देखने का एक बड़ा अवसर मिला है। वह कुछ समय फिनलैंड में भी बिताती हैं। उनकी एक कृति है जिसे बाल-

वधु के नाम से जाना जाता है। बालवधु इसलिए बहुत महत्वपूर्ण है क्योंकि इससे जुड़ा हुआ उनकी डायरी में एक छोटा-

सानो भी मिला है। नोट कहता है कि

“एक दिन हम एक भारतीय विवाह के लिए गए थे। दुल्हन की उम्र 12 साल थी और दुल्हे की उम्र 50 से अधिक थी और उसकी पहले से ही तीन पत्नियाँ भी थीं। बेचारी छोटी दुल्हन। वह बगीचे के एक कोने में अकेले बैठी थी,

जहाँ दुल्हे के चारों ओर सभी भारतीय महिलाओं ने भव्य वस्त्र और सोने के चाँदी के हीरे मोती और पन्ना पहने हुए थे। इतनी चमक से आपकी आंखें भी चौंधिया जायें।”

1926 में उन के मामा इरविन बक्ते ने शिमला का दौरा किया।

इरविन एक प्रसिद्ध डॉलोजिस्ट एक लेखक और एक चित्रकार भी थे। उन्होंने पेंटिंग में अमृता की अपार प्रतिभा को पहचाना और उन्हें कला के लिए प्रोत्साहित किया। अमृता जब 16 साल की हो गई तो वह एक डॉइंग करती हैं जिसे टिंडरबॉक्स के नाम से जाना जाता है। यह चित्र हमें मकहेंगे कि यह उन के उन साहसिक कार्यों का संकेत है जो यौन रोमांच अमृता के शुरुआत के होते थे।

इसी समय के दौरान अमृता ने खुद का एक बहुत ही सुंदर चित्र चित्रित किया है। ग्रांडे चौमीरे और फिर वह कला का अध्ययन करने के लिए इटली को ले डेस ब्यूक्स-आर्ट्स की ओर बढ़ती हैं। केवल 4 साल के भीतर अमृता खुद को एक कलाकार के रूप में स्थापित करती हैं,

जो पेरिस में आधुनिक समय का मकका है। यहाँ अमृता शेरगिल में एक विशिष्ट कला शैली उभरी। कपड़ों के लिए और होठों के लिए लाल रंग का उपयोग जुनून और कामुकता का संकेत है और कलात्मक करियर के दौरान उन के सभी कार्यों में एक आवर्ती तत्व है। महज 19 साल की उम्र में अमृता शेरगिल ने ग्रैंड सैलून का शीर्ष पुरस्कार जीता और वह ग्रैंड सैलून की सबसे कम उम्र की सदस्य बनी,

जो कि सी भी कलाकार के लिए एक बहुत ही प्रतिष्ठित सम्मान है। उनकी इस कैनवास कृति **THE YOUNG GIRLS** में उन्होंने अपनी छोटी बहन इंदिरा के साथ उनकी एक महिलामित्रिका चित्रण किया है।

अगर कहा जाये तो गलत नही होगा कि इस दौरान वह केवल कैनवास पेंट नहीं कर रही है,

इस दौरान वह पेरिस को गुलाबी रंग में पेंट कर रही थी।

उनके द्वारा बनाई गई एक पेशेवर मॉडल की पेंटिंग है जो इस दौरान की जाती है और इस पर पाब्लो पिकासो का बहुत प्रभाव दिखाई देता है।

यह मॉडल बहुत दुखद लगर ही है

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हम यह कह सकते हैं कि शायद वह किसी शारीरिक बीमारी से पीड़ित है। इस काम के माध्यम से अमृता मूल रूप से हमारा ध्यान इस तथ्य की ओर आकर्षित करने की कोशिश कर रही है कि पेरिस की ये ग्लैमरस दुनिया न कली है। इस ग्लैमर के पीछे उदासी, उदासी और अकेलापन है। पेरिस में रहते हुए अमृताने कई लैंडस्केप भी बनाये।

अमृता पॉल गाउगिन के कामों से काफी प्रभावित थीं,

जो ताहिती द्वीप में पेंटिंग कर रहे थे। वह गाउगिन मॉडल से प्रभावित होकर एक ऐसा काम तैयार करती हैं,

जिसे ताहितीयन के रूप में अमृता का सेल्फ पोर्ट्रेट कहा जाता है।

पेरिस की चका-चौंध से उबमहसूस करने लगी अमृताने 1934

में भारत लौटने का फैसला किया। भारतीय संस्कृति,

साहित्य के बारे में वह महसूस करती है कि भारत उसके कलात्मक विकास में उसकी मदद करेगा। यूरोप में उनके प्रवास ने उन्हें भारत की समृद्धि की खोज में मदद की है।

अमृता शब्दों की भी उतनी ही जादूगर हैं जितनी वह पेंटिंग की 21 साल की उम्र में ही उनके पास ये घोषणा करने का आत्मविश्वास था- यूरोप तो बराक, मैट और पिकासो के लिए है।

भारत सिर्फ मेरे लिए है। मुझे इस तरह का एक बयान देने के लिए एक प्रतिक्रिया शक्त की आवश्यकता होती है, जो कि भारत में है,

अमृता पहले कुछ साल अमृतसर में अपनी बहन के घर बिताती है और फिर भारत भ्रमण पर निकल जाती है। अब उनके काम में पूरी तरह से बदलाव आता जाता है।

वह भारत की गरीबी से दुखी और अकेली महिलाओं का गहराई से अध्ययन करके उनको एक कलाविषय के रूप में चुनती हैं।

जो अनुभवी कलाकार की अभिव्यक्ति बन जाता है। कला समय की अभिव्यक्ति है

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अमृता का काम उसके भारतीय ग्रामीण जीवन का अनुभव बन गया।

वह भारत के गरीबों की आवाज बनना चाहती थी। जो काम उन्होंने पेरिस में चित्रित किया था,

उनका वो काम गहराई से प्रभावित है। कार्ल खंडालावाला अमृता को अजंता,

एलोरा और दक्षिण भारतीय शहरों की यात्रा करने के लिए प्रोत्साहित करती है। अमृता को चिचकेडचमहल के भित्तिचित्रों और पद्मनाभम पुरम के भित्तिचित्रों से अभिहित हुई। इन यात्राओं के बाद अमृता द्वारा किए गए कार्यों को आकार देने में ये भित्तिचित्र एक बड़ी भूमिका निभाते हैं। यह एक और दिलचस्प विकास है जो उन की पेंटिंग्स में होता है, फिर पेंटिंग्स को भूरे,

लाल और अचानक एक सफेद पैच में चित्रित किया गया, जो हमारे देश के कई कामों में कुछ रूपों को दर्शाता है। दुल्हन का प्रसाधन,

ब्रह्मचारीज और दक्षिण भारत के ग्रामीण बाजार जाते हुए उनके प्रमुख कामों में से एक है। गतिशील चित्रण और लैंडस्केप भी दिखाई देते हैं। उनके काम में अब मुगल लघुचित्रों का अधिक से अधिक प्रभाव भी दिखाई देने लगा था। उनके कुछ काम अस्वीकृत हैं। वे प्रदर्शित नहीं हैं।

वे अस्वीकार्य हैं और वे उग्र भी हैं

उन्हें बॉम्बे आर्ट सोसाइटी द्वारा तीन लड़कियों के लिए एक स्वर्ण पदक दिया जाता है जो अमृता शेरगिल का पसंदीदा काम है। वह कहती हैं,

"कलाकार को मेरे काम के सार्वजनिक अनुमान को अस्वीकार करने या स्वीकार करने का पूरा अधिकार है,

जब जनता कला के किसी काम के संबंध में कोई गलती करती है, तो यह कलाकार का व्यवसाय है कि वह कुछ इशारों में उसे प्रदर्शित करे- प्रकट करें

. वह बहुत मुखर थीं। उसे अपने मन की बात कहने का कोई डर नहीं है। वह कहती है कि उससे रवींद्रनाथ टैगोर की पेंटिंग पसंद है लेकिन वह उस की कविता को ना पसंद करती है। वह जेमिनी राँय को पसंद करती हैं। वह भारत में कला के स्तर से बहुत खुश नहीं थीं। उन्हें लगता था कि यह पश्चिमी अकादमिक दुनिया बहुत खराब है। वह जो बयान देती है वह बहुत शक्तिशाली और बहुत मजबूत है।

1938 में अमृता अपने चचेरे भाई डॉ. विक्टर ईगन के साथ शादी करने के लिए हंगरी वापस चली गईं। वे एक-दूसरे को अपने बचपन से ही जानते थे। और जब वह पेरिस में पढ़ रही थीं। वह अक्सर हंगरी में समय बिताती हैं और इसीलिए वे हमेशा से अच्छे दोस्त थे। अब वह हंगेरियन ग्रामीण दृश्यों को चित्रित करना शुरू कर देती हैं। भारत ने उसे इतना प्रभावित किया है कि वह ग्रामीण भारत को हंगरी में चित्रित करने की एक शैली ले जाती हैं और हमारे पास उन के कई दिलचस्प काम हैं जैसे हंगेरियन फार्म, हंगरी का ग्रामीण बाजार, पोटेटो पिलर है। उनका एक लैंडस्केप भी है जो हंगरी में एक बर्फ से ढका हुआ लैंडस्केप है।

अमृता और विक्टर 1939 में भारत वापस लौट जाते हैं। अब वे उत्तर प्रदेश में सराय में रहने का फैसला करते हैं। जहां उन्होंने कुछ साल बिताए और इस दौरान की गई पेंटिंग्स में मुगल कला बहुत स्पष्ट प्रभाव दिखाया गया है। उनके महत्वपूर्ण चित्रों में - एक महिला चार पाईपर। एक महिला चार पाईपर लेटी हुई है। आग की लपटों की तरह उसके चारों ओर एक गरमागरम लाल हरे रंग की पृष्ठ भूमि में एक मोटी काली महिला उसे पंख लगा रही है। एक गहरे नीले रंग की चिलमन है जो मजेंडा और क्रीम के फूलों के साथ कशीदाकारी की जाती है। इस समय उनकी - स्नान, झूले, हल्दी गाइंडर की कई पेंटिंग हैं। सितम्बर 1941

में वे लाहौर चले गए और किराए के एक कान जिसका नाम सरगंगाराम हवेली बताया जाता था में रहने लगे। डॉ. विक्टर ने भूतल पर एक औषधालय शुरू किया और अमृता के पास सबसे ऊपर की मंजिल पर एक आर्ट स्टूडियो था। एक महीने के बाद ही अमृता के पेट में दर्द होता है। डॉ. विक्टर को लगता है कि यह कुछ पेचिश है क्योंकि उन दिनों उन्होंने कुछ पकौड़े आदि बहार की चीजें खाई थीं I , लेकिन वह और बदतर से बदतर होती जाती है। कोई भी यह नहीं सोच सकता था कि यह दर्द इतना घातक हो सकता है। I लेकिन धीरे-धीरे अमृता को मांमं जाने लगती है और 5

दिसंबर को सिर्फ दो दिनों के भीतर वह इस दुनिया से जा चुकी होती है। पिता उमराव सिंह और माता मैरी को इस बात से बहुत ही आघात लगता है। उनका अंतिम संस्कार रावी नदी के तट पर किया जाता है। विक्टर ने उनका दाह संस्कार किया और उनकी चिता का धुँआं रावी की हवाओं में घुलकर अमृता को अमरता प्रदान कर गया। अमृता को जाने के दुःख से ग्रस्त होने के कारण उमराव सिंह और उनकी मां मैरी का भी निधन हो गया है। क्योंकि मैरी गंभीर अवसाद में चली जाती है। वह खुद को कई बार मारने की कोशिश करती है और आखिरकार 1948 में उसने उमराव सिंह के स्टडी रूम से एक बंदूक उठाई और खुद को गोली मार ली।

अमृता का जीवन महाकाव्य है। हमें लगता है कि भारतीय कला का इतिहास पूरी तरह से अलग होता,

यह बहुत अधिक समृद्ध होता। भारतीय आधुनिक कला की जननी अमृता मरणोपरांत भी भारतीय आधुनिक कला का समर्थन करना जारी रखती है। उसके जीवन के बारे में कई रंगीन उपाख्यान हैं। खुशवंत सिंह शिमलामें हुआ किस्सा सुनाते हैं। अमृता ने खुशवंत सिंह के घ

रकादौराकिया।वेघरपरनहींथे।आनेपरखुशवंतसिंहउसेदीवारपरएकपेंटिंगदिखातेहैंऔरकहतेहैंकियहमेरीपत्नीकाकामहै, वहएकअपरिपक्वचित्रकारहै।अमृतानेकहा, 'मैंयहदेखसकतीहूँ'।खुशवंतसिंहकेपासकहनेकेलिएकुछनहींहै। अमृताकेकार्योकोसरकारद्वाराराष्ट्रीयखजानेकेरूपमेंघोषितकियागयाथा।भारतमेंनईदिल्लीमेंलोधीउद्यानकेपाससेगुजरने वालीएकप्यारीसीसड़कहै, जिसकानामउन्हींकेनामपररखागयाहै- अमृताशेरगिलरोड।अगरवहबचजातीतोनियतिसकेप्रतिइतनीक्रूरनहींहोती।जवाहरलालनेहरूनेउनकेनामकोललितकलाअकादमीकाअध्यक्षयाकुछऐसेसंगठनोंकेलिएप्रस्तावितकियाजोकलाऔरकलाकारकेप्रतिसमर्पितथे, नकिकलाऔरसाहित्यकोसमर्पित।अमृताएकऐसीकलाजननीबनीजिसेआधुनिकभारतीयकलाकोपोषितकरनेऔरउसेमहानउंचाइयाँतकलेजानेकाअवसरमिला।

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**Socio Economic Analysis of Poverty and Food Insecurity at Household Level: A Case Study of Bajhang District, Nepal**

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**Abstract**

The poverty and food insecurity is the crucial development agenda since it started its planned development in 1956. So that, The study aimed to analyzing the nature, situation, intensity and distribution of the poverty and food insecurity, their socioeconomic drivers and the community response towards food insecurity in Bajhang District of Nepal. The study district was selected purposively and was further categorized in to two clusters. Cross sectional 120 household (60 from each cluster) data in 2021 were collected using sample random sampling by pretested interview schedule. Intensity of poverty and food insecurity was measured using head count ratio, gap index and severity index. Further binary logit model was used to identify the impact of different socioeconomic variables on household poverty and food insecurity. Poverty incidence among the household in the study district was 52.5% and it was 46.7% in cluster one and 58.3% in cluster two of the district. Poverty gap index was higher in the cluster one of the district whereas severity of poverty was higher in the cluster two compared to the cluster one. Education attainment of Household head, foreign employment, livestock standard unit (LSU), Household training access had negative and significant impact on household poverty. Adult equivalent has positive impact on the status of household poverty at 1% level. The food insecurity incidence and food insecurity gap were higher in the cluster two of the study area compared to the one. Small proportion of the household was found food self-sufficient. Wage labor work, spending off farm and remittance income, low food consumption, food borrowing were the most adopted coping strategies by Households. Land holding had negative effect on household food insecurity at 5% whereas adult equivalent, household poverty and damage done by drought were positive effect on the status of the household food insecurity. The household in the cluster two were found to be more probable of being poor and food insecure. The study suggests policy makers to focus on the educational attainment of the household members, promote production and consumption of local indigenous crops like *kaguno* (Fox tail millet) *Chino* ( Pearl millet), *Kodo* (Finger millet), *Bethe*, and forest product like *lokta*, *allo*, *Tarul* (Yam) for income, development of road networks, focusing on income generating activities for vulnerable communities, irrigation facility to cope the harsh conditions of seasonal draught to improve the status of poverty and food insecurity in Bajhang.

**1. Introduction and Background**

Nepal's economy is highly dependent on agriculture with more than 60% of the population working and accounting for 30% of GDP and cultivable area only 25%, 33% of area is forest and most of the area is mountainous. (MOALD, 2019). The agriculture production is increasing in recent years but still there is the chronic food insecurity especially on the mountainous areas of Far western Nepal. In recent years, Nepal's economic and social progress has included reducing poverty rates, increasing literacy rates, and narrowing gender disparities. The country aims to achieve the Sustainable Development Goals by 2030. However, poverty is still high in rural areas and among socially disadvantaged groups. The 20% of Nepalese population is still living under the poverty line, their household production is not sufficient for year round consumption. Many Nepalese are dependent on foreign employment and out farm income to cope the situation. Through their remittances (which together account for a third of GDP), food insecure Nepali households strive to mitigate regular food shortages and the negative effects of unpredictable harvests (NPC & WFP, 2019).

The global outbreak of corona virus disease (COVID-19) in 2020 has adversely affected Nepal's economic growth, equity, and poverty reduction achievements. (ADB, 2020). The poverty and food insecurity is becoming prior country level problem of many countries due to the pandemic disease COVID-19 crisis, which unfolds breaking of domestic food supply chains, inactivation of farm labor due to countrywide lockdown, loss of incomes and employment are creating huge tensions and food insecurity in many countries (WFP, 2020). Due to the socio-economic impact of the pandemic in Nepal, a significant number of people, particularly the poor and vulnerable, are at risk of suffering from acute starvation (Subedi, 2020). According to the Household Food Insecurity Access Scale 29% of households of urban and 38% of rural households is food insecure. While Nepal's overall demand for food increases over time, unregulated urbanization of plains and fertile land, particularly in the *Terai*, has put downward pressure on the food supply in the country.

There has been considerable attempts done by GON and its development partners to address the food insecurity and poverty problem of Nepal but somehow it has not fruitful impact on minimization practically. Such situation is still prevailing in spite of the fact that the country is receiving a substantial amount of financial as well as other support since it began its first plan in 1956. Different subsidy schemes were introduced in the past including fertilizer subsidies, credit subsidies, irrigation subsidies as well as food subsidies provided to achieve the goal to minimize poverty and food insecurity through enhanced agriculture production by the help of improved technologies. However their impacts have been poor due to limitation in their use by rural HH. Rural HH are unable to produce enough food on their farms, nor are they able to meet the food security benchmark income in deficit months. (Maharjan et., al, 2011).

Nepal has been receiving food aid from past to cope with the problem of food insecurity. In this support the organization like WFP has been assisting Nepal to fight with the problem of food insecurity. Other neighbour countries like India, China, Japan, USA has also been involved in combating food insecurity problems but the problem of regional disparity of food security in Nepal is not only due to food unavailability as the available food is not distributed equally well in all regions due to legal and illegal export of food produced in Terai region to India.

Regarding food insecurity and poverty the numerous studies were conducted in far western province as a whole but the Bajhang is one of that district in the far west Nepal which is recognized differently in terms of the access of basic infrastructure and services, agriculture production and productivity, socio-cultural and geographical settings. The numerous programs has been launched in Bajhang district by GON and NGO/INGO with the goal of poverty alleviation and achieving food security but the progress is still there where it was started with interaction of the districts geographical unsuitability and poor connectivity in the presence of varied socio-cultural setting. So the study is done to recognizing poverty and food insecurity situation which are interconnected with each other.

### 1.1 Objectives

The study is done with following objectives

- i. To profile the level of household poverty and food insecurity with intensity and severity in the study areas.
- ii. To identify the potential social and economic drivers of household poverty and food security in study area.
- iii. To assess community response on coping strategies on food insecurity and poverty at study area.
- iv. To suggest policy measures to tackle the problem of poverty and food insecurity in the study area.

## 2. Research Methodology

The study was carried out in Bajhang district of Nepal during July-August 2021. Bajhang is a mountain district in the far-western development region (now called as Sudur Paschim Pradesh) covering an area of 3411km<sup>2</sup>. The elevation of the district varies from 900 m to 7035 m above sea level (masl), the climate of the region is variable due to the great variation in altitude consisting 60% of temperate, climate region, 30% mild temperate region, and only 10% sub tropical region. The jethi bahurani and Saipal mountain range is evergreen snowy cap of the district. Average rainfall of the district is 50-150mm based on data taken near headquarter area of the district. The district has only 7.83% cultivable land, 29.94% area of the district is covered by forest. Temperature range of the district is minimum 20 to maximum 35<sup>0</sup>C in summer and minimum 2 <sup>0</sup>C to maximum 18<sup>0</sup>C in winter season. The total population of the district is 195,159, which consists 47.44% (92,794) male, and 52/45% (1, 02,365) females living in total 33,786 households, which covers 0.74% of national population. The average HH size of the district is 5.78. The annual population growth rate of the district is 1.61% and the average population density of the district is 57/sq. km. (CBS, 2013).

**Sample size determination and sampling procedure:** Household's respondents of the study were selected through purposive and simple random sampling technique. Bajhang was selected purposively and it was further divided in to 2 clusters named first cluster and second cluster. First cluster consist of 6 local levels which are connected with district head quarter, 2<sup>nd</sup> cluster consist of 6 local levels which are far from district head quarter. Among the cluster each of 2 local bodies are selected randomly for the study. The *Jayaprithivi Municipality* and *Masta Rural Municipality* is selected from first cluster whereas *Kedarsyun* and *Saipal Rural municipalities* were selected form cluster 2. Altogether 120 respondents were selected from these clusters (each of 60) by simple random sampling method. Data were collected with the use of interview schedule and structured and semi-structured questionnaires. Secondary data regarding poverty and food insecurity, impact of prolonged draught on overall agricultural production and other required information related to the geographical attributes of the study area were collected from the AKC, VHLSEC, WFP, FAO, ADB, NPC, CBS, Rural municipalities publications, Bulletins regarding the subject and other organizations/publications.

**Statistical analyses:** The data was collected and compiled from survey area and the analysis was done using MS Excel version2013, social package for statistical software (SPSS) version 26.00 and STATA version 13 for windows. The descriptive statistics was used in this study. **Defining the factors affecting Household poverty and food insecurity**

The empirical model chosen is determined by the type of data and the study's objectives. The logistic regression technique is applied to analyze determinants of food security by Arene and Anyeji (2010), Felker-Kantor and Wood (2012), Joshi and Joshi (2017). By extending the basic concepts, logistic regression has the advantage of allowing the evaluation of numerous explanatory variables (Huffman, 2015). The logistic regression model is based on the cumulative logistic probability function, which employs Pyndick and Rubinfeld's logistic cumulative density function (1991).

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \dots + \beta_{14} X_{14}$$

Where,

Y=status of food insecurity (1=Food insecure; 0 =otherwise)

$\beta$ =coefficirnt of independent variables in the equastion

X1.....X15 =Different socio economic variables determining food insecurity

**Table 1: Expected Variables used to determine the poverty & food insecurity of the study area through binary logistic model**

SN	Variables	Expected Sign	References
1	Age of HH head	+ve	Gebre; Ashgar & Ahemad, 2015
2	Gender of HH Head	-ve	Maharjan & Joshi, 2011; Ashgar & Ahemad 2015
3	Ethnicity	+ve	Maharjan & Joshi, 2011
4	Years of Schooling of HH head	-ve	Gebre, 2012
5	Occupation of HH Head	-ve	Rose et., al, 1998; Ede & Bempong, 2012
6	Adult Equivalent	+ve	Ashgar & Ahemad, 2015, Rose et., al., 1998, Gebre, 2012
7	Dependency ratio	+ve	Ashgar & Ahemad, 2015; Maharjan & Joshi, 2011
8	Land Holding	-ve	Ashgar & Ahemad, 2015; Gebre, 2012
9	Livestock standard Unit	-ve	Haile et., al, 2005; Maharjan & Joshi, 2011
10	Poverty Status	+ve	Rose et., al, 1998;
11	Log of total Income	-ve	Ashgar & Ahemad, 2015; Joshi & Maharjan, 2007,
12	Irrigation availability	-ve	Maharjan & Joshi, 2011; Ashgar & Ahemad, 2015; Amarsiinghe et., al, 2010
13	Membership in Social organization	-ve	Gebre, 2012
14	Training Received dummy	-ve	
15	Cluster dummy	+ve/-ve	
16	If damage done by drought	+ve	Von Bram et., al., 1992

### 3. Result and Discussion

#### 3.1 Socio economic characteristics of Households

Table 2 revealed that majority of households is male headed and the average schooling years of the households in the study area is 5.1. Which is found 5.42 years for cluster one and 4.66 years for cluster two? The major ethnic group was Brahmin/Chhetri (75.8%) followed by Dalits (13.3%). Majority of the household heads were involved in agriculture as primary occupation and the average household size was 6.9. The average land owned was found to be 0.4 ha. And livestock standard unit was 6.53 in the study area. The average annual income from various sources was NRs. 161422.

Table 2: Socioeconomic Characteristics of sampled Households

Variables	Cluster 1		Cluster 2		Total	
	Frequency	%	Frequency	%	Frequency	%
<b><u>Gender of HH head</u></b>						
Female	9	15	40	66.67	19	15.83
Male	51	85	50	83.33	101	84.16
<b><u>Years of Schooling</u></b>	5.41		4.66		5.1	
<b><u>Ethnic Groups</u></b>						
Brahmin/Chhetri	44	73.33	47	78.33	91	75.8
Dalit	8	13.33	8	13.33	16	13.3
Thakuri	8	13.33	2	3.333	10	8.33
Janajati	0	0	3	5	3	2.5
<b><u>Major occupation</u></b>						
Agriculture	34	56.67	38	63.33	72	60
Non Agriculture	26	43.33	22	36.67	45	37.5
<b><u>household size</u></b>						
<b><u>Land Holding</u></b>	0.44		0.36		0.4	
<b><u>livestock standard unit</u></b>	6.28		6.8		6.53	
irrigation access	20	33.33	17	28.33	37	30.8
<b><u>Income sources</u></b>						
Crops	18025		16493.5		17259.2	
Livestock	37391.7		46745		42068.33	
off farm	121758.3		92933.3		107345.8	
Total	166673.4		156171.8		161422.6	

#### 3.2 Household poverty, food insecurity status and self-sufficiency months

From the table 2, the poverty incidence in the district is 52.5% by head count ratio. The poverty gap index of the district is 14.03 and the poverty severity index is found 12.35. The poverty gap index is larger in cluster one than that of cluster 2 but poverty severity is seen higher in cluster two of the study district.

The 54.70% household of the study area were found food insecure in the study district. The food insecurity is higher in the cluster two of the district which is physically far away from the district headquarter and the major source of transportation are mule until days.

The food insecurity gap index was higher in cluster two than that of cluster one (See table 2), in which more amount of calorie is required in cluster to meet adult equivalent in cluster two than that of cluster one. The food insecurity is more severe in 2<sup>nd</sup> cluster of the district than that of cluster one of the district. As a whole the food insecurity severity index of the district is 2.65. The study reveals that the 27.5% of the household in the district are self-sufficient below 3 months on their own production. The most of the food insufficient household lies in cluster two of the district in which 28% of the household within the cluster are self-sufficient below 3 months. The small portion 11.7% households of the district are only self -sufficient year round on their farm production. So the study revealed that the remaining 88.3% of the household of the district of both the clusters are not able to meet their food demand from their own production. (See Table 2)

*Table 2: Household poverty, food insecurity and food self-sufficiency status of the district*

Indices	Total n=120	First Cluster n=60	2nd Cluster n=60
Poverty Incidence (%)	52.5	46.7	58.3
Poverty Gap index	14.03	25.39	22.97
poverty severity index	12.35	10.59	14.3
Food Insecurity incidence (%)	50	48.33	51.66
Food insecurity Gap index	6.14	4.394	7.9012
Food insecurity severity index	2.65	3.7	1.608
<u>Food Self-sufficiency months</u>			
Below 3 months	27.5	8.333	46.7
3 to 6 months	36.7	40	33.3
7 to 9 months	24.2	40	8.33
Year round	11.7	11.67	11.7

**Source: Field study, 2021**

#### **4. factors Determining poverty at HH level by binary logistic regression**

The table three showed, Gender, Age, Education attainment by Household head, Adult equivalent, Dependency ratio, Ethnicity, Irrigation Access, occupation, Family size, Livestock Standard Unit, Membership in social organization, food insecurity has significant impact on Household poverty status.

The gender has negative influence at 10% significance level. Which indicates the number of male household reduce poverty by 42.5% (See Table 3), Education attainment of household head reduces chance of being poor by 8.5%, Livestock Standard unit, Training, Foreign employment, Adult Equivalent, has positive role in reduction of poverty. Similarly, Age of Household head, Dependency ratio, family size, occupation (agriculture), landholding, membership of social organization, Draught, Food insecurity has negative role to reduce poverty. The draught has major role to invite poverty as 77.62% and the food insecure households are more vulnerable to poverty in the study area.

Table 3: Factors determining the poverty of Household level

Variables	Coefficient	Std.Error	P>z	dy/dx	Std.Error
Gender	-0.425	0.615	0.489	-0.08**	0.115114
Schooling Year	-0.085	0.063	0.179	-0.016*	0.011669
Draught	0.7762	0.572	0.175	0.1465	0.105179
Livestock Standard Unit	-0.006	0.051	0.911	-0.001*	0.009697
Family Size	0.238	0.094	0.011	0.0449**	0.01603
Occupation	0.3661	0.493	0.458	0.0691***	0.092326
Land holding	1.886	0.906	0.037	0.3559	0.160241
Irrigation	0.0849	0.474	0.858	0.016**	0.089429
Membership on social organization	0.1496	0.524	0.775	0.0282**	0.098841
Training	-0.8	0.63	0.204	-0.151	0.115826
Foreign employ	-0.401	0.56	0.474	-0.076***	0.104885
Adult Equivalent	-0.636	0.403	0.114	-0.12	0.073218
Age of household head	0.0154	0.022	0.485	0.0029*	0.004146
Dependency ratio	0.195	0.172	0.257	0.0368**	0.031868
Ethnicity	0.1194	0.617	0.847	0.0225**	0.116398
Food insecurity	0.5378	0.486	0.269	0.1015	0.09007
Cluster	-0.584	0.466	0.21	-0.11	0.085937
_cons	-1.572	2.011	0.434		
Number of obs=120			Log likelihood = -66.762656		
LR chi2(17)=32.53			Pseudo R2=0.1959		
Prob > chi2=0.0129					

Source: Model output, own calculation from the survey data. The star on the top of the predictor variables reflect that the predictors are discrete while the remaining refers to continuous ones. The stars on the top of p value such as \*, \*\*, \*\*\* reflects that they are statically significant at 1percent, 5percent and 10 percent respectively

#### Variables affecting the food insecurity status of the study area, Table four has shown the Age

Table 4 Logit regression model for determining variables for household food insecurity

Variables	Coefficient	Std.Error	P>z	dy/dx	Std.Error
Gender	0.7386	0.651	0.257	0.1416	0.122579
Schooling Year	-0.105	0.061	0.087	-0.020**	0.011273
Draught	0.2729	0.558	0.625	0.0523**	0.10664

Livestock Standard Unit	-0.024	0.05	0.624	-0.004*	0.009492
Family Size	-7E-05	0.093	0.999	-0.000*	0.017913
Occupation	0.56	0.487	0.251	0.107**	0.091494
Land holding	-0.764	0.806	0.343	-0.146	0.152616
Irrigation	0.1001	0.476	0.833	0.019*	0.091149
Membership on social organization	1.6927	0.533	0.002	0.324	0.08629
Training	-1.24	0.622	0.046	-0.23	0.112269
Foreign employ	0.1433	0.531	0.787	0.02**	0.101684
Adult Equivalent	-0.062	0.405	0.878	-0.01*	0.077716
Age of household head	0.032	0.022	0.147	0.006*	0.004105
Dependency ratio	-0.293	0.161	0.068	-0.056**	0.02928
Ethnicity	0.4667	0.632	0.46	0.089***	0.120342
Poverty	0.6112	0.475	0.198	0.11	0.088922
Cluster	0.2722	0.46	0.554	0.052**	0.087735
_cons	-3.115	2.026	0.124		
Number of obs=120			Prob > chi2=0.0219		
LR chi2(17)=30.66			Pseudo R2=0.1843		
Log likelihood =-67.84669					

**Source: Field Study,2021**

\*, \*\*, \*\*\* indicates 1, 5 and 10% level of significance.

The logit regression model in table 4 has shown Gender of household with male, Draught, occupation (Agriculture), Irrigation, Membership in social organization, Household member on foreign employment, Poverty has positive influence on inducing food insecurity. The further practice of same subsistence agriculture occupation will result more vulnerable to food insecurity. The membership of various social organizations is empirically reported positive to minimize food insecurity but in my study they are revealed as cause of poverty and food insecurity, which may be due to ineffective membership. The access of irrigation should have negative impact on food insecurity but the irrigation access to have not much role to reduce food insecurity, which may be because the fragmented land holdings, subsistence agricultural system and traditional pattern of farming. The result has indicated the requirement of further study. The result revealed that the draught is one of the important variables to drive the lower production, land barren and uncultivated cultivable land (Shively et al, 2011). The result further revealed that the household poverty is vulnerable to cause food insecurity in the study area.

### Conclusion and recommendation

The incidence of poverty and food insecurity is found higher in Bajhang district than that of national average of Nepal. Among cluster one and two of the district the food security and poverty is found more prone in cluster two of the district which lies in far away from district head quarter and relatively deprived from basic facilities and opportunities, the food insecurity gap is found higher in cluster two but the severity index is found higher in cluster one of the district. Similarly the poverty gap index is found higher in cluster one of the district but the

severity is found more in cluster two of the study site. The maximum of the household were found food self-sufficient only for 3-6 month in the district. The remaining food demand is recovered through near market. The expenditure on food was mostly done from off farm activities like foreign employment, wage labor, service, business etc. The different coping strategies were reported but wage labor work for food is performed mostly in the district which is followed by borrowing food, and low consumption as well as seasonal migration is also acted as coping strategy. Different socio economic factors have significant influence on household poverty and food insecurity in the district. Gender, Age, Education attainment by Household head, Adult equivalent, Dependency ratio, Ethnicity, Irrigation Access, occupation, Family size, Livestock Standard Unit, Membership in social organization, food insecurity has significant impact on Household poverty status. Gender of household with male, Draught, occupation (Agriculture), Irrigation, Membership in social organization, Household member on foreign employment, are found the inducing factors of food insecurity.

Focusing on the educational attainment of the household members, promoting production and consumption of indigenous crops like kaguno, Chino, Kodo, Bethe, and forest product like lokta, allo, Tarul for income, development of road networks, focusing on income generating activities for vulnerable communities, irrigation facility to cope the harsh conditions of seasonal draught is suggested to be done to improve the status of poverty and food insecurity in study district.

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**डॉ. त्रिखाके साहित्य में तकनीकी प्रयोग**

प्रवीणतायल

ओमस्ट्रेलिंग्लोबलविश्वविद्यालय , हिसार

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शोधसार –

प्राचीनसमयसेहीप्रौद्योगिकीकाप्रयोगमानवीयकार्यक्षेत्रपरदेखाजासकताहै | मानवद्वाराजब –

जबअपनीआवश्यकतायोंकीपूर्तिहेतुयार्योंकहेंकिमनुष्यनेजब –जबसभ्यबननेकेलिएअपनेकदमआगेकीओररखेतब –

तबप्रौद्योगिकीकाप्रभावउसपरदेखनेकोमिला | पाषाणकालसेअबतकपत्थरकेऔजारकीखोजहो, आगकी

,सुईकीखोजयाटंकनमशीनआदिकी | मेरेविचारसेमनुष्यनेअपनीसमझयाज्ञानसेअपनेपरिश्रमकीलागतकोकमकरनेकाजब –

जबमंथनकियातब-तबप्रौद्योगिकीकानयास्वरूप (खोज) उसकेकार्यक्षेत्रपरदेखनेकोमिला |

फिरभलासमाजकाकोईभीक्षेत्रइससेअछुताकैसेरहसकताहै.....!

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keyword: तकनीकी(प्रौद्योगिकी), अंतर्जाल(इन्टरनेट),कम्प्यूटर ( संगणक )

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प्रस्तावना –

आजकेतकनीकीयुगमेंसाहित्य

,प्रौद्योगिकीकेबिनाअधुराकहाजासकताहै।साहित्यरचनाहेतुविभिन्नसामग्रियोंएवंसाधनोंमेंतकनीकीप्रयोगमहत्वपूर्णभूमि काअदाकरताहै।साहित्यकारकेमनमेंउभरेकिसीभीविचारकोलिपिबद्धकरनेहेतुउपर्युक्तसभीसामग्रियोंऔरसाधनोंपरनिर्भर होनाअनिवार्यहोजाताहै।क्योंकियहीसाधनसमाजकेलिएसाहित्यकेदर्पणस्वरूपहैंऔरयहीकारणहैकिइनसभीसाधनोंसेनिर्मित कैनवासहीसमाजकोसाहित्यकारसेपरिचितकरवाताहै |

इसप्रकारकिसीभीयुगमेंप्रौद्योगिकीकेबिनासाहित्यकास्थायीअस्तित्वनहींहोसकता |

पुरानेसमयमेंकागज़औरटंकनमशीनकेआविष्कारसेपहलेसाहित्यकासृजनपत्तों, पत्थरों,

ताम्रपत्रऔरकपड़ोंपरलिखाजाताथा।इसलेखनकोभीप्रौद्योगिकीसेअलगकरकेअनदेखानहींकियाजासकता।

वर्तमानयुगसाहित्यरचनाकेलिएकेवलकागज़औरकलमतकसीमितनहोकरवहएकडिजिटलीकृत (Digitalized)

रूपमेंभीहमारेसमक्षप्रस्तुतहै।जिसकेकारणआजहमकिसीभीसाहित्यकरचनाचाहेवहकिसीभीकालमेंलिखीगईहो,कोहममोबा

इल, लैपटॉपयाअन्यतकनीकीसाधनोंकेमाध्यमोंसेघरबैठेहीपढ़सकतेहैं | यहाँतककिहमकिसीभीरचनापरअपनीटीका-

टिप्पणी कर सकते हैं या कोई भी साहित्यकार अपनी रचना को किसी भी समय तकनीकी प्रयोग से कभी भी प्रकाशित कर सकता है। यह सब परिवर्तन प्रौद्योगिकी के कारण ही संभव हो पाया है। अतः कह सकते हैं कि जहाँ प्रौद्योगिकी के इस युग में कागज़-कलम पर निर्भरता कम हुई है वहीं प्रौद्योगिकी विकास ने साहित्य के लिए नवीनतम मार्ग प्रशस्त किए हैं।

अतः

हमें स्वीकार करना ही होगा कि दुनिया बहुत तेज़ी से आगे बढ़ रही है और इसका कारण प्रौद्योगिकी ही है। इस प्रक्रिया में अंतर्जाल और कंप्यूटर काम हत्वपूर्ण योगदान है। आज सूचना एवं संचार प्रौद्योगिकी या यूँ कहें कि सोशल मीडिया का उपयोग जीवन के हर क्षेत्र में हो रहा है। इसके प्रयोग से वैश्विक धरातल आज बहुत छोटा नजर आने लगा है। बहुत से ऐसे साहित्यकार जो केवल एक संकुचित क्षेत्र तक ही सीमित रह जाते थे, प्रौद्योगिकी के कारण आज उन्हें पहचान मिलने लगी है। आज कोई केवल एक सीमित क्षेत्र का साहित्यकार नहीं, यदि वह लेखन के प्रति सजग,

समृद्ध एवं समर्पित है तो प्रौद्योगिकी उसके लिए एक ऐसा मंच है जो उसकी प्रतिभा को विस्तृत आयाम प्रदान करती है।

कंप्यूटर एक उपकरण है,

जो प्रौद्योगिकी की ही उपज है। यह सांकेतिक भाषाओं के माध्यम से कार्य करता है। आधुनिक प्रौद्योगिकी के विकास में कंप्यूटर का आविष्कार अविस्मरणीय है। आज सिद्ध है कि कंप्यूटर को किसी भी भाषा और लिपि को स्वीकारने में कोई तकनीकी दिक्कत नहीं आती है। कंप्यूटर के प्रयोग और अंतर्जाल की उत्पत्ति ने 'वसुधैव कुटुम्बकम्' उक्ति को चरितार्थ कर दिखाया है।

इलेक्ट्रॉनिक समशीली तकनीक में अंतर्जाल एक ऐसा माध्यम है जिसने साहित्यिक तथा साहित्येतर रचनाओं को उपलब्ध हर पाठक या लेखक की पहुँच तक सम्भव बनाया है। इससे पाठक गणविधि साहित्यिक तथा वैचारिक पुस्तकों, लेख-

आलेखों से आसानी से जुड़ सकते हैं। माइक्रो फिल्म और पीडीएफ आदिके रूप में नई-

नई तकनीकों के माध्यमों से साहित्य की विभिन्न विधाओं की पुस्तकें सर्वसामान्य के लिए उपलब्ध होने लगी हैं। आज प्रौद्योगिकी के कारण साहित्य का अधिक मात्रा में प्रचार-

प्रसार होने लगा है। आज बाज़ार में अनेक हिंदी से संबंधित और अन्य भारतीय भाषाओं की साहित्यिक पत्र-

पत्रिकाएँ संगणक जैसी मशीनों के कारण और नई-

नई तकनीकों के कारण अंतर्जाल के माध्यम से शुरु हो चुकी हैं। साथ ही साहित्य की विभिन्न विधाओं जैसे कि कहानी, उपन्यास, एकांकी,

नाटक और कविता आदिका फिल्मीकरण द्वारा प्रौद्योगिकी के माध्यम से आम जनमानस के लिए अधिक मनोरंजक बनता जा रहा है।

प्रौद्योगिकी ने इससे आसान बनाया है। मीडिया द्वारा भारतीय भाषाओं को अधिक विस्तार और बढ़ावा दिया जा रहा है।

**तकनीकी शब्द की परिभाषा एवं साहित्य में प्रवेश -**

मनुष्य एक सामाजिक प्राणी है | समाज की नींव उसकी आवश्यकताओं की पूर्ति हेतु रखी गई | अतः

अपनी महत्त्वकांक्षाने उसे नित नए आयाम स्थापित करने के लिए प्रेरित किया | इसी प्रेरणाने उसे अन्य प्राणियों से विशेष बना दिया |

विशेष बनने की इस निरंतर प्रक्रियामें उसके जीवन पर प्रौद्योगिकी का प्रभाव भी प्रलक्षित है |

प्रौद्योगिकी ने समाज के विकासमें अहम योगदान दिया है |

प्रौद्योगिकी शब्द पर यदि विचार करें तो अंग्रेजीमें जिसे Technology या हिंदीमें प्रौद्योगिकी या तकनीक शब्द प्रचलित है

“तकनीक ग्रीक शब्द ‘टेक्नी’ और ‘लोजी’ से आया है, जिसका अर्थ है कला और शिल्प,

और शब्द लोजी, जिसका अर्थ है शब्द और भाषण | इसका उपयोग पहले लागू कलाओं का वर्णन करने के लिए किया जाता था,

लेकिन अब इसका उपयोग उन प्रगति और परिवर्तनों का वर्णन करने के लिए किया जाता है जो हमारे आसपास के वातावरण को प्रभावित

करते हैं”<sup>[1]</sup> साहित्य का क्षेत्र भी इससे अछूतान ही रहा है | मेरे विचारमें हिंदी साहित्य का तकनीकी युगमें प्रवेश 30 मई सन 1826

को प्रकाशित हिंदी साप्ताहिक समाचार पत्र ‘उदन्त मार्तण्ड’ के साथ हुआ |

जिसका सम्पादन एवं संचालन हिंदी साहित्यमें अग्रणी श्री जुगल किशोर द्वारा किया गया

| इसी कड़ी को आगे बढ़ानेमें हिंदी साहित्य को विश्व पटल पर पहचान दिलाने वाले भारतेंदु हरिश्चंद्र हों,

प्रेमचंद हों, महावीर प्रसाद द्विवेदी हों, माखन लाल चतुर्वेदी या माधवराव सप्रेभी रहे, ये सिर्फ हिंदी साहित्य के नायक नहीं थे,

बल्कि इन्होंने प्रौद्योगिकी - प्रयोग से अनेक पत्र-पत्रिकाओं का सम्पादन भी किया |

शायद इसी लिए इस दौर के रचनाकार एकतरफ अपने साहित्य के माध्यम से एक श्रेष्ठ सृजन भी कर रहे थे तो अपनी पत्रकारिता के माध्य

म से जनचेतना को जगाने का काम भी कर रहे थे | वर्तमान समय की विषम परिस्थितियोंमें तो प्रौद्योगिकी ने अपने विभिन्न स्वरूपमें

आज साहित्य को और अधिक प्रभावित किया है

, जो साहित्यकार पहले केवल अपनी रचनाओं को केवल प्रकाशन के बाद ही अपने पाठकों तक पहुँचा पाता था

, आज कोई भी पाठक साहित्य की किसी भी रचना को घर बैठे पढ़ सकते हैं, यहाँ तक की तुरन्त रचयिताओं को भी फेसबुक

, ट्विटर, वहाट्स, यू-ट्यूब आदिके माध्यम से सुन एवं देख सकते हैं |

### डॉक्टर त्रिखा के साहित्यमें तकनीकी का प्रभाव -

वरिष्ठ पत्रकार, गजलकार, साहित्यकार एवं हिंदी साहित्य एकादमी, हरियाणा के वर्तमान निदेशक डॉ.

चन्द्र त्रिखा भी आज आधुनिक युग की इन तकनीकियों का प्रयोग कर अपने पाठकों एवं श्रोताओं को मन्त्रमुग्ध कर देते हैं | 9 जुलाई,

1945 को पाकपटन (अब पाकिस्तानमें) में जन्में डॉक्टर त्रिखालगभग पिछले दो वर्षों से लगातार अपनी बात को अपने श्रोताओं/

पाठकों तक पहुँचाने के लिए लेखन के साथ – साथ यू-

ट्यूब जैसे तकनीक का प्रयोग भी बखूबी कर रहे हैं | वे समाज की वर्तमान परिस्थितियों एवं साहित्यकारों के व्यक्तित्व एवं कृतित्व पर अ

पनीयू- ट्यूबवीडियोबनाकरसमाजकोएकनईदिशाप्रदानकररहेहैं | समाजकाऐसाकोईक्षेत्रनहींजिसपरडॉक्टरत्रिखाद्वाराकोईयू-ट्यूबवीडियोनबनायागयाहो | एकहोम्योपैथिकडॉ. केरूपमेंजहांउन्होंनेकोविड -19 <sup>(2)</sup> केविषयमेंसमय-समयपरअपनेयू-ट्यूबवीडियोद्वारासमाजकोआगाहकिया | उन्होंनेबतायाकिकोरोनाक्याहै ?, इसकायहनामक्योंपड़ा ? आजइससैकैसेबचाजासकताहै | इसप्रकारउन्होंनेअनेकसमसामयिकमुद्दोंजैसेचुनावीविश्लेषणहो ,एमएसपीकामुद्दा,रोबोटकामानवीकरणहोयाफिरबच्चोंपरमोबाइलकाप्रभावहोआदिअनेकज्वलंतमुद्दोंपरयू-ट्यूबवीडियोबनाकरडॉ. त्रिखाजीसमाजकामार्गदर्शनकररहेहैं।

### शोधनिष्कर्ष :-

आजवैश्विकफलकपरप्रौद्योगिकीकाप्रभावइतनाअधिकहैकिविश्वकाप्रत्येकदेशइसकेबिनाअधुराहीकहाजाएगा | प्रौद्योगिकीकाप्रयोगमानवीयजीवनकाज्वलंतविषयहै, जिसनेमानवजीवनकोसबसेअधिकप्रभावितकियाहै। पिछलेपांचवर्षोंमेंसोशलमीडियाकेउपभोक्ताओंकीसंख्याजिसतीव्रगतिसेबढ़ीहै,वहमानवीयजीवनमेंइसकेमहत्वकोस्पष्टकरताहै।आजसोशलमीडियाकेसाधन – यू- ट्यूब , फेसबुक, व्हाट्सआपआदिनेमानवजीवनकोजैसेअपनागुलामबनालियाहै |आजकामानवीयजीवनमीडियाकेबिनाअधुराहै।आजइंटरनेटकीमददसेहमविश्वकेअनमोलसाहित्यकोअमरताप्रदानकरसकतेहैं | सोशलमीडियाकेयेसाधनवर्तमानयुगमेंसामाजिकजीवनमेंक्रांतिकारीपरिवर्तनलानेमेंसफलहुएहैं। आजजिसभूमण्डलीकरण,उदारीकरणएवंनिजीकरणकीसर्वाधिकचर्चाकीजातीहै,वहमीडियाकेगर्भसेहीनिकलाहै।अतःमीडियाकाभावीस्वरूपमानवीयजीवनकोअत्यधिकसुदृढ़ताप्रदानकरनेवालाहोगा।अतःनिष्कर्षकेतौरपरयहीकहाजासकताहैकिहिंदीसाहित्यहोयाअन्यभारतीयएवंपाश्चात्यसाहित्यप्रौद्योगिकीऔरसाहित्यकाअत्यंतगहरासंबंधहै।आजलगभग 77 वर्षकीअवस्थाहोनेकेपश्चात्भीडॉ. त्रिखाजीनेजिसप्रकारअपनेसाहित्यएवंविचारोंकेप्रचार-प्रसारकेलिएप्रौद्योगिकीकासहाराकियाहै , वहसमाजकेलिएएकअनूठाउदाहरणहै | आजअपनेआपकोपुरानेजमानेकेकहनेवालेलागोंकेलिएउनकायहप्रयास, उन्हेंप्रेरितकरताहैकिमनुष्यअपनीसोचसेहीवृद्धयायुवाहोताहै | उसकीआयुकेवलउसकेशरीरकोहीवृद्धअवस्थामेंपहुंँचातीहै ,उसकीनवीनतमसोचउसेहमेशायुवाबनायेरखतीहै |

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**Security Implementation in Cloud-Based Enterprise Resource Planning solution**

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**ABSTRACT:**

An extensible framework can be provided for defining access to the system and data by using security. ERP security is the need of the hour for all organizations because leakage of the company's sensitive information can lead to various dangerous repercussions. It plays an important role when it is used to protect company's finances and reputation. ERP can be considered as a backbone for the organization and also a virtual treasure trove of data. This makes ERP highly susceptible as it is attractive target for anyone looking for stealing private information. In this research, security implementation has been considered for AX portal. Functional and technical customizations need to be integrated in order to build up a secure environment involving negligible risks for malicious activities. System administrator will help to decide the functional aspects for the access which needs to be granted to the users, and developers will be responsible for the technical aspects including the entry points which will be customized for the users to access the forms and menus. The proposed work has been implemented in two phases. In the first phase, limited access to the system has been considered by allowing user to access specific modules. In the second phase, the limited access to data has been considered by allowing user to access user specific data.

**Keywords:** ERP, Security, Privilege, Duty, Permission, Role

**Abbreviations:** ERP- Enterprise Resource Planning, OS- Operating System, NIST- National Institute of Standards and Technology

**INTRODUCTION**

In today's instant era of modernization, ERP is the upcoming most widely used technology. ERP is becoming popular and taking an important place in our daily routine life. ERP based solutions are making our life easy and comfortable. There are several fields in which the ERP based solutions are used like aerospace, defense, medical, education and technology.

AX can be considered as ERP solution i.e. enterprise resource planning resolution for medium sized and big organizations which facilitate users to operate effectively, supervise modifications, and compete worldwide. AX can be considered as a solution which computerizes and rationalizes economic, "business intelligence", and "supply chain" processes in a manner

which can provide assistance in the business. AX can also be defined as a customizable, multi-language and multi-currency Enterprise Resource Planning (ERP) solution. AX has been very beneficial in various fields like manufacturing, wholesale, e-business and service industries. AX has proven to be a unique and powerful solution which contains functional and technical features.

The security role can be related to the job role which the end-user has within the organization. The duties, privileges and permissions need to be established for the security implementation. Role and duties need to be managed by the system administrator in the rich client whereas privileges and

permissions need to be established by the developer in the developer workspace.

The role needs to be assigned to the end-user. The role helps to identify the behavior pattern which the user can play in an organization. For example, project manager can be considered. The duties need to be assigned to the user role. The duties actually resemble the responsibilities which the user possesses in the organization. For example, project manager's duties will be to maintain the project master. Privileges specify the access which is required to perform the responsibilities in the organization. For example, the project manager will need to have access to the project contracts and funding sources. Permissions specify the level of access the user has to the securable objects required to perform a specific function. For example, the project manager requires access or full control of the projects form accessed through the entry point for display menu item. It also requires full control to create new project quotation accessed through entry point for action menu item.

#### PROBLEM FORMULATION

However there have been several researches under the field of ERP security but these researches have done limited work. There is a need to propose a mechanism which would be faster, flexible and customizable than traditional approaches. There is a need to integrate the functional and technical features of the enterprise resource planning solutions to implement security. This concept could provide better approach to achieve this objective.

#### Background:

Cloud computing provides the next generation of internet, computer systems are becoming more widely distributed with the help of "cloud computing" services. The cloud computing model as per the definition given by NIST is the most generic. This

definition can be stated as "a model to facilitate easy network access, and demand for a shared pool of configurable computer resources (e.g. networks, servers, storage, applications and services) that can be quickly provided and extracted through minimal management or network communication service provider." Cloud computing provides with a flexible and elastic model which can be widely used. Multi-possession enables sharing the same service model among various employers. Strength will increase the capacity and resources provided by the service in accordance with current service requirements. Both of these factors focus on improving resource utilization, cost and availability of resources.

The major challenge posed for the cloud computing is security due to which its usage is hindered up to some extent.

The risk management factor for the third parties have not been included in the organizations

Sharing of assets take place on cloud without the knowledge of risks and threats

There is no deal related to security between the providers and consumers

As the IT assets are publically available, therefore the risk of management has been increased

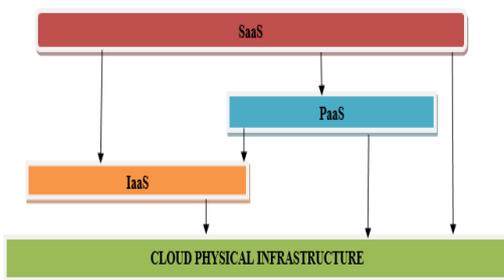
From the view of cloud providers, security can be implemented with the investment of capital and usage of large number of resources. And, without security, cloud computing cannot be posed beneficial to all. Therefore, these concerns should be paid attention to and a way needs to be formulated so as to maintain

privacy and security and protect from dangerous repercussions.

Securities in Cloud Services Architecture

There are three deployment models majorly which are stated as below. First is the “private cloud” which can be defined as the platform reticent for a company. Second is the “public cloud” which can be defined as the model in which cloud is available to all users and everyone can have access to the cloud system. Third is the “hybrid cloud” which can be defined as a private cloud that can enlarge to utilize assets in public clouds. The most vulnerable model is the public one because it is available to everyone and malicious users can also access the same easily and pose dangerous repercussions.

**Fig 1: Physical Infrastructure of Cloud**



Cloud Security Issues

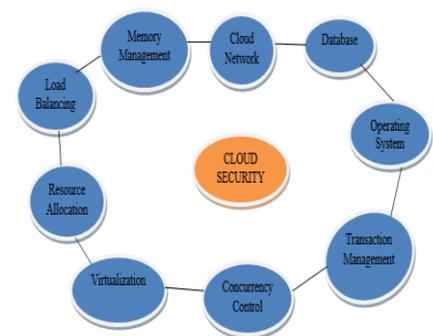
“Parameters affecting Cloud Security”

The problems related to cloud computing security are posed by many parameters like OS, virtualization, memory, transaction and financial management, networks, resource planning etc.

Many of the security problems from the given programs and technologies apply to the computer of the cloud. For example, a network that connects systems to the cloud must be protected. In addition to this, the visualization paradigm on the cloud computing can pose many issues. As an instance the mapping between the virtual machines need to be done securely. It is to be ensured that data communication involves

encryption methodology while data distribution. Data security includes data encryption and ensures that accurate policies are imposed for data distribution. It also includes the proper management and distribution of assets and memory devices. The investigation for the malicious activities can be done with the help of data mining techniques.

**Fig 2: Factors Affecting Cloud Security**



“Security issues faced by Cloud Computing”

There is still progress required in the field of cloud computing security. It needs to be ensured by the cloud service supplier that there are no thefts or any malicious activities going on. It needs to be ensured that any malevolent user cannot enter the cloud environment by faking the authentication details which can have harmful effects on the entire environment. This means that various users will be using the same effected environment. The common categories of the problems related to security can be stated as below.

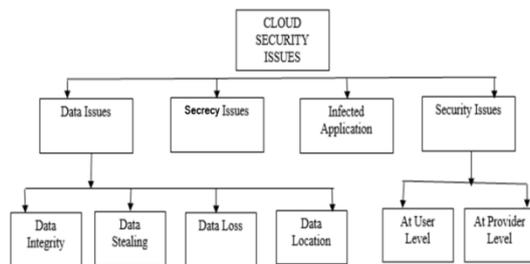
“Data Issues”

“Privacy issues”

“Infected Application”

“Security issues”

**Fig 3: Problems related to security in cloud computing**



“Data Issues”: The major problem in cloud computing systems seems to be the susceptible data which can be used for malicious activities. The data stored in the cloud is available for access by everyone from anywhere and at anytime. The data can be normal, confidential or personal. Also, many users can access and make modifications in the data concurrently on the cloud. This will need a sort of reliable system for cloud computing. Also, the stealing of data is one of the major issues under cloud computing. Most of the cloud services use the servers from other cloud services because the resources are costly and elastic with the cloud execution and servicing. Therefore, there are high possibilities of the stealing of data from exterior servers. The other major problem is the loss of data in case the cloud services are turned off by the service supplier due to any kind of financial or legislative issue. This may lead to the thrashing of data. In addition, data may be lost or damaged as a result of missing missions, natural disasters and fires. This may lead to the non-availability of data for access by the users. The other major issue under cloud computing is the storage for data which requires attention. It is very important to have perceptible storage space. The users and the clients need to clarify related to the same. The information related to the storage cannot be revealed by the merchant.

“Secrecy Issues”: It needs to be ensured that personal and confidential data is safeguarded on the cloud from others users or clients. It needs to be taken care of who is going to access the data and the exterior servers need to maintain the data privacy so that confidential data does not get leaked and malicious activities are avoided.

“Infected Application”: It needs to be taken care of that all management and monitoring rights are present with the cloud service supplier so that he can take care of the server. This will help to control the downloading of any malicious application of the cloud which can have dangerous repercussion for the cloud services and users.

“Security issues”: Security needs to be maintained majorly at two levels: first is the supplier level and the next one is the user level. It needs to be made sure that the cloud service supplier safeguards the cloud from any exterior intimidation. Although, the security layer is provided at the user level by the cloud service supplier, the user needs to ensure that no malicious activities like data stealing or loss of data occurs due to his act. The cloud environment is considered beneficial only if the data security is maintained both at the supplier and the user level.

#### Solutions and Tips

A safe and protected cloud is required which can be made possible with the help of sophisticated and expanded technology, conceptions and methodologies so as to maintain a safeguarded server.

Therefore, a framework to maintain a secure cloud environment can be made consisting of

the four layers as depicted in the given diagram.

The foremost layer is tenable to the 'machine layer'. The subsequent layer is a layer of 'cloud storage'. This includes the mechanism for the linking of multiple service suppliers to the storage devices. The fourth layer is a "network monitoring layer". This helps to integrate computer with the s/w solutions so that the virtual mechanisms can control the issues.

Various solutions and tips related to the cloud security can be stated as below which should be adhered by the cloud service suppliers while providing their services to the clients.

"Verify the access controls": It needs to be ensured that the access is controlled by the service suppliers so that he can maintain a secure environment by allowing limited access only to the users and clients as per the requirements. The access rights need to be maintained and verified by the service providers. It needs to be taken care of that only authorized and legitimate users can access the data and malicious activities are prevented.

"Control the consumer access devices": It needs to be ensured that the devices used to access the cloud environment are safeguarded. The devices may include cell phones, desktop, laptop, gazettes etc. The protection of the access devices is really very important. The loss of these devices or the misuse by the malicious users can pose very dangerous repercussions under the sector of cloud computing security. The proper and appropriate authentication features need to be enforced for these devices so as to prevent malware issues.

"Monitor the Data Access": It is important for the cloud service suppliers to maintain the records for which data should be available for access at what point of time and for whom. As an instance, various social sites have problems related to the malicious activities by various

users such as sneaking into calls, mails and other confidential data.

"Share demanded records and Verify the data deletion": If a client or customer requests details of agreement, the cloud service provider should send graphical representation of data or other data or share test proceedings to the client. It needs to be ensured that accurate data elimination takes place from reused or common devices. Mostly, the accurate version of data is not provided from drives when drive space is absent. Stress needs to be laid on the protected elimination of data and have the procedure stated in the agreement.

"Security check events": It needs to be ensured that proper security events are organized. These events include obligations, promises and adjustments. The information related to reporting can be provided. This is of vital importance that the cloud service suppliers provide adequate and appropriate information related to fulfillment of security related assurance.

#### METHODOLOGY/TECHNOLOGY

Research Methodology can be defined as a pattern or method which has been followed in a research by the researchers. In simple terms, it can also be stated as a process which is contemplated in order to make research on a precise topic. The various types of research methodologies should be recognized by a researcher before she specified her research work. A technology which is used in order to perceive, select, treat, and scrutinize information related to a precise subject turn out to be research methodology. The methodology segment under a research work

allows the readers to critically estimate the study's overall rationality and consistency.

#### TOOLS AND TECHNOLOGY USED IN RESEARCHWORK

AX ERP portal is used in various sectors of education such as academies and exploration. AX provides an integrated ERP solution which can be modified however and whenever necessary. This is possible due to the customizable source code available for this platform. The development is done using X++ language which is an object-oriented language with similarities to C#. X++ was designed to be a superset of Java with strong data access features. In proposed work, the integration of functional and technical customizations using X++ would reduce the time consumption along with high quality of the desired outcome.

#### PROCESS FLOW

Security based on the access to the system: Allowing the user to access user specific modules

User id will be created in the portal.

Entry points will be made for the forms which need to be visible under the required modules.

Privileges will be made for the required menu items.

Duties will be made having the required privileges.

Roles will be made accurately as per the requirements containing appropriate duties and privileges.

Roles will be assigned to the corresponding user.

Security based on the access to the data: Allowing the user to access user specific data

User id will be created in the portal.

User will be assigned the access to the module with the help of previous algorithm.

A query will be written using X++ with embedded sql which will help to filter the data according to requirements.

The query will be used in the list page.

Entry point will be made for that list page.

Appropriate duties and privileges will be created with required entry points.

Role will be made containing the accurate duties and privileges.

Role will be assigned to the respective user.

#### RESULTS OF IMPLEMENTATION

Security based on the access to the system: Allowing the user to access user specific modules

First of all, user needs to be imported to the portal.

Appropriate role needs to be assigned to the user according to the requirements.

All the modules will not be visible to the user according to the privileges assigned to the user. Only a specific module i.e. the project management module will be visible as shown in the below screenshot. The Home module is the standard system module visible to all users of the ERP portal.

The admin account will have access to all the modules as shown in the below screenshot.

Security based on the access to the data: Allowing the user to access user specific data

The user will have access to the project quotations created by her. The project quotations created by other users will not be visible to her. As shown in the below

screenshot, the user has access to personal quotations only.

The admin account has access to all users' data. Therefore, all the quotations created on the ERP portal will be visible to him as shown in the below screenshot.

## CONCLUSION

In this era of technology and internet, cloud computing is a fastest growing technology in each and every field. However, the more advancement in cloud means more threat to its data. Cloud based - Enterprise Resource Planning is a concept which is gaining importance and popularity day by day. ERP is considered as the backbone for any organization. Along with this, the security related issues have also posed dangerous repercussions in this field. There is an urgent need to propose a security mechanism which is faster, flexible and customizable than traditional approaches. The users' access needs to be controlled to the system and proper authentication should be required. Users should be able to access the data relevant and appropriate to them. Therefore, there is an urgent need to propose a security mechanism which is faster, flexible and customizable than traditional approaches.

This can be achieved by integrating the functional and technical features of the enterprise resource planning solutions to implement security. Proposed mechanism is found capable to ensure the security in ERP with respect to the access control of the system as well as data appropriately. This research has considered the limitation of traditional research works. This proposed framework is also capable to group the users with same job role and use a single customized source code for security implementation. The integration of functional and technical customizations using X++ code enabled the security implementation in ERP system. Role and duties need to be managed by the system administrator in the functional workspace whereas privileges and

permissions need to be established by the developer in the developer workspace.

With the help of the proposed implementation, the users can be assigned limited access from the business perspective. The access control can be customized as per the requirements stated by the system administrator. The access control can also be maintained with respect to the data as well with the help of the security policies and sql based customized query. The malicious users will not be able to access the system. The confidential data will also be secure as the users will not be able to access the private data belonging to other users. Therefore, this extensible and customizable security framework would pose to be highly fruitful and beneficial for all the organizations.

## FUTURE SCOPE

This proposed review on extensible security framework for Enterprise Resource Planning solutions would be beneficial to propose a better and efficient solution to resolve the existing issues in the field of security under cloud-based enterprise resource planning solutions. This research work discusses the challenges that are faced by the organizations using ERP portal. It also consists of a proposal of extensible security framework. This security framework can be deployed in the organizations so as to avoid the malicious activities and maintain a secure environment. This security framework includes the functionality for defining and maintaining the access control over the system and data. In addition to this, this research work provides us a review of existing researches and modules used in the field of cloud security. The work would be preferred as a brief review of

security framework based on the integration of functional and technical aspects.

In this paper, there is a section in which the issues and problems of existing researches are discussed which would be very helpful for researcher who wants to propose a better solution in this field. If someone could access other ERP solutions like “Odoo”, “Scoro”, “Syspro”, “Epicor ERP”, “Kechie ERP”, “NetSuite ERP”, “Sage Intacct”, “Brightpearl” etc. and implement the same algorithm in those environments then the security can be enhanced and the research can be carried forward with the integration of technical and functional aspects. The study will continue in order to elaborate tools and software which facilitate the process of adjustment of scope of security implementation in ERP. It’s expected that with the advancement in practices and technical adjustments, the organizations will turn possible the optimization of its security implantation.

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**A STUDY ON IMPACT OF STRESS ON ACADEMIC DURING COVID 19**

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**ABSTRACT**

Around the world, studies on mental health and academic achievement have been undertaken. As a result, the purpose of this study is to examine students' mental health in the new normal of education using the 21-item Depression, Anxiety, and Stress Scale or DASS-21 in relation to their academic achievement. The results of the study revealed that over half of the participants suffered from moderate to severe depression, stress, and anxiety. However, especially during this pandemic crisis, students' mental health should constantly be monitored and they should be assisted in coping with their daily concerns.

**Keywords: Academic Achievement, Depression, Anxiety, and Stress Scale**

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**INTRODUCTION**

The academic success of students lies at the heart of the entire educational system. Any educational institution's success or failure is determined on the academic performance of its students. Parents, as well as institutions, have high expectations of students' academic success because they feel that better academic results will lead to better employment opportunities and future stability. Academic performance refers to the degree to which a student, instructor, or institution has met their educational objectives (Narad and Abdullah, 2016).

COVID-19 entered our life at the end of 2019, threatening the health of millions of individuals throughout the world and reaching pandemic proportions. An outbreak of pneumonia with an unknown origin has been reported in Wuhan, Hubei Province, China, since December 2019. (Wang et al. 2020).

We must recognize that a pandemic is more than just a medical problem; it also has a social, emotional, and psychological impact on the people. Anxiety, sleep difficulties, panic, tension, and other mental illnesses are linked to the thought of being alone and wearing masks. Many pupils suffered psychological problems as a result of the pandemic, which are impacting their academics as well as their overall personality (WHO, 2020).

"Quarantine" is defined by the Centers for Disease Control and Prevention (CDC) as "the separation and restriction of movement of people who have been exposed to an infectious disease in order to see if they become ill" (CDC, Report, 2020). Living in quarantine, often known as lockdown, can take a toll on everyone's mental health. Quarantine has a significant impact on three aspects of mental health: autonomy, competence, and connectedness. People feel isolated because they are cut off from their pals and unable to go about their everyday routine.

Samantha K Brooks' latest study on "the psychological impact of quarantine and ways to mitigate it" revealed how COVID-19 affects people in lockdown. Fear, sadness, numbness, insomnia, bewilderment, rage, post-

traumatic stress symptoms, depressive symptoms, low mood, stress, emotional disturbance, impatience were among the most common symptoms reported.(Brooks et al, 2020)

## **STRESS**

Stress has an impact on people's physiological and psychological well-being, whether it is real or imagined. As a result, these impacts can trigger a variety of stress responses, including the fight-or-flight response (Seaward, 2018). In a research of Filipino students, stress was found to be favorably connected with their daily routine and to have a substantial impact on their mental health. Academics, workload, and time management were ranked as the top three routines that correspond with their stress reaction (Dy, Ferido, Espiritu-Santo, &Ria, 2015).

## **OBJECTIVE OF THE STUDY**

- ❖ To determine the significant relationship between the emotional states of depression, anxiety, and stress on the students' academic performance?

## **MATERIALS AND METHODS**

### **Research Design**

The structure, technique, and organization of how data can be collected and processed to serve relevance to the research's variables and aims is referred to as the research design of a study. It is most usually referred to as a study's "blueprint," as it determines the answers to specific questions concerning the research issue and offers extra information such as: what the study is about, what type of data is required, what sampling method should be utilized, and so on (Akhtar, 2016).

The researchers employed a descriptive correlational research design, which is a quantitative research method, in this study. Quantitative research methods use numbers and any measurable type of data or information in order to investigate variables and their interactions using systematic procedures.

### **Procedures**

The researcher obtained information through an online survey using Google Form to obtain the essential data for the study in identifying the association between depression, anxiety, and stress and the academic performance of the participants. The participants were given the DASS-21 and asked to disclose their academic performance for the first grade of SY 2020-2021 with their agreement.

## **RESULTS**

Following the research questions, this section of the study deals with the data acquired through the research instrument. This is so that the findings may be compared and the respondents' levels of sadness, anxiety, and stress can be determined. Statistical approaches such as the frequency count, percentage, and mean were used to analyses the collected data.

## LEVELS OF DEPRESSION AND STRESS

The purpose of this collection of data is to identify and describe the proportion of students who used severity levels from the three DASS-21 Questionnaire domains (Depression and Stress) that were delivered to the respondents. The researchers used the DASS-21 scaling approach to determine the severity level of the responders in order to explain it. The severity levels were then categorized into the following categories: Normal, Mild, Moderate, Severe, and Extremely Severe.

**TABLE -1: THE PROPORTION OF THE DEPRESSION LEVELS OF THE STUDENTS**

<i>Level</i>	<i>Frequency</i>	<i>Percentage</i>
Normal	20	8.69%
Mild	22	9.56%
Moderate	60	26.08%
Severe	78	33.91%
ExtremelySevere	50	21.73%
	<b>230</b>	<b>100.00%</b>

Table 1 revealed that the majority of senior high pupils had severe levels of depression, with 33.91 percent out of 100.00 percent having severe levels of depression. With a 26.08 percent success rate, moderate levels were achieved. Extremely severe came in second with 21.73 percent, mild came in third with 9.56 percent, and normal came in last with 8.69 percent. The highest level of severity among the students was "severe," indicating that the majority of the pupils had severe depression. Meaning that the respondents' depression was present the majority of the time and manifested itself in more active symptoms such as intense sadness and life rejection

**TABLE -2: THE PROPORTION OF THE STRESS LEVELS OF THE STUDENTS**

<i>Level</i>	<i>Frequency</i>	<i>Percentage</i>
Normal	35	15.21%
Mild	35	15.21%
Moderate	100	43.47%
Severe	50	21.73%
ExtremelySevere	10	4.34%
	<b>230</b>	<b>100.00%</b>

Table 2 revealed that the majority of senior high pupils had moderate indicators of stress, with 43.47 percent out of 100.00 percent showing signs of stress. Following that were severe indicators of stress, which accounted for 21.73 percent of the total. With 15.21 percent, normal and mild signs of stress are next. Extremely severe indicators of stress accounted for 4.34 percent of the total. The fact that moderate indicators of stress accounted for the largest percentage level shows that senior high students were under moderate stress. Meaning the respondents had non-excessive and manageable stress symptoms such uncontrollable emotions and physical issues.

## CORRELATION OF DEPRESSION AND STRESS AND THE ACADEMIC PERFORMANCE OF THE STUDENTS

This section detailed the impact of depression and stress on all respondents' academic performance. SPSS was used for the multiple correlation analysis, which was tested at the 0.01 level of significance.

**Ho<sub>1</sub>:** The depression measure used by the pupils has no correlation with their academic performance.

**Ho<sub>2</sub>:** There is no correlation between the pupils' stress scale and their academic achievement.

**TABLE – 3: THE RESULTS OF THE CORRELATION ANALYSIS OF THE RESPONDENTS' DEPRESSION AND STRESS SCALE AND THEIR ACADEMIC PERFORMANCE**

Variables		Academic Performance	Depression	Stress
Academic Performance	Pearson Correlation	1	.007	-.050
	Sig.(2-tailed)		.925	.435
	N	230	230	230
Depression	Pearson Correlation	.007	1	.275**
	Sig.(2-tailed)	.928		.000
	N	230	230	230
Stress	Pearson Correlation	-.052	.276**	1
	Sig.(2-tailed)	.450	.000	
	N	230	230	230

\*\* . Correlation is significant at the 0.01 level (2-tailed).

As seen in Table 3 the study's findings from the correlation analysis were reported. It was discovered that there is no substantial association between depression, anxiety, and stress and students' academic performance. This is because the null hypothesis was accepted because the linked variable had a probability greater than the 0.01 alpha level of significance.

## DISCUSSION

The study began by asking, "What is the level of students' emotional states of sadness, anxiety, and stress, as well as their academic performance?" The researchers used the DASS-21's scaling process and statistical analysis of percentage and mean to display the severity levels of the three domains. The students' academic performance was displayed using a statistical presentation of rate and frequency.

Overall, the prevalence of unfavorable mental health issues has an impact on students' personal and social development, particularly as they approach maturity and the conclusion of their adolescence stage. The researchers conclude that students, as well as other associated elements and individuals, should be more self-aware of their own and others' mental health. Furthermore, acknowledging the value of good mental health and taking efforts toward it are critical factors for persons' future and current psychological development.

## CONCLUSION

The researchers looked into the impact of depression and stress on pupils' academic performance. According to the study's findings, most students are suffering hopelessness, rejection of life, and dysphonia as a result of their depression. Subjective nervous effects and situational anxiety are common in students' daily lives. Lack of emotional control and physical problems are additional indicators of high stress levels, which are frequent among students.

Furthermore, the study's suggestions were as follows: (1) the school develops individual and group interventions through one-on-one interviews with guidance counselors and occasional programmers that promote and explain good mental health to both parents and students; (2) other professionals familiarize teachers with basic coping techniques such as knowing the "Do's and Don'ts" on students who exhibit negative mental health symptoms; (3) parents participate in the school's coping strategies.

COVID-19 had an impact on the entire world. This lockdown was instituted 100 years ago to combat the Spanish Flu. People at COVID-19 are now tired and anxious because of the lockdown. In their academics, students are losing ground. Students also use coping tactics such as yoga, exercise, and diversion therapy, which includes spending time with family and watching television. The effective use of current student welfare services, the creation of more "student-friendly" environments, and the frequent participation of all students in extracurricular activities can all be beneficial stress relievers. Similarly, students living in hostels have been found to be more likely to develop stress; as a result, a periodic evaluation of hostels with feedback from students should be done, and student complaints should be addressed swiftly. Students' health is a big concern, so encouraging healthy eating and lifestyle practices should be encouraged. Furthermore, instructors, parents, and even students themselves should be aware that having unrealistic expectations for academic success can cause stress. Finally, good study habits and appropriate preparation can help students avoid stress and learn more effectively.

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**Consumer Behaviour towards Online Shopping during COVID-19 Pandemic**

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**Abstract:**

The initial spread of COVID-19 in March, 2020 has changed the life of many human beings. During crisis time, the Government imposed many restrictions and a complete lockdown in the country took place. People of the country could not move from one place to another. This crisis impacts the economy and business sector of the country. In this research, Consumer Behaviour toward online shopping was studied in detail. Questionnaire was prepared and distributed to various people. In this study sample, size is 120. Random sampling was used. This study proved that the crisis shifted the consumer towards online shopping during the pandemic and sentiments of consumers changed towards their spending during COVID-19.

Keywords: Online Shopping, Consumer Behaviour, COVID-19, Economic Crisis

**I. INTRODUCTION**

During the period of study, climatic change has been undertaken in the society, a virus called COVID 19 has spread, it is creating various health problems to masses, and in certain cases, it is so dangerous that it is causing death penalty on society on the large. Due to which the financial condition and income of the society is adversely affected. The focus of the present section is on available literature on impact of COVID -19 on Consumer behaviour towards online shopping[1].

**II. LITERATURE REVIEW**

Various papers were reviewed related to this study. In this section, only base paper was mentioned here.

**Seema Mehta et al (2020)** highlights consumer Behaviour during COVID-19 crisis. The article attempts to weave through the maze of literature available about consumer Behaviour in normal times and in crisis times and strengthens it with the rapid assessment reports culled out by the different consulting organisations during the lockdown phase.

**Alina Butu et al (2020)** depict changes triggered by the COVID-19 crisis on the purchasing intention of such products before and after the end of the respective crisis. The aim of this scientific investigation relies on identifying the methods by which these Behavioural changes can influence the digital transformation of short food supply chains.

**III. OBJECTIVE & RESEARCH METHODOLOGY**

Main objective of the research to study the Consumer Behaviour towards Online Shopping during COVID-19 Pandemic

- A. **Data Collection:** For data collection, an appropriate questionnaire would be designed and its validity & reliability would be tested prior to its execution.
- B. **Sample Size:** A 120 sample units would be taken that data collected from different states of India.
- C. **Sampling Technique:** Random Sampling Technique will be used in the study.

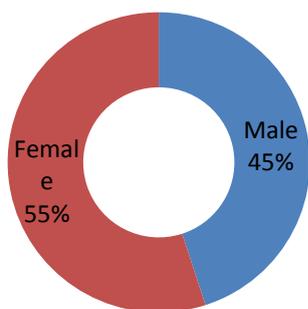
**IV. DATA ANALYSIS AND RESULT**

The data was analyzed and interpreted. Calculations were made with the help of Microsoft Excel 2007. Interpretation of data was done for the fulfillment to achieve the objectives of the research.

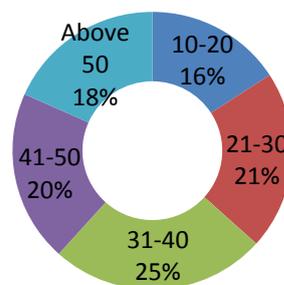
The Survey was conducted in October 2021, with sample size 120 from throughout India. The demographic profile of Consumers as shown in Figure 1(a,b,c,d).

**Table 1: Demographic Profile of Consumer**

Demographic Basis		Male	Female	Total
Age(Years)	10-20	10	9	19
	20-30	11	14	25
	30-40	12	18	30
	40-50	11	13	24
	50 Above	10	12	22
Total		54	66	120
Income per month(Rs.)	>5000	3	2	5
	5001-10000	7	7	14
	10001-20000	9	13	22
	20001-30000	8	11	19
	30001-40000	9	13	22
	40001-50000	10	10	20
	Above 50000	5	7	12
	Not answer	3	3	6
Total		54	66	120
Education Level	Illiterate	0	0	0
	Below Matric	1	1	2
	Matric	9	5	14
	10+2	9	12	21
	Graduate	30	40	70
	Post-Graduate	5	8	13
		54	66	120



(a)



(b)

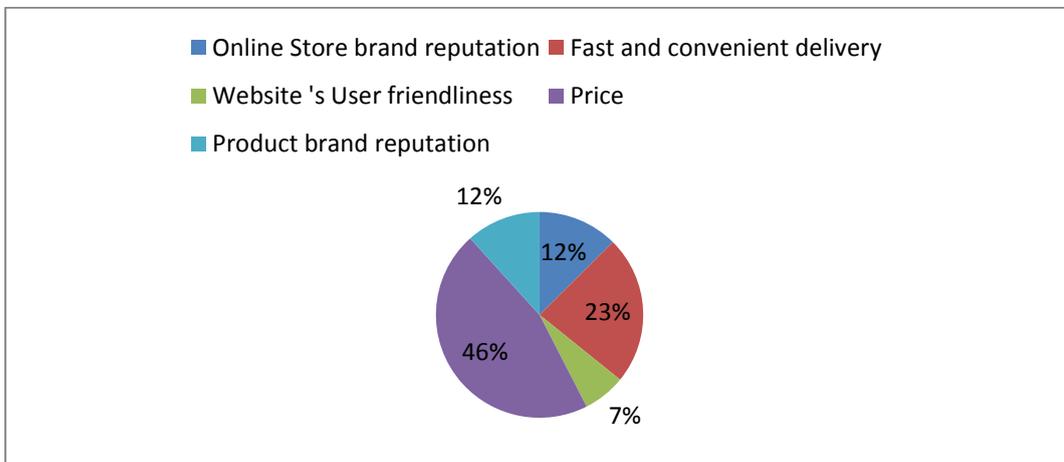


**Figure 1: a. Gender Ratio b. Age of respondent c. Income level d. Education Level**

- **To study the factor most influencing the consumer towards online purchase.**

Question was asked to consumers which factors influence them to purchase products online.

Figure 2 shows that 46% of shoppers are highly price-sensitive. and this is the most influencing factor other than online store and brand of product reputation.

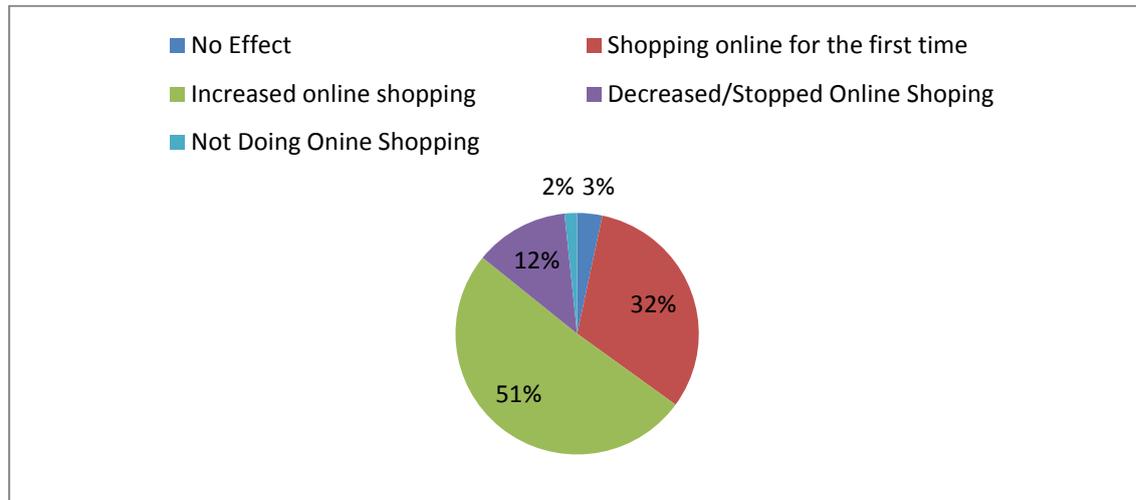


**Figure 2: Factors most influencing the consumer towards online purchase**

- **To study how COVID-19 affected purchasing habits of consumers towards online shopping.**

COVID-19 has changed the Consumer Habits towards online shopping. It pushes all consumers to boost their online purchase. Some new consumers use online shopping for the first time during crisis time. The COVID-19 outbreak affected consumer Behaviour towards online shopping.

Result shows that 32% shopped online for the first time, while 51% increased their online shopping during the time of crisis.



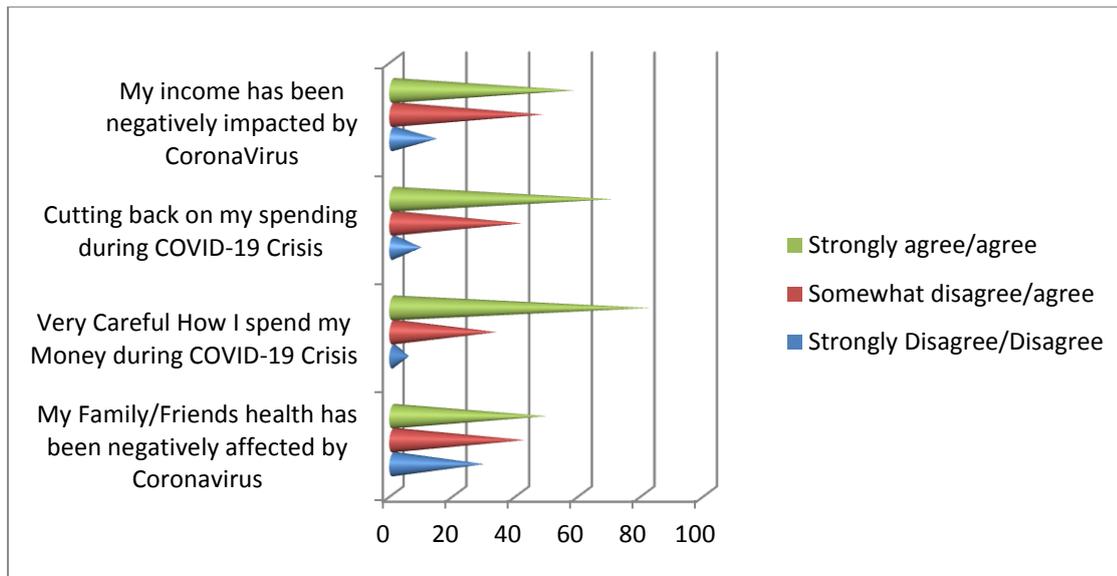
**Figure 3: Purchasing habits of consumer**

- **To study how sentiments of Consumers changed towards spending of their income.**

Income level is affected during COVID -19 outbreaks. Many businesses closed, many servicemen were relieved from their jobs, and less salary during crisis time will affect their spending habits during crisis time.

Questions were asked to consumers with three options: 1) Strongly disagree/disagree 2) Somewhat disagree/agree 3) Strongly agree/agree.

Results shows that 41% strongly agreed that My Family/Friends health has been negatively affected by Coronavirus, 68% strongly agreed that they are Very Careful to spend their Money during COVID-19 Crisis, 58% agreed that they did less shopping during crisis time and 48% my income has been negatively impacted by Coronavirus.



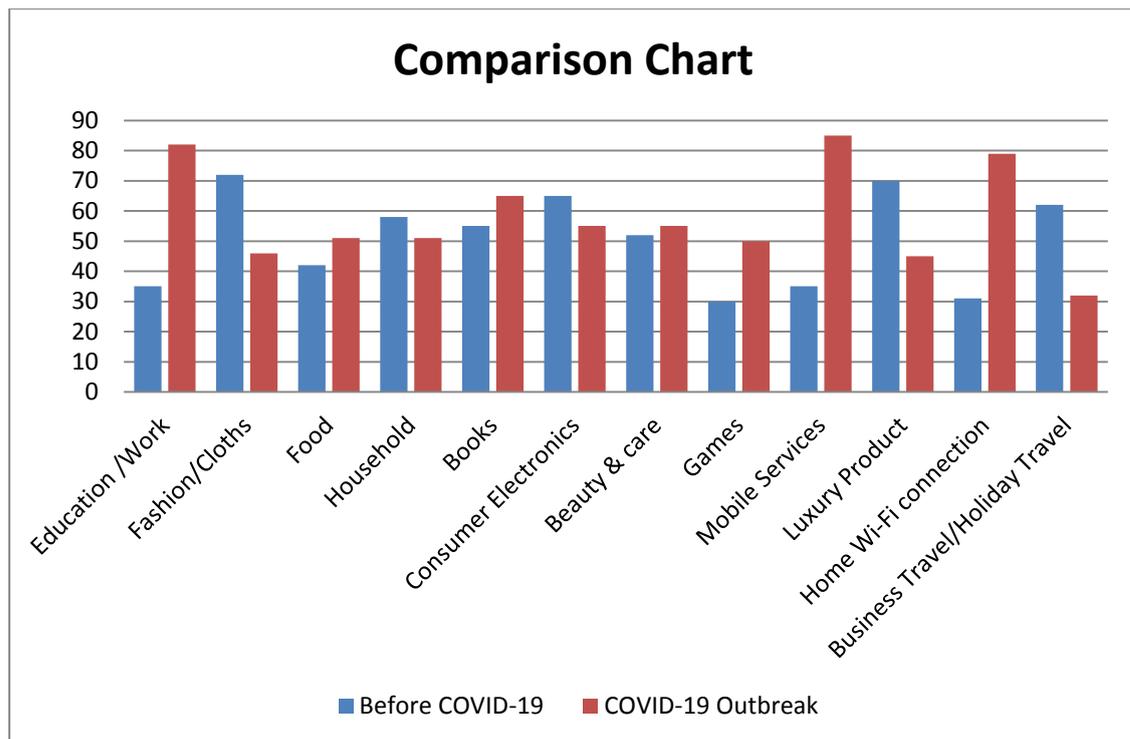
**Figure 4: Sentiments of Consumer changed towards spending of their income**

- **Study which Product/Service types have consumers bought online before and during COVID-19 outbreak.**

Question was asked to consumers which Product/Service types you have bought online before and during COVID-19 outbreak. Result shows that respondents have more interest in online Education/Work, Mobile services, Wi-Fi connections, Book Purchase, Games. Most of the respondents have bought less luxury products, Business Travel/Holiday Travel was badly affected.

**Table 2: Product/Service Types**

Product/Service Type	Before COVID-19 Outbreak (%)	During COVID-19 Outbreak (%)
Education /Work	29	68
Fashion/Cloths	60	38
Food	35	43
Household	48	43
Books	46	54
Consumer Electronics	54	46
Beauty care	43	46
Games	25	42
Mobile Services	29	71
Luxury Product	58	38
Home Wi-Fi connection	26	66
Business Travel/Holiday Travel	52	27



**Figure 5: Product/Service types have consumers bought online before and during COVID-19 outbreak**

## V. SUMMARY AND CONCLUSION

COVID-19 Outbreak showed a jump in surfing of online websites for purchase of products/services. Consumer habits and sentiments changed toward online shopping. Certain product/service gained popularity and some products were slightly affected during COVID-19 pandemic. Consumers were more aware of his spending because health and income level affected a lot.

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## **A Comparative Study for Classification of Heart Disease Patients with Data Mining Techniques**

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### **Abstract**

During the first heart attack, more individuals die from heart disease than from any other cause. However, certain issues have been addressed for breast cancer, lung cancer, and the ventricle, in addition to heart attacks. Valve, for example. There's nothing to be concerned about if you have a common cardiac disease. Cardiovascular disease, commonly called as coronary heart disease, is, on the other hand, a potentially fatal ailment. The majority of individuals in the globe are afflicted with heart disease. Coronary heart disease affects the blood arteries in the area. In this study, the prediction of cardiac disease was assessed using classification methods. Data mining has been utilized for a variety of applications, including prediction systems. Data mining techniques are often utilized in illness diagnosis in healthcare. The algorithms are used to assess cardiovascular patient data and predict the kind of cardiovascular illness they have. The patient is gathered from EKG morphology, blood pressure and information about the existence of chest pain, dizziness, palpitation and cold sweat. Medical records from Harapan Kita Hospital have been collected and served as a database sample for this study.

**Keywords:** Heart disease, Data mining, classification and cluster.

### **Introduction**

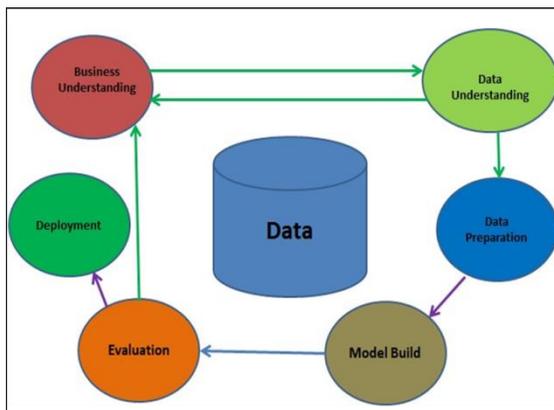
Heart infection is one of the most common diseases that may shorten a person's lifetime today. Heart disease claims the lives of 17.5 million individuals worldwide. Because the heart is a vital element of our body, its component functioning is critical to our survival. Heart illness is a condition that impairs the heart's function. Many aspects of public

health and clinical treatment need an evaluation of a person's heart disease risk.

Multivariate regression analysis of a longitudinal research may be used to create a risk prediction model. Because digital technologies are constantly evolving, healthcare organizations are storing massive amounts of data in their databases that are very complicated and difficult to analyze. In medical facilities, data mining methods are critical for analyzing various types of data.

Data mining is a computer technique that involves finding outlines in big information sets and has origins in machine knowledge, statistics, database design, and visualization. Some of the most common data mining methods are Association Rules, Classification, Neural Networks, Clustering Regression, and Summarization. Data mining is the mix of data mining and knowledge discovery. Data and data analytics have become important features in most industries. It is a specific medical database system. A databases is just a data collection. Data base management solutions are used for the development and maintenance of database systems. The method of computationally extracting latent knowledge structures from large data sources represented in models and designs is known as data mining. Data mining is a key step in medical database knowledge, which is a well-defined procedure. The interactions of all this data may be

transformed into knowledge about past patterns.



**Figure 1: Data mining Process Flow**

In the healthcare industry, a variety of data mining methods are utilized. The goal of this research article is to look into the prediction of heart illness and evaluate the different classification methods and algorithms that have been used on real-time medical data sets. The performance study of different classification algorithms is done by evaluating an algorithm with the highest accuracy rate on a variety of real-time medical data sets. based on the accuracy rate, will forecast whether diabetic individuals will get heart disease or not. According to the results of the performance comparison, SVM is the best classification technique for predicting accuracy rate. “Comparative study of increasing the accuracy rate utilizing various types of data mining (prediction) classification algorithms” is the title of this research project, which also includes the development of a CMS prediction model (Cardiology Medicine or Surgery). The goal of the study is to solve the problem of predicting cardiac disease in diabetes individuals.

### Heart Disease-Analysis

Data mining techniques are utilized to analyse the prediction model for cardiovascular diseases. In the United States, India, United Kingdom, Asia, the United Arab Emirates and others, heart disease was the top cause.

These methods are used to anticipate many types of

heart-related problems in people's lives.

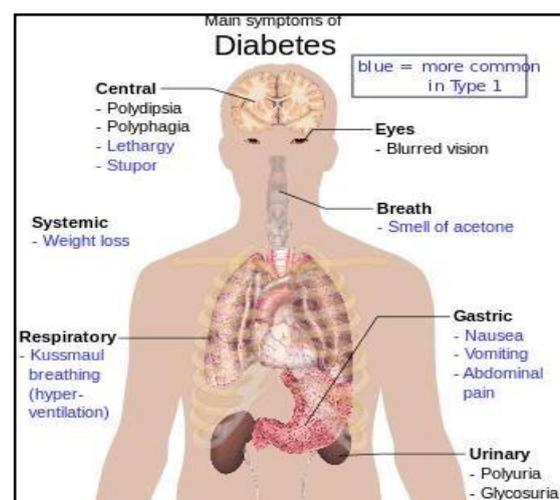
Symptoms of CMS illness differ from one person to the next. In the actual world, every man is more likely to have chest discomfort. Along with chest pains, every female has additional symptoms. Breath, tiredness, and nausea are some of the other symptoms.

The main and significant symptoms of a heart attack are given below, and the model will be built based on these symptoms. The computer process of finding patterns in huge data sets using machine learning techniques is known as data mining.

- Pain in chest
- Rapid
- Irregular heartbeats
- Pressure
- Numbness
- Pain in chest
- Rapid
- Neck Pain

### Data Mining Procedures in Medical science

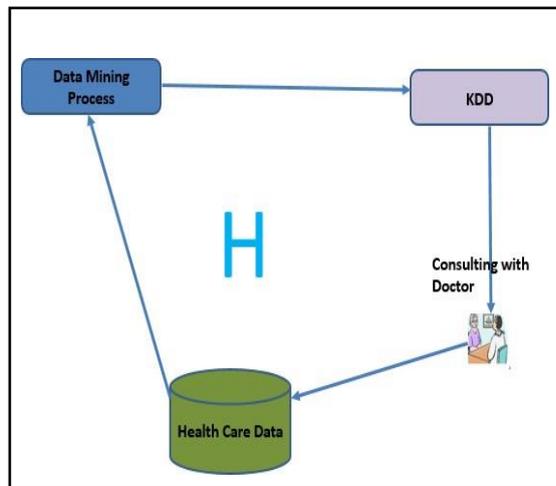
In recent years, data mining techniques have been used in a variety of fields, including computer science, medicine, banking, finance,



**Figure 2: Symptoms Heart Disease**

retail, and manufacturing. Data mining knowledge provides a intelligible slant, and it also aids in the discovery of hidden patterns in data. The department of heath generated a massive amount of

medical data. The real-time medical data from a large number of patients is reviewed, as well as the results of this study in the medical department.



**Figure 3: Medical architecture using Data Mining Process**

### Literature Review

Data mining methods in medical and health-care databases have a wide range of homework assignments.

Every day, huge quantities of data are generated by automated data record systems in healthcare departments, from which data mining may extract valuable information. The next chapter gives a short overview of how data mining classification methods may be used to predict cardiac disease.

Every nation has a cumulative number of people with diabetes and heart disease; 76 percent of people with heart disease reside in countries with low income. Many researchers have used Weka and R to create a variety of prediction models for cardiac data. A couple of the models built via data mining are included below for my reference. Many studies have been conducted on the identification of lifestyle diseases utilising various medical data sets and data mining methods. Many lifestyle illnesses are listed below.

- Heart disease
- Diabetes

In today's world, the sports domain is the most significant. Since the majority of customers, especially athletes will purchase the goods online. As a result, data security is increasingly important. Huge quantities of data are gathered in the sports world for each player in various years, teams with different games, and year length. Sports teams may use data mining for statistical analysis, pattern finding, and prediction models.

The goal of our work is to offer a study of various data mining categories that may be used in a heart disease prediction model. Viswanathan K et.al (2017) "Review on Heart Disease Prediction System Using Data Mining Techniques" For this investigation, several abilities that are utilised in a variety of characteristics are reported. In one study, heart disease prediction was shown to be 100 percent accurate. Some studies also claim that by utilizing chosen characteristics, Decision Tree classification algorithms may achieve 99.62 percent accuracy.

According to a study published by Niti Guru et al. in 2013, neural networks may be used to diagnose heart disease, high blood pressure, and diabetes. They removed a lot of iterations by using genuine patient information. With 13 input characteristics, the classification technique was trained and evaluated. Shekar (2017) and colleagues created a novel prediction model to extract association and categorization from a medical real-time dataset. To construct the prediction model, the whole data set is split into equal parts, and each model division is referred to as a cluster. According to a study published by Niti Guru et al. in 2013, neural networks may be used to diagnose heart disease, high blood pressure, and diabetes. They removed a lot of iterations by using genuine patient information. With 13 input characteristics, the classification technique was trained and evaluated.

This study used a genetic algorithm to create a prediction system for heart disease. To obtain the appropriate prediction model, we utilized just six of the 13 characteristics. The model's conclusion is that the Decision Tree data is significant.

“In this work, the author used a mix of data mining algorithms to predict cardiac disease,” Ankita Dewan (2017) suggested. When comparing all of the classification methods for non-linear data, the results of this study show that the neural network is the best.

The article "Disease Dataset using Neural Network Approach" was proposed by Usha Rani in 2018. The author of this article proposes an artificial neural network that employs both forward and backward transmission techniques. Single and multilayer neural network prototypes are at the forefront of this research.

This study used the C4.5 classification technique to create a prediction model and various classes using the C4.5 classification methods. The primary findings and prediction model for this article show that the developed prediction model accurately predicts cardiac problems.

This model presented the data mining method to prediction from patient real-time medical data set with other illnesses, “Predicting Disease By Using Data Mining Based on Healthcare Information System”. The primary goal of this study is to investigate connections between illnesses from health departments, with the following classification methods, such as Naive Bayesian and J-48 classifiers, being used.

According to the authors, a research of prediction models for breast cancer was conducted. The primary aim was to identify key factors that influence the development of breast cancer. The SVM model performed well in tests using a dataset acquired from SEER. According to this research,

they generated the complete classification tree and changed it once using pruning.

Artificial networks in predicting disease detection are represented by Dilip Roy Chowdhury (2011). The anticipated approach is using a BP learning algorithmic programme to train a Multi-Layer Perceptron to recognize a disease method and prediction model. This research uses an ANN to forecast sickness and increases the accuracy rate to 75% with more stability.

The result of these studies indicates that logistic regression has a higher accuracy rate than other algorithms. This study used a genetic algorithm to create a prediction system for heart disease. To obtain the appropriate prediction model, we utilised just six of the 13 characteristics.

Babu Sarath et al. The main focus of this article is on the use of data mining methods and a series of different features to successfully predict heart disease. For prediction of cardiac disease, the genetic algorithm, the K-means algorithm, the MAFIA algorithm and the decision algorithm are suggested. After applying the evolutionary method, the decision tree is extremely efficient.

Meenal Saini et al. conducted a survey on several new methods for predicting the risk of heart disease. For the hybrid system, nine classifiers were utilised. Create a hybrid method that includes a hybrid classifier and weighted voting (HCWV). The accuracy of HCWV is 82.54 percent.

### **Research Objective**

The healthcare industry employs a variety of data mining methods. The goal of this research article is to investigate heart disease prediction and evaluate the performance of different classification methods and algorithms used on real-time medical data sets. The performance study is done by evaluating an algorithm with the highest accuracy rate on a variety of real-time medical data sets among different categorization methods. On high-

dimensional patient data sets, it also compares SVM, C4.5, KNN, and Decision Tree algorithms. Using the accuracy rate, it will be possible to forecast whether diabetic individuals would develop heart disease or not. SVM is the best classification technique for predicting accuracy rate based on the performance comparison outcome.

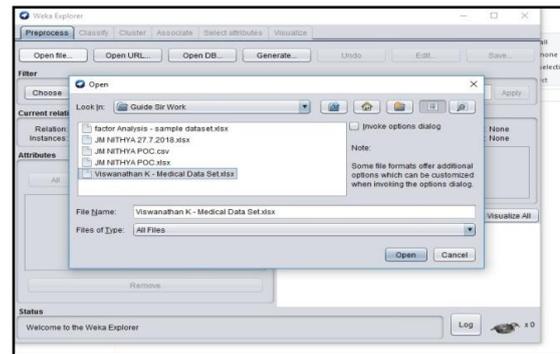
### Contribution of Research

This study and thesis have provided several important aspects to the prediction model's development. The development of this prediction model is divided into many stages. This research's first phase focuses on how classification algorithms may aid in the development of model prediction utilizing machine learning technologies such as Weka and R. There are many key benefits of using data mining methods for categorization. Next steps in this research project include developing an innovative technique for forecasting the accuracy rate of heart disease in diabetes individuals.

### Research Methodology

With the assistance of Java Database Connectivity, Weka can connect to SQL databases. A database query's result may be processed by Weka. Weka also has access to deep learning. Weka does not enable multi-relational data mining directly, but will indirectly support it. Weka's most recent version is Weka3.2.

In healthcare, data mining is useful for assessing the efficacy of medical treatments. It is a multidisciplinary research project including databases, statistics, machine learning, and data visualization. Diabetic heart disease is a serious



**Figure 4 : WEKA Pre-Process Flow**

condition that affects diabetics. The technique of anticipating or forecasting information from large collections of medical data sets is known as data mining. These patterns and trends may be gathered and used to create a data mining mo

### R And R Studio Workflow

The "R" programming language is a general-purpose programming language. It is a free open source utility. To construct the prediction model, it offers great graphical skills. R will be backed up by a huge user base. Some statistical techniques will be accessible in R that are not available in other machine learning programmes. R's features include Studio Desktop, which allows R programmes to run locally.

### Data manipulations

- Statistical computing
- Graphics

The scientific effort is focused on the issue of predicting diabetes patients' cardiac disease. The major importance of this study is

- How the data mining classification techniques has been implemented in the in health care department?
- To build the prediction model.

### **Classification Algorithm Types**

Researchers have suggested a number of categorization techniques. This research study has utilized and implemented some of the techniques. To obtain the appropriate prediction model in data mining,

Classification methods were used in this study.

- K-NN
- Support Vector Machine
- Naïve Bayes
- Decision tree

### **Results and Discussions**

#### **SVM Implementation**

One kind of classification technique is the support vector machine. Data mining, text mining, and pattern recognition will all be supported by SVM. The user or client will be able to easily analyse real-time medical data sets thanks to SVM. SVM will provide excellent and optimum results. SVM was created in 1992.

SVM is a non-linear classifier technique that is often credited with outperforming other methods in classification. SVM is mostly used to solve classification issues. The following diagram depicts the SVM procedural, functional, and architectural flow.

#### **Decision Tree Implementation**

Decision trees are a kind of classification method that is very effective. A decision tree is a decision-making aid that employs the tree concept. The root, left, and right child nodes will make up the tree model. It's one method of displaying an algorithm. Attribute selection is a crucial stage in data mining, and it's also one of the most essential processes in processing or predicting the accuracy model. To

choose or filter the characteristic, follow the steps below.

- To identify the primary or required attribute from the data set
- To select the classifications methods
- To choose the learning method (supervised or unsupervised)
- To split the training and testing data set
- To use the K-fold validation

For the ultimate conclusion of this experiment, data mining methods were utilized in conjunction with the Weka tool to calculate and compare four classification algorithms: SVM, Decision Tree, Navie Bayse, and Knn using a diabetic patient dataset. The primary data set and parameters and classification techniques such Naive Bayes, Support Vector Machine, Decision Tree and KNN are compared. The key features of diabetes we used in our research and their descriptions are shown in the following table.

### **Conclusion**

The primary objective of this research is to evaluate the best prediction and prediction techniques in medicine and surgery utilizing a range of medical data mining algorithms (CMS). To develop effective prediction techniques, SVM, Decision Tree, J4.5 and K-NN Classifiers performance comparisons with Cardiology sets of data are collected. The Analysis is conducted is used to assess the best predictive models and to improve it. The best classification method was selected as the one with the highest accuracy rate and the shortest execution time. SVM has the highest classification accuracy rate and is regarded as the best classification algorithm.

### **Future Work**

This course has a lot of potential for future work. Based on business rules, future attribute selection, attribute reduction, and row reduction have been

completed. The planned or future study would use a fresh medical data set and chosen characteristics to improve the accuracy rate of SVM.

The objective of the future research on this subject is to enhance the present accuracy rate by using different datasets to develop the prediction model, from its current state to a more accurate rate. In the CMS model, a manual process is now utilized, but this will in the future be replaced by a "CMS app.

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**Big Data with Demand and supplying Approaches using Machine learning and Deep learning : Review**

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**ABSTRACT**

Using Big Data analytics in supply chain management. In order to come up with a strategy for change, they need to figure out what went wrong and why. A resource may detect when action is required based on a previously specified business rule. This is also how they'll get better forecasts. As a result of this, the optimum course of action may be generated regardless of the supply chain operations that are now taking place. What we used and how we did it As a means of integrating supply chain management into data analytics, this thesis attempted to explore examples from the literature, a research challenge, the outlines of an architectural framework, and the advantages of using data analytics. It is possible to predict future supply chain operations such as sales, demand, marketing, and finance by using time series forecasting methods. Using historical data trends, time series forecasting aids firms in making sound business choices. It's a useful tool for making predictions about the future.

**INTRODUCTION**

Before addressing any data, you must first understand the database's fundamental functionalities. It is possible to think of a database as a mirrored image of the real world. It was developed for a particular purpose, and is supposed to be constructed and filled with information. It's an element of your entire data strategy, too. An information system that holds historical and transmutative data from one or more sources is called a data warehouse. Transaction data from numerous sources may be analysed, reported, and integrated in this system. The following are some benefits of use a database management system. It ensures the safety and easy accessibility of data. A database may be used to store and retrieve data in a variety of ways. It's a good idea to use a database to accommodate the demands of several programmes that need access to the same data. A database management system (DBMS) provides a high level of security by prohibiting data from being accessed by those who are not authorised. Only one user can see the same data in a database at a time due to the way concurrent data may be accessed. It's vital to keep in mind a few fundamental characteristics while dealing with data in any format. Because it's secure and removes unnecessary information, it's like that. There are several angles from which to view the information. In accordance with the ACID principles, the database system is (Atomicity, Consistency, Isolation, and Durability). Provides an additional layer of security between programmes and the data they contain. processing and sharing of data across several users A large number of concurrent users may be accommodated in relational databases.

Supply chain managers must be prepared for a broad variety of challenges since change is unavoidable in our everyday lives. The growth of "big data" and the subsequent examination of this data via analytics are two important factors that have had a considerable influence on this development. To maximise the value of a company's data, it is essential to use 'big data' analytics and other data resources. Large-scale data collection and analysis are essential for Supply Chain Management's operational aspects. Data science for supply chain management utilises

quantitative and qualitative methods to anticipate outcomes in order to solve relevant SCM concerns from other disciplines in combination with SCM philosophy. In SCM predictive analytics, quantitative and qualitative approaches will be used to examine different integration levels of the past and future of the organization's actions in order to better supply chain design. For supply chain management (SCM), service levels and associated costs are essential considerations. A pure type of data analytics is the most effective way to understand it.

### **Analytical Framework for Massive Data Sets**

Big data is the only way to extract and analyse data from unstructured databases when working with large or complex datasets. However, because to the amount of rows and columns of data, that data set has a richness of statistical power and complexity. A high false discovery rate is more probable when a data set has a greater number of attributes or columns. Big data analysis presents a number of challenges, including finding the data source.

If you don't have the raw data, you can't evaluate and share it; if you don't share it with others, you can't keep it private. Large amounts of data, a vast variety of possible variations, and a very rapid pace of change characterise big data. When it comes to large datasets, ex-professionals are just observations that can only be examined via sampling. A large amount of data must be analysed and valued quickly because of the constraints of traditional software.

"Big data" now refers to advanced data analysis techniques used to extract value from vast volumes of data, although the size of a specific data collection is seldom attained. That the current data landscape is enormous does not make it the most important feature of this new data ecosystem (1). Data may be used to uncover new links between, for example, "discovering business trends, preventing sicknesses, combatting crime, etc." (2). Big data provides a challenge to corporate executives, scientists, doctors, advertisers, and government officials in a wide range of fields, including internet search, financial technology, health analysis, geographic information systems, urban informatics, and business informatics. Scientists face several challenges in domains like as genetics, electrical science (including meteorology (3)), environmental research, advanced physical models, and biology (4).

When working with huge volumes of data, the use of desktop statistical tools with relational database management systems may be troublesome. Big data processing and analysis may need "massively parallel software working on dozens, hundreds, or even thousands of computers" (5). People's skills will be put to the test on a regular basis. The individuals who examined "big data" and the tools they used determine the data's quality. Because of authorisation, big data becomes a mobile target. When confronted with hundreds of terabytes of data, some companies may need to reassess their data management strategies. Others may need tens or even hundreds of terabytes of data to become a major role in the overall picture (6).

Data storage, management, and analysis provide a substantial challenge to any firm. In recent years, data has emerged as a key concern for every business, bringing with it both challenges and opportunities. A considerable lot of complexity must be dealt with by the organisation since data is not gathered from a single source(7) but rather from several sources and takes on various formats (Structured, Unstructured, Semi-structured, etc.) "Big data" often refers to the volume of data, however this is not the case in the real world. There are several ways to narrow down the concept of "big data," and not all of them rely just on the quantity of data being kept. In addition to volume, data velocity and variety are essential components in defining big data. The 3Vs (volume, variety, and velocity) of huge data may offer a complete description.

Volume here is a reference to the quantity of data that will keep increasing over time. When deciding whether or not a piece of data is big data, the value and potential of the data play a role. It's an essential one since it goes above and beyond what's normally possible in terms of database management. The shift from Terabytes to Petabytes in data volume is a worldwide phenomena (8).

It is imperative that data be collected and processed as quickly as possible in order to meet the ever-increasing needs and issues that come with development and advancement. Production of large data, in contrast to that of small-scale, static data, is an ongoing process. Organizations that deal with vast volumes of data have two major challenges: continuous data collection and management. [Page Required] (9). Every day, 2.5 quintillion bytes of data are generated, and the last two years have produced the most. Data streaming. Decisions made in milliseconds or less based on real-time data analysis Real-time communication has replaced batch processing. Modern systems are more quicker in terms of data flow, data change, and data processing.

Diverse sources of data, as well as a wide range of data types and sizes, are all examples of data diversity. Even in its early days, RDBMSs were capable of effectively managing structured data. But the new font, however,

The current tools and technology had a hard time keeping up with the new structure and personality.

Big data technologies were designed to collect, store, and analyse data generated at a quick rate (velocity) and over a broad range (variety) (volume). Similarly designed tools and technology would be used in the future to handle structured data, but mostly for archiving purposes. A decision had to be made between big data and relational databases when it came to structured data processing. As a result of this, it is possible to extract valuable information from social media, log files, sensors, etc. In addition to structured data, which was formerly the only data used for analytics, unstructured and semi-structured data are also being used. A few data sources, such as audio, video, social media, web sources, and data, cannot be classified. Various sorts of Big Data are accessible.

Two more Vs are introduced by big data, which asserts that the three primary Vs can only be

translated into value via the use of certain technologies and techniques. In addition to large data, it adds the two "V"s of veracity and value to the equation..

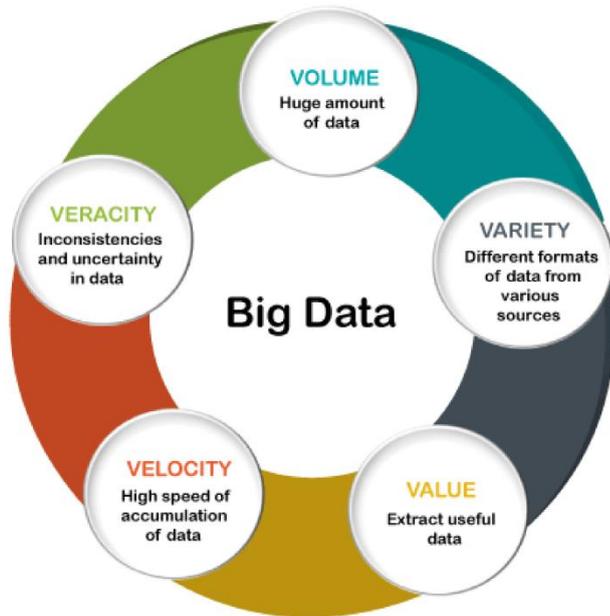


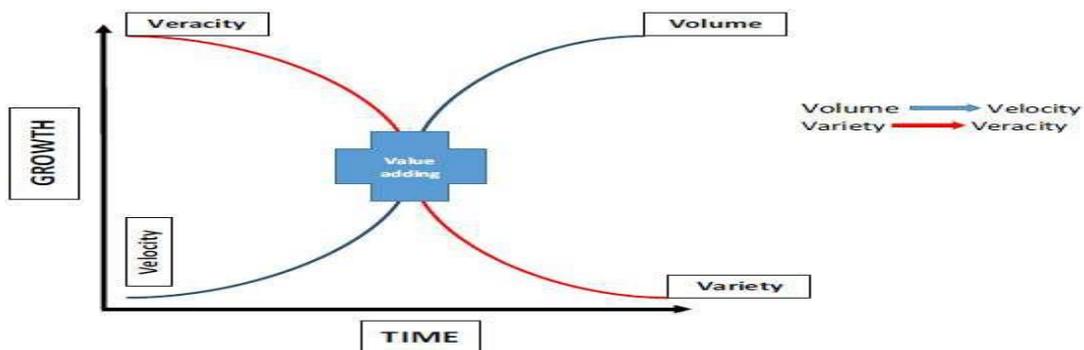
Figure 1.1 Big Data Analytics Characteristics

Veracity: Trustworthiness and Consistency are the two most important aspects (or data doubt). Quality, correctness and accuracy of the data will decide whether or not an imprecise data type is reliable or predictable. To be useful, the analysis of big data need both a great volume and a high degree of trustworthiness. Capturing high-quality data is essential for performing reliable analyses (10).

Value: The large data does not make any sense if it is not giving any meaningful value to the business. That is why Value is the most important Vs amongst all V's have in big dataanalytics.

figure 1.2 illustrates(9)Squeezing a large amount of data (V3) for increased data flow velocity (V2) in less time, while simultaneously increasing data variety (V1) to improve date veracity (V4) in less time, are two important aspects of analysing big data for maximum value addition.

Figure 1.2 Modulation of the vs of Big Data



Data is now necessary to be examined by each operation together with a vast dataset, however the challenge arises when data comes from several sources rather than a single central location. However, data is made up of

many different categories, some of which are even in the form of streaming data. As a result of the unique characteristics of vast, high-dimensional, diverse, complicated, unstructured, incomplete, noisy, and erroneous data, statistical and data analysis methodologies may have to adapt (11).

It is a process of analyzing large data sets to customer preferences, existing market trends, unidentified correlations, discover patterns, and other useful business information known as big data analytics which helping to business executive to make a decision. In other words, applying advanced analytics methods on large or big dataset.

## LITERATURE REVIEW

In their study, Konarasinghe et al. (2015) examined the accuracy of the ARIMA model in predicting the share market returns in Sri Lanka. ACF and PACF put the series' stationary through their paces before approving them for release. The Colombo Stock Exchange's ARIMA models were put to the test against the market's overall return, sector return, and individual business return.

Electrical recognition, handwritten characters, voice and fingerprint recognition are only few of the domains where the notion of ANN has been effectively utilised in the early 1990s. Aside from bank failure prediction, pattern identification, and stock market forecasting, ANNs have been used in a variety of other applications. Vehicle Control, Game Playing and Decision Making in Chess and Racing, Medical Diagnosis, Process Control and Financial Applications are some areas of use for this technology. From a survey of the literature, it is clear that there is a great number of studies that utilise ANN to model stock prices, particularly in advanced nations, and that in his work, he employed ANN and moving averages to forecast the movements of the Turkish stock market. To anticipate the trend in financial markets in 2003, Wu and coworkers employed neural networks, while Kim and coworkers used neural networks with optimum feature transformations to predict daily closing prices of Turkey's stock indexes. They even employed a genetic method in their research to enhance ANNs' learning capacity for prediction. It is clear from the findings that ANN with a GA model performs substantially better than ANN. An approach called Multi Expression Programming (MEP) was utilised by Crina et al (2010) to forecast stock market indexes and compared the results to ANN models (trained using the Levenberg-Marquardt algorithm), Fuzzy Neural Networks, and Support Vector Mechanism (SVM). ANN has a distinct edge over the others since it is more effective at seeing complicated patterns in data (Ripley, 1994). The use of artificial neural networks (ANNs) in time series forecasting has received a lot of attention. Basic neural networks beat traditional statistical approaches by a wide margin.

Synapses are the connections between neurons, and the structure of artificial neural networks (ANNs) mimics that of the human brain. Interneuron weights are used to store knowledge in a similar way to how a person's brain learns and retains information. Nodes, connections between nodes, activation function, and learning rule make up a neural network. The weighted total of other neurons is collected by the neuron in the network. To keep the model operating as simple as possible, Haykin only used one of the three activation functions available: the threshold function, the sigmoid function, and the hard-limiter function. When nonlinearly separable classes are involved, the threshold model does not operate as an activation function for ANNs.

From Fortune 500 and Business Week's Top 100, Yoon and Swales (1993) gathered stock market data. Based on our data analysis, we found that MDA (Multiple Discriminate Analysis) was 74% accurate on our training set

while ANN (Automatic Neural Network) was 91% accurate on our training set and 77.5 percent accurate on our test data accurate. It is clear that neural networks are superior than MDA in this regard. This model's properties and relevance may be sufficiently explained by the MDA model, on the other hand. Net-based computer algorithms and econometric time-series models were used to evaluate data gathered from 1945 to 1990 on power usage in the United States. RMSE, MAD, and MAPE (Mean Absolute Percent Error) were used to determine the best model-adjusted R-squared, and the results revealed that the NN models outperformed the econometric time series models.

In a study by Moshiri et al. (2000), heuristic algorithms using data on inflation rate were applied to several BPN models. In addition to using BPN, ARIMA, and BPN with ARIMA, she also employs ARIMA, although BPN is based on the VAR model the most. Econometric models were used in the empirical economic investigations. A Bayesian model, an ARIMA model, and a VAR model are all examples of predictive models. The CANISMAK report, which started in January 1973 and lasted until the end of 1994, included monthly statistics on inflation, GDP deficit, money supply, and import price inflation. Two kinds of data were created during training: training data from 1970 to 1990, and testing data from 1991 forward. The root mean square error (RMSE) and the mean absolute error (MAE) were employed to calculate prediction efficiency. In addition, the models were tested using data to evaluate how accurate they were. It seems that hybrid models perform comparably to, or are more dynamic than, their econometric counterparts when it comes to forecasting future demand. Artificial neural networks and ARIMA models were compared using eight years of data from a medium-sized Brazilian corporation.

T jung et al (2012) has compared neural network with the regression model (OLS method was used to estimate parameters of regression model) using financial stock data and for forecasting this data stock prices and eight explanatory variables were used as input data. Regression model was created by using SPSS program, and for creating neural network model, ayyuda neuro intelligence program was executed. The evaluation metrics was used to compare the models derived by the mean and standard deviation of the percentage error. Adjusted R-square value was also calculated by the authors. "Neutral The results showed that the network was more precise than the ordinary linear regression procedure. The neural network algorithm had a higher accuracy of 96% while the ordinary least-squares algorithm was at 68% When performing the neural network analysis, there were some complications. A more complicated neural network takes more time to find the right solution. It is a black-and-white search process as the model cannot be tweaked until it produces a successful result. Time series modeling and time-based forecasting is thought to be one of a family of quantitative forecasting methods developed in operations and science. An Auto-Regressive Integrated Moving Average (Arim) model is also known as the "B-J." There are a variety of similar methods; they all use only a previous values set to predict potential ones. It is referred to as a uni-variate model, as future values are obtained from single-variable values

Study carried by Niaki&Hoseinzade (2013) used 27 financial and economic indicators as input in predicting S&P 500 performance using feed forward neural network. Based on the result they developed a buy and sell signal strategies for decision-making, which helps the investor to re-

alter the composition of portfolio as per the trend. Kara, Boyacioglu & Baykan (2011) predicted the performance daily movements of Istanbul Stock Exchange National Index 100 using ANN and SVM with technical indicators as input. The result showed that ANN performance is better than SVM (Support Vector Machines). Whereas Yao, Tan & Poh (1999) used back propagation neural networks (BNN) for predicting KLSSE stock market index by considering technical indicators as inputs and compared the results with conventional ARIMA models. Their results also showed that neural networks performed better than conventional ARIMA models. Jasic & Wood (2004) developed buy and sell signals using single hidden layer neural network prediction by considering lagged values of FTSE index, DAX, S&P 500 and TOPIX as inputs. Fernandez et al., (2000) used back propagation neural network and designed buy and hold strategy for Madrid Stock Market Index. They consider 9 past days index prices as input and sales as output. From the results it is observed that rule of technical trading for decision-making is much better than buy and hold strategies in bearish market, but the same rule failed in bullish markets.

CART (the Canadian artificial neural network technique) was first applied to the currency market starting in the 1990s. According to these researchers, ANN is more accurate when predicting exchange rate fluctuations in two countries. An ANN is more accurate when using moving averages in currency-forecasting, particularly when smoothed out with time. The main use of ANN today is to forecast exchange rates (2000). All the currency market analysts agree that using artificial neural networks is the best option. According to Tyree, the random walk model predicts results are more accurate.

Artificial neural networks can be applied to a broad range of areas of finance, science and industry, including classification and pattern recognition. In certain cases, this method is often used for short-term forecasting. Multilayer Perceptron (MLP) and Kohonen networks are perhaps the most widely used ANN models. Since MLPs have a simple yet powerful architecture, they are relatively easy to implement (Tay et al., 2001a).

Inflation, GDP, daily highs and lows, closing prices, and moving averages are all inputs to a feed-forward neural network and a basic recurrent neural network suggested by Khoa, Sakakibara, and Nishikawa (2006).

Predicting stock market values using neural networks (NN) has been shown to be more accurate than using statistical methods. Complexity is a concern for statistical methods, but not for neural networks. There are better methods for predicting the daily price of stocks than the NNs.

When it comes to financial predictions, stock index forecasting stands out as one of the most often used approaches, according to Pratyosh Rai and Kajal Rai (2011). It describes and compares many forms of neural networks for stock forecasting, such as modular neural networks and ARIMA-based neural networks, as well as more complex networks such as multi-branch artificial intelligence systems and genetic algorithms.

SVM was suggested by Awan (2005) as an alternate method for predicting time series. While most studies employed technical indicators and Artificial Intelligence (AI) models, there were just a few situations when

basic indications were used as input.

News stories were used by Schumaker and Chen (2008) to develop a Support Vector Machine model for forecasting stock values (SVM). Using financial statement analysis to predict stock prices, the findings indicated that the strategy not only improved accuracy but also satisfied the expectations of diverse stockholders. For forecasting the direction of stock values, Garg (2008) developed a hybrid system that incorporates genetic algorithms and support vector machines. ANN and decision trees were integrated by Tsai and Wang (2009) to assist investors in making more informed decisions on whether to sell, purchase, or keep their stock investments. Baykan et al (2011) showed that the ANN's average prediction performance was much superior than the SVM model. They claimed that an AI-powered market indicator provides relevant extracts that can be used to make better decisions in the face of uncertainty. Based on a comparison of these four techniques, it was shown that the GA-ANN algorithm surpassed all three approaches in terms of accuracy.

Zhang et al (2012) employed Support Vector Machines (SVM) to make predictions about stock price, and the results showed that it was very accurate. As a consequence of this hybrid model, it was shown that support vector machines (SVMs) outperformed artificial neural networks (ANNs) when it came to predicting the outcome of financial markets. One model included both technical and fundamental factors, while the other used an artificial neural network to include experts' opinions, as well as technical and fundamental indices. Both research found that their suggested models outperformed the standard strategy of utilising ANNs with technical indicators in terms of performance.

Based on their research, Chavan and Patil (2013) found that hybrid input parameters (i.e. a mix of technical and fundamentals inputs) outperformed independent parameters in stock market forecasting.

Aiming to build on previous studies, we use a variety of forecasting models, including simple exponential smooth (SES), Holt's additive and multiplicative, ARIMA, RNN with a single independent variable, VARMAX, ARIMAX, and RNN with additional independent variables, to develop forecasting models for the closing point value of the BSE SENSEX. Afterwards, a short comparison of the performance of the two models is made.

a variety of forecasting methods The term "ultimate inversion" refers to anticipating the right. The selected forecasting method's accuracy, forecast bias, and interpretability are all critical (Nikolopoulos et al. 2016). During this literature study, we are going to look at several forecasting approaches and see what their limitations are so that we can choose the best one for our data. We're referring about multichannel forecasting approaches here. Auto-Regressive Moving Average (ARMA) is widely used by academics and clinicians, however most of them are used in operational settings (Gilbert 2005; Svetunkov and Boylan 2019).

ARIMA is a logical extension of ARIMA when extra explanatory variables are provided (Dellino et al. 2018). Assuming non-linear connections where predictions are directly linked to data and only highly aggregated ties to occurrences (Sugihara and May 1990; Terui and Van Dijk 2002). Non-linear models, on the other hand, need a higher level of skill and are more difficult to represent using ARIM connections.

Almost all of the time (Wu 2010). Artificial neural networks have long been popular forecasting methods because of their intrinsic non-linearity (Khashei and Bijari 2011). Instead of accounting for the link between the input and output of the predictors (predictors), various machine learning approaches have recently gained favour for dealing with the forecasting problem by incorporating model patterns in the dependent variable

(regression) as a factor (target). Time-series outcomes, on the other hand, are more difficult to forecast, and this is where statistical tools excel (Assimakopoulos and Nikolopoulos 2000). In order to deal with temporal patterns and make use of the additional capabilities, new strategies are required. Others in the literature have suggested time-series and explanatory hybrid techniques for machine learning (Guo et al. 2011; Taskaya-Temizel and Casey 2005). ARIM has had a number of efforts to implement machine learning models (Khashei and Bijari 2011; Taskaya-Temizel and Casey 2005). In many cases, predicting the reality using solely hybrid techniques is actually excellent on that data; this is due to the fact that hybrid methods can estimate each variable independently, and strong output estimates from both may be combined to make a final prediction (Azevedo and Campos 2016; Guo et al. 2011; Wu 2010).

Deep learning neural networks have recently done well in challenges for sequences that cannot be described as simple or linear." In the discipline of deep learning, neural networks are used to build artificial intelligence models. The enhanced depth of RNNs and LSTM architectures in time-series forecasting is one of the most prominent applications of their popularity in comparison with their widespread use (Fischer and Krauss 2018; Lv et al. 2015).

Long-term and long-short-term memory neural networks have the unique ability to retain information through successive intervals of elapsed time (Hochreiter and Schmidhuber 1997). For non-linear sequence forecasting, an enhanced variant, such as the maximum gradient LSTM, was discovered by Schmid and Graves (2005) and demonstrated to be resistant to gradient vanishing. Sequences may benefit from learning (Graves and Schmidhuber 2005).

An LSTM model developed by Fischer and Krauss (2018) for stock market forecasts provided large returns predicting gains. A growing number of investigations into deep learning methods are pointing to the effectiveness of these techniques as well. ' We urge the development of a new approach that combines various elements in response to this demand, as well as attributing it to other forms of research. Forecasting and prognostication in the retail sector Both online and brick-and-mortar retailers require sales projections to make business choices. Order selection and demand estimates are also necessary for capacity management (Dzyabahabra and Jagabla 2008). Various models have been created to demonstrate how demand plays a key influence in inventory management choices when sales expectations are integrated into the production and retail levels (Doganis, Aggelakis, and Sarimveis 2008). Per Priore et al. 2019; Erlebacher 2000; Priore and Co. In addition to helping with supply, distribution, and logistics, demand projections may also be utilised to help with store and distribution planning, operations planning, routing, and transportation.

To make the best judgments, you need to be as confident in your forecasts as possible. Offline, an exponential smoothing of theorenomor model was prominent (Benitez-Rodrigue, Basallo-Triana, and Rodguez-Sasti 2017). Random forests for mvarenograms and neural networks for multivariate issues have recently been utilised to tackle multivariate difficulties. inferred inferredinferredinferredinferredinferredIn spite of all of the research,

There is a rudimentary grasp of multichannel marketing, but the study of internet buying is still in its infancy. Additionally, multichannel merchants lack the necessary resources for demand forecasting. The conventional technique is to conduct deterministic or stochastic impact studies rather than demand-driven analysis (Cao, So, and Yin 2016). Multichannel and internet shopping need an understanding of expected demand patterns. In this

study, a novel demand forecasting model is built using a hybrid method to solve the issue.

## CONCLUSION

significance of big data analytics in the context of SCM along with its theoretical and practical contributions by technical usage. The aim was to explore new applications of BDA to support forecasting using data-driven decision-making in SCM. The thesis includes a literature review that aims to provide glimpses of supply chain function where BDA can be applied in all possible ways with the help of advanced analytical models and methods that support supply chain operation. More specifically, the literature review attempted to address the supply chain operation area where BD technique can be applied, along with the category of analytics that is best suited for SCM, and a technique worthy to implement forecasting model. In literature, it is shown that existing research is largely based on conventional statistical models which fail to capture the non-linear behavior of customer demand and market factors in a real sense.

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## **Dynamics of Major Cereal Crop Production in Nepal: A Study**

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### **Abstract**

Paddy, maize and wheat occupies the maximum share in terms of area and production of Nepalese agriculture and plays major role in food and nutrition security in Nepal. Although government has been investing in cereal production since 1960s and there is a slow and steady growth in area, production and productivity. In this scenario, there is dearth of research studies which provides overview of the growth and instability of the cereal crops, and it is also necessary to identify the causes of the growth in production. This paper tries to address the fore mentioned issue by measuring the growth rate and instability in area, production and productivity of paddy, wheat and maize in Nepal for 30 years ranging from 1990/91 to 2019/20. Similarly, it also attempts to identify the cause of growth crops by using decomposition method. It is found that there was significant growth in area of paddy only in period I; and in production and productivity in period II and overall time period. In wheat and maize, it is found that there is statistically significant increase in the area, production and productivity in all the sub periods and over all time period, except for area in wheat in period III. Similarly, it is found that in all the crops studied, greater extent of instability was observed in production, followed by the productivity. And, in all the crops, area effect is higher than productivity and interaction effect in all the time periods and whole study time frame.

### **I. Introduction and Background**

Nepalese economy is heavily dependent on the agriculture sector, which contributes about 26 per cent of the total GDP and 60.4 per cent of Nepalese population are involved in agricultural sector (MOF, 2021; NPC, 2019). High degree of variation in altitudinal, topographical and temporal aspects of Nepal has made Nepal rich in agricultural biodiversity. Nepal has high crop species, animal and vegetation diversity. Although Constitution of Nepal, promulgated in 2015 enshrines food as a fundamental right of the Nepalese citizen, but 2.8 million of the them are food insecure (WFP, 2021). In 2019 Nepal ranked 73<sup>rd</sup> out of 117 countries on Global Hunger Index (NPC, 2019). Nepalese agriculture had gained interest of government and policy makers from earlier plans, but results are not as expected. After the failure of the Agriculture Perspective Plan 1995-2015, government of Nepal has brought Agriculture Development Strategy (ADS) 2015-2035, which is supposed to transform the Nepalese agriculture from subsistence to commercialization, but its implementation is still questionable.

Cereal crops, not only occupies the maximum share in terms of area and production, but also have gained maximum interest of stakeholders related to agriculture. Paddy, wheat, maize, barely, buckwheat and millet are the cereal crops that are grown in Nepal, among which first three occupies 91.31 and 96.67 per cent of total area and production of cereal, respectively (MoALD, 2021). Cereal crop plays major role in food and nutrition security in Nepal as Nepalese food habits is based on the cereal crops. Cereal supplies 65 and 60 per

cent of the total food energy and proteins to the Nepalese population (Regmi, 2016). Cereal crop shares about 33 and 23 per cent of the total food expenditure of the rural and urban households, respectively in Nepal.

Paddy, wheat and maize are important crops for food security in Nepal. They occupy first, second and third position, respectively. Paddy and wheat are grown in valley, tarai, Terai and irrigated lands in mountain; while maize is middle hills of the country. Despite having the importance, Nepal is not able to become self-sufficient in terms of cereal crop production. Cereal import dependency ratio is increasing every year and food import to export ratio is all time high. Import of food as increased fourfold from 2011 to 2018 making country vulnerable to food insecurity (NPC, 2019).

Cereal crop production is heavily input intensive in nature. They require large amount of investment in terms of fertilizer, irrigation, labor force and plant protection chemicals. Only 54 per cent of the total cultivated land is irrigated, among which only 33 per cent of land have over the year irrigation facilities. Such a situation makes Nepalese cereal production system highly monsoon dependent. Paddy production heavily depends upon the timing and amount of the monsoon rainfall, whereas maize and wheat depends on rainfall on other months. Production of these crops varies due to highly variable, unpredictable rainfall as well as lack of other irrigation system. Similarly, 78 per cent of the population hold land size lesser than 0.8 hectare (CBS, 2011). Although the latest data is not available, this situation is much aggravated at the present time due to the unwanted urbanization and housing in the fertile agricultural land. This has pressure on agricultural land to supply food for growing population. Also, chemical fertilizer used in Nepalese cereal production is very low, as Nepal is not able to supply required chemical fertilizer at the production time as Nepal is dependent on India for supply of those fertilizers.

Government has been investing in cereal production since 1960s and there is a slow and steady growth in area, production and productivity. In this scenario, there is dearth of research studies which provides overview of the growth and instability of the cereal crops, and it is also necessary to identify the causes of the growth in production. In such background, this paper tries to address the fore mentioned issue by measuring the growth rate and instability in area, production and productivity of paddy, wheat and maize in Nepal for 30 years ranging from 1990/91 to 2019/20. Similarly, it also attempts to identify the cause of growth crops by using decomposition method. The result of this study will be helpful for researchers and policy makers to understand the growth of the three major cereal crops of Nepal namely, paddy, maize and wheat; and suggesting suitable policy option to obtain targeted growth.

## **II. Objectives**

This study is undertaken with following objectives:

- i. To analyze the trend of major cereal crops Nepal over the study period.
- ii. To examine the extent of instability in area, production and productivity of major cereal crops Nepal.
- iii. To study the relative contribution of the area and productivity in the production of major cereal crops Nepal.

## **III. Research Methodology**

This study is based on the secondary data related to the area, production and productivity of the paddy, wheat and maize. Time series data on those variables for the period 1990/91 – 2019/20 were collected from various volumes of ‘Statistical Information on Nepalese Agriculture’, which is published by Agri - Statistics Section, Monitoring, Evaluation and Statistics Division of Ministry of Agriculture and Livestock Development, Kathmandu. Other related data were collected from relevant published by Ministry of Agriculture and Livestock Development, Department of agriculture and other sources. Study period was divided into three sub periods of 10 years viz. period I (1990/91-1999/00), period II (1999/00 – 2009/10) and period III (2010/11-2019/20).

### **Compound Growth Rate (g)**

Exponential growth function was used to calculate the compound growth rate of area, production and productivity of the crops over study period. Function can be written as  $Y_t = ab_t u_t$ ; where  $Y_t$  = variable of which growth rate was calculated,  $a$  = intercept,  $b_t$  = regression coefficient, such that  $b_t = 1+g$ ; and  $u_t$  = error term for year  $t$ . For calculating the growth rate, the above equation was transformed into log-linear form and ordinary least square method (OLS) was used for estimation. Compound growth rate was worked out as  $g = (\text{antilog of } (\ln b) - 1) \times 100$ .

### **Measurement of instability**

Instability was measured by using coefficient of variation method as used by Gairhe et al. (2018) and Patil & Yeledhalli (2016). It is worked out as follows:  $CV = \frac{\sigma}{\mu} \times 100$ ; where,  $CV$  = Co-efficient of variation,  $\sigma$  = Standard deviation of the variable; and  $\mu$  = Mean of the variable.

### **Decomposition analysis**

Decomposition analysis is used to find the effect of area, productivity and interactions between them in increasing the production. It is worked out as:

Area effect =  $[(A_0 \Delta Y) \times 100 / \Delta P]$ ;      Productivity effect =  $[(Y_0 \Delta A \times 100) / \Delta P]$  and

Interaction effect =  $[(\Delta A \Delta Y \times 100) / \Delta P]$

Where,  $\Delta P$  = Change in production;  $A_0$  = Area in base year;  $A_n$  = Area in current year ;  $Y_0$  = Yield in base year ;  $Y_n$  = Yield in current year ;  $\Delta A$  = Change in area ( $A_n - A_0$ ) ;  $\Delta Y$  = Change in yield ( $Y_n - Y_0$ ).

## **IV. Result and Discussion**

### **Trend of major cereals in Nepal**

Trend of the area, production and productivity of paddy, maize and wheat from 1990/91 to 2019/20 has been shown in figure 1-3. The trend line depicts that there is very minor growth in the area of all the crops. Similarly, in term of production and productivity, there is observable amount of growth in all the crops.

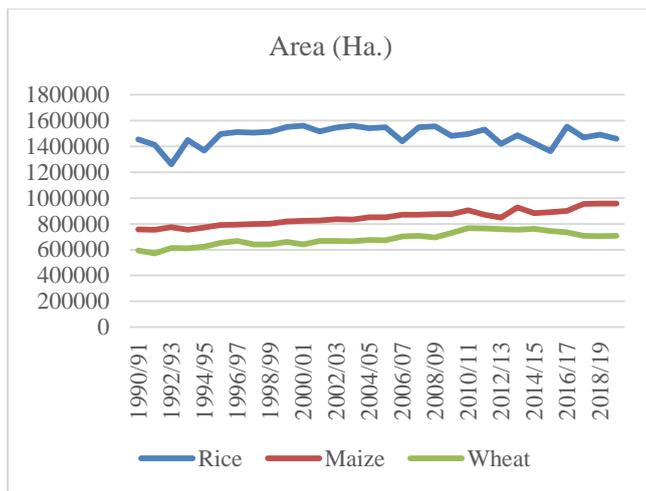


Figure 1: Area of major cereals from 1990/91 – 2019/20

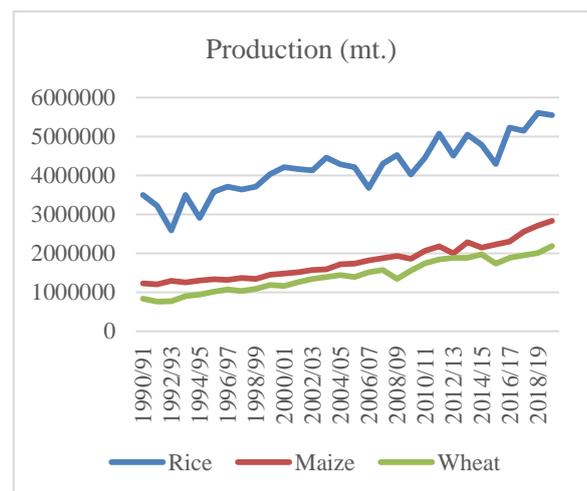


Figure 2: Production of major cereals from 1990/91 – 2019/20

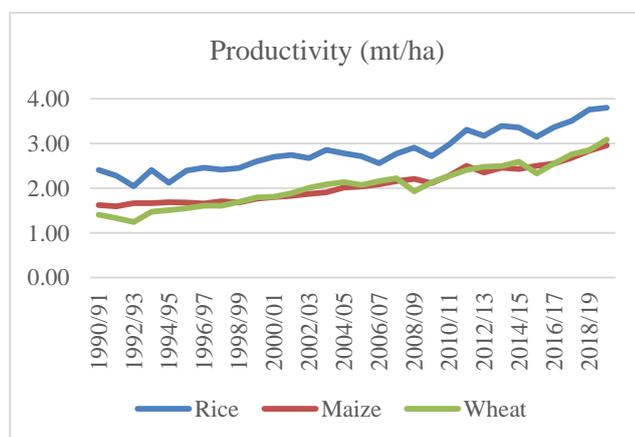


Figure 3: Productivity of major cereals from 1990/91 – 2019/20

**Compound growth rate (g)**

Growth of the cereal crops over the period was divided into three sub periods and compound growth rate was calculated, which is shown in table no. 1. In paddy crop, it is found that there was significant growth in area of paddy only in period II; and in production and productivity in period II. Also, considering whole study area, it is found that there is significant positive growth in production (1.48 per cent) and productivity (1.75 per cent) in paddy. Although a minor growth is observed in area (0.09 per cent), but it is not statistically significant. In wheat and maize, it is found that there is statistically significant increase in the area, production and productivity in all the sub periods and over all time period, except for area in wheat in period III. It is found that there was statistically significant decline in the area of wheat (1.07 per cent) in period III. From the compound growth rate analysis, it is found that maximum growth was present in production and productivity of wheat, followed by maize and paddy.

Table no 1 Compound growth rate for area, production and productivity of the paddy, maize and wheat over 1990/91 – 2019/20.

Crops	Year	Period I (1990/91 - 1999/00)	Period II (2000/2001- 2009/10)	Period III (2010/11- 2019/20)	Over all period (1990/91-2018/19)
Paddy	Area	1.32**	-0.31	-0.1	0.09
	Production	2.67	-0.14	2.05**	1.84*
	Productivity	1.33	0.17	2.15*	1.75*
Maize	Area	0.89*	0.78*	1.00**	0.77*
	Production	1.64*	3.10*	3.49*	2.88*
	Productivity	0.74*	2.31*	2.47*	2.10*
Wheat	Area	1.40*	1.16*	-1.07*	0.80*
	Production	4.78*	2.54*	1.61**	3.48*
	Productivity	3.34*	1.36	2.71*	2.66*

\* Significant at 1 % level of significance

\*\* Significant at 5 % level of significance

### Measurement of instability

Coefficient of variation of the area, production and productivity of paddy, maize and wheat from 1990/91 to 2019/20 is shown in table 2. It is found that in all the crops studied, greater extent of instability was observed in production, followed by the productivity. Low degree of instability is present in area as there is minor changes in the area as compared to other variable. This is because there is limited scope of increasing area over the time; and also in decreasing area because crop studied are staple food crops (Gairhe et al., 2018) .

Table no 2 Coefficient of variation of area, production and productivity of the paddy, maize and wheat over 1990/91 – 2019/20.

Crops	Year	Period I (1990/91 - 1999/00)	Period II (2000/2001- 2009/10)	Period III (2010/11- 2019/20)	Over all period (1990/91- 2018/19)
Paddy	Area	5.47	2.24	3.60	4.64
	Production	10.98	5.28	9.63	17.21
	Yield	6.03	3.73	8.34	16.16
Maize	Area	2.75	2.28	3.97	6.93
	Production	5.09	8.99	11.37	25.68
	Yield	2.58	6.78	7.88	18.82
Wheat	Area	4.64	3.62	3.30	7.78
	Production	14.11	8.89	6.51	28.75
	Yield	10.31	6.16	9.21	22.87

### Decomposition analysis

Decomposition analysis of the production of the paddy, maize and wheat over the study period is presented in the table no 3. It found that area effect is high in period I, III and over all period in paddy than productivity effect and interaction effect; showing that increasing in area is the major source of growth of paddy production as compared to growth in productivity and interaction effect. In period II, there is negative area effect (-11.05 per cent), which is offset by productivity effect (110.49 per cent). In case of maize and wheat, in all the time periods and over all study time frame, area effect is higher than productivity and interaction effect. In the period III, productivity effect and interaction effect is found to be negative.

Table no 3. Decomposition analysis of production of the paddy, maize and wheat over 1990/91 – 2019/20.

Crops	Year	Period I (1990/91 - 1999/00)	Period II (2000/2001- 2009/10)	Period III (2010/11- 2019/20)	Over all period (1990/91-2019/20)
Paddy	Area Effect	52.84	-11.05	113.10	99.30
	Productivity Effect	43.68	110.49	-10.27	0.44
	Interaction effect	3.48	0.56	-2.84	0.26
Maize	Area Effect	49.56	70.80	80.19	63.11
	Productivity Effect	46.43	24.80	15.26	20.24
	Interaction effect	4.01	4.39	4.55	16.65
Wheat	Area Effect	65.28	51.89	142.16	73.73
	Productivity Effect	27.31	40.82	-31.05	12.00
	Interaction effect	7.41	7.29	-11.11	14.28

### V. Summary and Conclusion

This study analyses the dynamics of area, production and productivity of the major cereal crops namely, paddy, wheat and maize in Nepal over the period of 1990/91 to 2019/20. It is found that there was significant growth in area of paddy only in period I; and in production and productivity in period II and overall time period. In wheat and maize, it is found that there is statistically significant increase in the area, production and productivity in all the sub periods and over all time period, except for area in wheat in period III. Similarly, it is found that in all the crops studied, greater extent of instability was observed in production, followed by the productivity. And, in all the crops, area effect is higher than productivity and interaction effect in all the time periods and whole study time frame. Although the study shows that area has greater impact in production, there is limited scope in area expansion (Gairhe et al., 2018), due to the increasing population, urbanization and forest cover, so in order to increase the production of the cereal crops, policies and programs should be directed toward increasing productivity.

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## **Performance of Recycled Aggregate Concrete using Silicate Glass Powder and Mining Powder**

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**Abstract:** Concrete is widely used construction material in the construction industry due to its versatility, durability and economy. The concrete consists of cement, fine aggregates and coarse aggregates. The growth rate of urbanization in India is very high due to the rapid industrialization. Hundreds of concrete structures are being constructed on a daily basis. This increases the demand of the raw materials needed for construction i.e. cement, aggregates, sand etc. The increase in the demand leads to depletion of the natural resources and environmental degradation. Also, this rapid industrialization results in demolition of old concrete structures to build new ones. Using crushed concrete as fill and sub-grade material for roads, sidewalks and foundations is a common practice. However, research has been going on worldwide over the years to investigate the use of crushed concrete from demolished old concrete structures to fully or completely replace the natural aggregates in concrete structures. This present study aims to investigate experimentally the use of recycled aggregates and partial replacement of cement using silicate glass powder and mining powder one at a time as a mineral admixture for abrasion strength in cement concrete.

In this study, the cement was partially replaced with silicate glass powder (SGP) and mining powder (MP) at varying proportion (2.5%, 5%, 7.5% and 10%). The replacement of natural coarse aggregate is done with recycled coarse aggregate (RCA) which is fixed at 20 % in all samples to investigate the abrasive resistance. From this study, it was noticed that in silicate glass powder, abrasive strength of recycled aggregates concrete remains almost same till the sample containing 5% of silicate glass. On further increasing the silicate glass content from 5% to 10%, a sudden decrease in the percentage of weight loss was noted. For mining powder, abrasive strength of recycled aggregates decreases with the increase in mining powder till 2.5%. On further increasing the amount of mining powder content from 2.5% to 10% gradual decreases in the percentage of weight loss was observed. It was observed that the partial replacement of cement with the silicate glass powder and the mining powder both will increase the abrasive resistance of concrete at varying proportions (2.5%, 5%, 7.5% and 10%).

**Keywords:** Recycled aggregate, Silicate glass powder, Mining powder, Abrasive resistance.

### **1. INTRODUCTION**

Concrete is a widely used material in the world due to its versatility, durability and economy. Based on global usage it is placed at second position after water. Universally, the concrete industry consumes huge quantities of natural resources, which are becoming insufficient to fulfill increasing demands. Aggregates are the most mined materials in the world. Fine and coarse aggregates are naturally occurring resources and are being consumed at a very high rate by the construction industry. Approx., the total production of concrete is at an annual rate of  $1\text{m}^3$  per capita. The worldwide total consumption of natural aggregate will increase to 49 billion metric tons after

2015. Also, the utility of old structures is diminishing, so these buildings are demolished to pave way for new and modern construction. Structures are demolished due to a number of reasons i.e. reconstruction for better economic gains, natural disasters and war inflicted damages. The rate of demolition is increasing everyday due to increase in demand for better and bigger structures and at the same time the cost of dumping the demolished concrete is increasing due to non-availability of appropriate dumping sites.

## 2. METHODOLOGY

The experimental programme was planned to investigate the abrasive strength of recycled aggregate concrete (RAC). The objective of the study is to vary the percentage replacement of cement with silicate glass powder (SGP) and mining powder (MP) as 2.5%, 5%, 7% & 10% while keeping the replacement of recycled coarse aggregates (RCA) constant as 20%. The test programme consisted of the following activities: -

1. Procurement of the materials including aggregates, cement, demolished concrete waste for recycled aggregates, supplementary cementitious materials (Silicate Glass Powder and Mining Powder).
2. Crushing of the demolished concrete specimens to obtain recycled coarse aggregates.
3. Testing of the natural and recycled aggregates for their physical properties such as specific gravity, water absorption and the testing of cement for its consistency, soundness and initial and final setting time.
4. Design of the nominal mix of M25 and casting of the test specimens.
5. Testing of specimens for abrasive strength at curing ages of 7, 14 and 28 days respectively.
6. Analysis of the test results.

## 3. RESULTS

### 3.1 Abrasive resistance with Silicate Glass Powder

Table 1: Abrasive resistance at 7 days

Sr. No.	Percentage of SGP replacement with cement	Percentage of Coarse aggregate with RCA	Initial weight	Final weight after 16 cycle	Weight reduction after 16 cycle	Percentage weight loss
1	0%	20 %	8496	8453	53	0.62
2	2.5%	20 %	8510	8455	55	0.64
3	5%	20 %	8480	8432	48	0.56
4	7.5%	20 %	8488	8438	50	0.58
5	10%	20 %	8501	8460	41	0.48

Table 2: Abrasive resistance at 14 days

Sr.	Percentage of SGP	Percentage of	Initial	Final	Weight	Percentage
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No.	replacement with cement	Coarse aggregate with RCA	weight	weight after 16 cycle	reduction after 16 cycle	weight loss
1	0%	20 %	8503	8455	48	0.56
2	2.5%	20 %	8511	8464	47	0.55
3	5%	20 %	8498	8449	49	0.57
4	7.5%	20 %	8486	8440	46	0.54
5	10%	20 %	8493	8458	35	0.41

Table 3: Abrasive resistance at 28 days

Sr. No.	Percentage of SGP replacement with cement	Percentage of Coarse aggregate with RCA	Initial weight	Final weight after 16 cycle	Weight reduction after 16 cycle	Percentage weight loss
1	0%	20 %	8509	8469	40	0.47
2	2.5%	20 %	8513	8476	37	0.43
3	5%	20 %	8498	8459	39	0.46
4	7.5%	20 %	8500	8465	35	0.41
5	10%	20 %	8487	8462	25	0.30

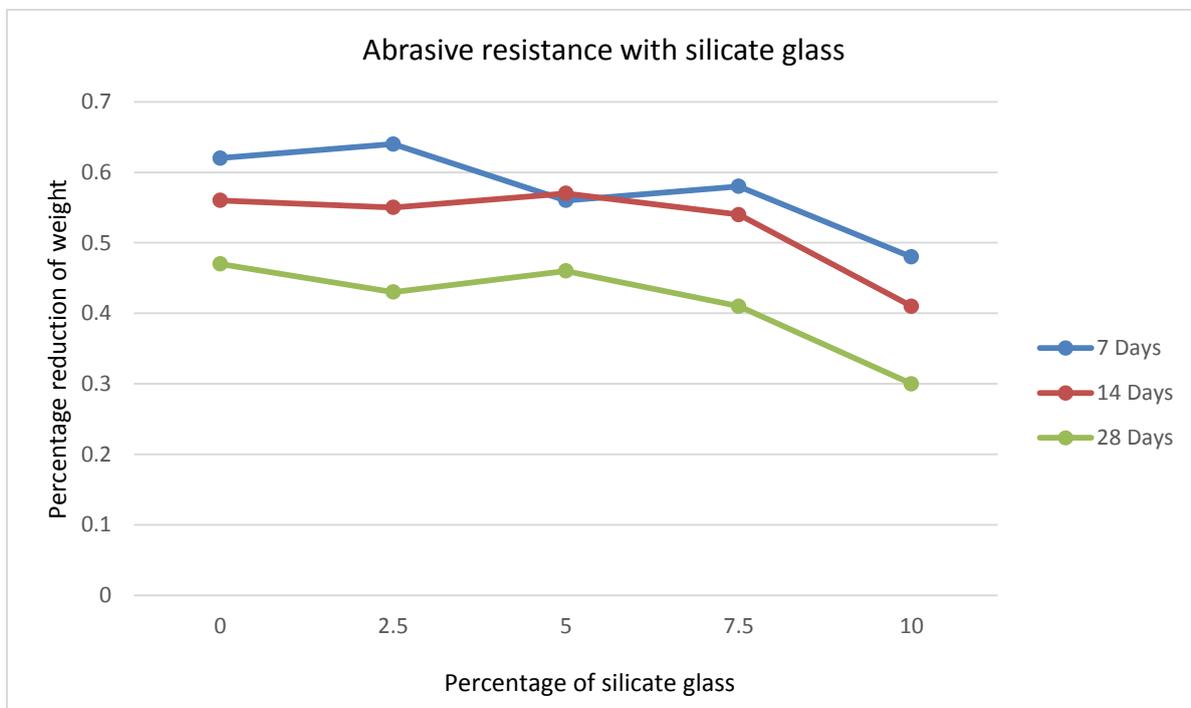


Fig 1: Comparison of abrasive resistance at different curing ages

- For 7 days- Abrasive resistance of recycled aggregates concrete remains almost same till the sample containing 2.5% of silicate glass. On further increasing the silicate glass content from 2.5% to 5%, a sudden decrease in the percentage of weight loss was noted. From 5% to 7.5%, slight increase in percentage of weight loss was observed. From 7.5% to 10 %, sudden decrease in percentage of weight loss was observed.
- For 14 days- Abrasive resistance of recycled aggregates goes through approximately the same amount of abrasion till the sample containing 5% of silicate glass. On further increasing the silicate glass content from 5% to 10 %, a sudden decrease in the percentage of weight loss was noted.
- For 28 days- Abrasive resistance of recycled aggregates goes through approximately the same amount of abrasion till the sample containing 5% of silicate glass. On further increasing the silicate glass content from 5% to 10 %, a sudden decrease in the percentage of weight loss was noted.

### 3.2 Abrasive resistance with Mining Powder

Table 4: Abrasive resistance at 7 days

Sr. No.	Percentage of Mining powder replacement with cement	Percentage of Coarse aggregate with RCA	Initial weight	Final weight after 16 cycle	Weight reduction after 16 cycle	Percentage weight loss
1	0%	20 %	8496	8453	53	0.62
2	2.5%	20 %	8480	8422	58	0.68
3	5%	20 %	8473	8418	55	0.64
4	7.5%	20 %	8478	8428	50	0.59
5	10%	20 %	8485	8438	47	0.55

Table 5: Abrasive resistance at 14 days

Sr. No.	Percentage of Mining powder replacement with cement	Percentage of Coarse aggregate with RCA	Initial weight	Final weight after 16 cycle	Weight reduction after 16 cycle	Percentage weight loss
1	0%	20 %	8503	8455	48	0.56
2	2.5%	20 %	8506	8451	55	0.65
3	5%	20 %	8491	8437	54	0.63
4	7.5%	20 %	8496	8449	47	0.55
5	10%	20 %	8507	8467	40	0.47

- For 7 days – Abrasive resistance of recycled aggregates decreases with the increase in mining powder till the sample containing 2.5%. On further increasing the mining powder content from 2.5% to 10%, a gradual decrease in the percentage of weight loss was noted.
- Similar trend was also observed for 14 and 28 curing days.

Table 6: Abrasive resistance at 28 days

Sr. No.	Percentage of Mining powder replacement with cement	Percentage of Coarse aggregate with RCA	Initial weight	Final weight after 16 cycle	Weight reduction after 16 cycle	Percentage weight loss
1	0%	20 %	8509	8469	40	0.47
2	2.5%	20 %	8517	8472	45	0.53
3	5%	20 %	8511	8468	43	0.50
4	7.5%	20 %	8521	8483	38	0.44
5	10%	20 %	8507	8478	29	0.34

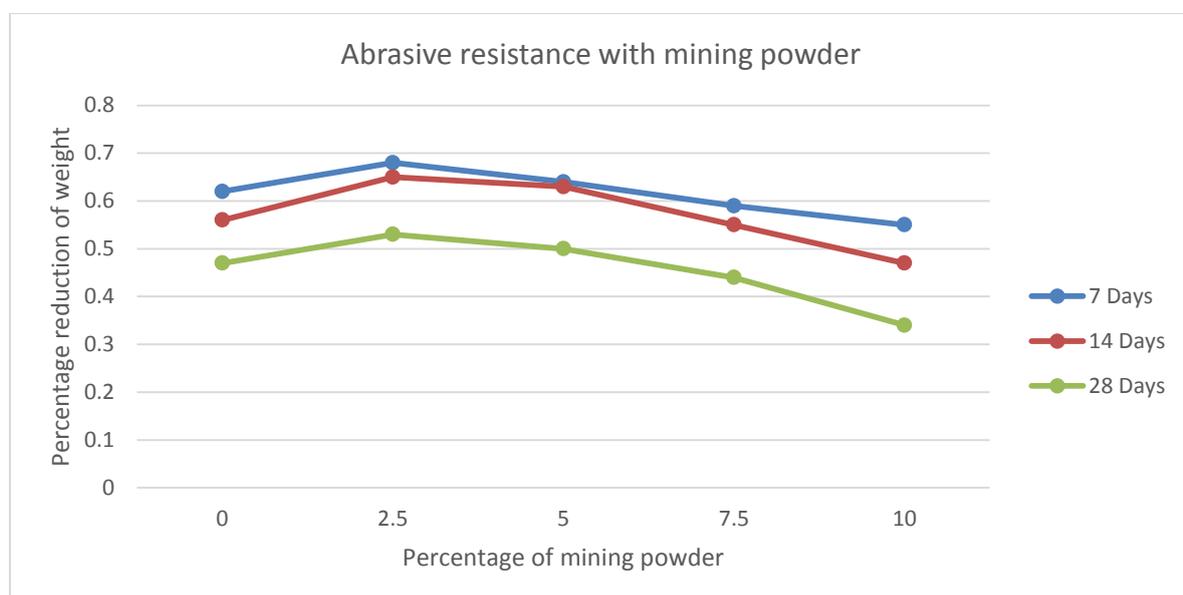


Fig 2: Comparison of abrasive resistance at different curing ages

Presence of magnesium oxide, calcium oxide and silicon dioxide in mining powder enhances the abrasive resistance of concrete when used as a supplementary cementitious material. Due to hydration of calcium oxide in concrete, variation of percentage weight loss was observed.

#### 4. CONCLUSIONS

The main objective of the research was to utilize the recycled aggregate as a replacement to natural aggregate in concrete and partial replacement of cement is done with silicate glass and mining powder in different proportions and the abrasive resistance of concrete was tested at different curing ages. This chapter presents the summary of conclusions based on the experimental study.

##### 4.1 Silicate Glass

From our study, it was noticed that abrasive resistance of recycled aggregates goes through approximately the same amount of abrasion till the sample containing 5% of silicate glass. On further increasing the silicate glass content from 5% to 10%, a sudden decrease in the percentage of weight loss was noted. As the amount of

weight decreases, the resistance to abrasion of the sample increases. This implies that the abrasion resistance of concrete specimen suddenly increases as the percentage of glass is increases from 5% to 10%. Further it was also observed that concrete shows maximum abrasion resistance on replacement of 10% of cement and minimum on without replacement of cement.

#### 4.2 Mining Powder

From our study, it was noticed that abrasive resistance of recycled aggregates decreases with the increase in mining powder till 2.5%. On further increasing the amount of mining powder, content from 2.5% to 10% gradual decrease in the percentage of weight loss was observed. As the amount of weight decreases, the resistance to abrasion of the sample increases. This implies that the abrasion resistance of concrete specimen increases as the percentage of mining powder is increases from 2.5% to 10%. Further, it was also observed that concrete shows maximum abrasion resistance on replacement of 10% of cement and minimum on replacement of 2.5% of cement.

#### 4.3 Comparison of silicate glass powder and mining powder

Replacement of cement with both (silicate glass and mining powder) shows increase in abrasion resistance of concrete.

- On comparing both it was observed that percentage weight loss with silicate glass powder was more than mining powder.
- Decrease in abrasive resistance was observed on slight (0-2.5) percentage replacement of cement with mining powder meanwhile with silicate glass powder there was an increase in abrasion resistance.
- Replacement of cement with silicate glass powder is relatively more economical than mining powder in large construction.

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## Magnetic Characteristics of Three-Phase Core Type Transformer Using Maxwell

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*Abstract*— A transformer is a static device that is mainly used for stepping up and down the voltage level. The Power transformer is a kind of transformer that is used to transfer electrical energy in any part of the electrical circuit between the generator and the distribution primary circuits. These transformers are unit employed in distribution systems to interface intensify and step down voltages. The transformer is important in transmission and distribution, hence their testing is also essentially equal. The cost of a high voltage transformer is too high and also unavoidable equipment in that domain, hence it has to be designed properly before implementation in real-time. Simulating the transformer with the designed parameters will give the same results as in the real model. So it is easy for analysing the EF distribution and calculating the losses and that can be easily avoided while implementing in real-time. The simulation of a three-phase power transformer using the Finite Element Method is carried out in this project. The present work is an attempt to investigate the Magnetic Flux Density and Flux Lines within Air-gap and other region of Three Phase Transformer.

*Keywords*—Three Phase Transformer, Maxwell, Finite Element Method, Magnetic Field Analysis.

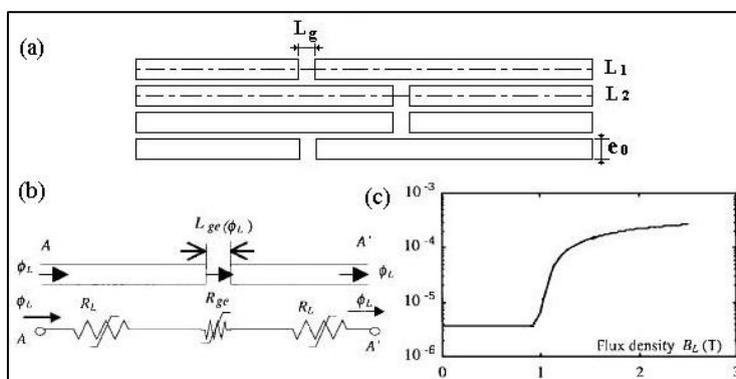
### INTRODUCTION

A precise electrical transformer model is very important in the purpose to its good control (Das et. al., 2009), best protection, successful diagnostic and behavior estimation under some phenomenon. In literature, different transformer models are proposed depending on domain application and its structure. It is possible to distinguish circuit and FEM models types. The numerical accuracy of electrical parameters transformer model depends on the knowledge of geometrical (Chen et. al., 2005), electrical (Ragavan et. al., 2005) and magnetic (Abdulsalam et. al., 2006, Shen et. al., 2006) characteristics of its different components. Several local phenomena settled in transformer must be considered, such as the non-uniform flux distribution in laminations (Nakata et. al., 1984), local saturation in magnetic joints (Shen et. al., 1988), harmonics in local flux density, magnetic field rotating in T-joint etc.

Furthermore, it is important to note that core assembly manufacturing techniques leads to complex air gaps in overlapping laminations packages in joint which are too difficult to model. It is due of course to their unequal lengths  $L_g$  (Fig. 1.a) in different level of joint depth and remain difficult to estimate. Moreover, the magnetic field has a three dimensional 3D distribution aspect in joints and in (Takehara et. al., 1989), a hybrid analysis is carried out based on 3D analysis in joints and 2D elsewhere. The air gaps have been treated in several works because their effects can be seen in no-load currents waveforms, in flux density, distribution and subsequently in iron loss. However, a great interest has been accorded to model them. In (Gyselink et. al., 2001), an arbitrary air gaps length has been chosen in joint area showing magnetic field lines deviation. These areas have been fulfilled by elements with isotropic nonlinear material feature. The magnetic characteristics B-H of these depend on air gap length and saturation level. This method was of great interest in case of assembly regularity with air gaps lengths uniformity for all electrical laminations packages. This assumption allows considering

periodicity and symmetry of laminations stacking advantages but the random irregularity of air gaps, lengths along core thickness makes difficult the choice of magnetic field lines distortion area and an equivalent length for all air gaps.

Taking into account the real laminations assembly arrangement, in (Elleuch et. al., 1998), the authors have been used experiment no-load currents results for different saturation levels in order to recognize an equivalent variable air gap length (Fig. 1.b). This method has allowed describing dependence of equivalent air gap length ( $L_{ge}$ ) to magnetic saturation level  $\Phi_L$  and has permitted to model them with nonlinear magnetic reluctance. However, in numerical field resolution programs based on FEM, the use of this approach is too difficult. To avoid this limitation, a numerical function is recognized based on Fourier series expansion to interpolate the curve of equivalent variable air gap length versus flux density level. The expression of equivalent variable air gap length is introduced in air gap reluctance term ( $R_{ge}$ ) (Fig. 1.c), representing magnetic drop in Ampere law. A new transformation in reluctance formulae make possible to obtain constant gap length with isotropic nonlinear material. This magnetic characteristic is affected to transversal element implemented in FEM programs code. A 2D magnetic field distribution in transformer core is so deduced taking into account joints effects. In order to determinate no-load current versus time, it is used Ampere law and magnetic field distribution along a mean path in leg and halves yokes of lateral phase. To carry out such analysis, it is proceeded by imposing magnetic potentials vectors (Mechler et. al., 1998) in the magnetic core boundaries. This method neglects leakage flux. Other work (Komez et. al., 1997) imposed no-load currents. Another approach based on coupling of Finite Element Analysis (FEA) with electrical circuit equations is used by some authors (Kumbhar et. al., 2007).

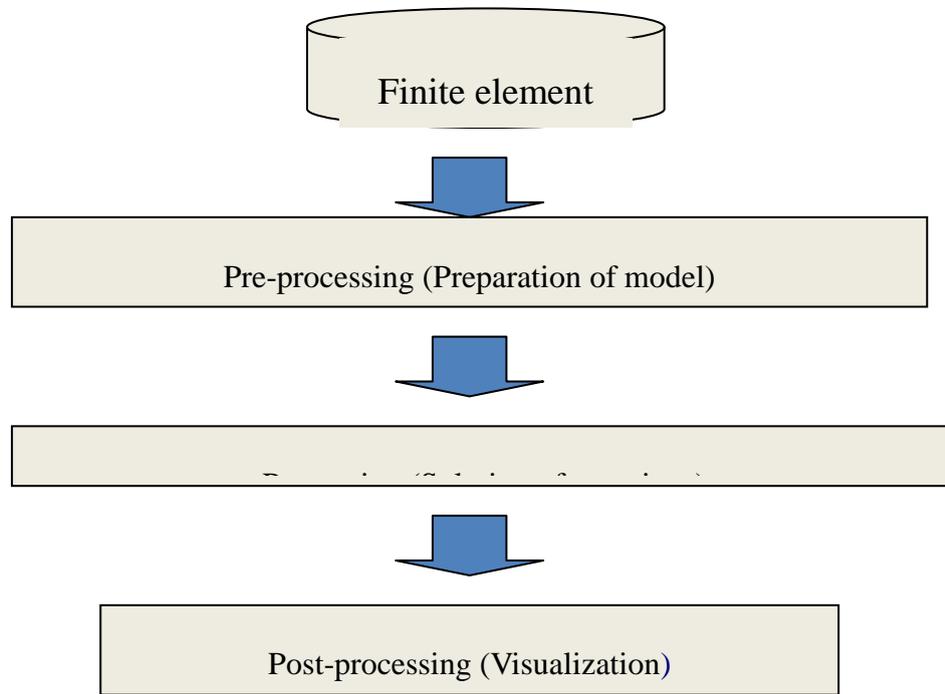


**Fig. 1. (a) Stacking up of electrical laminations in overlapping joints; (b) Length of equivalent butt joint versus flux density on the lamination; (c) Schematic of nonlinear equivalent air gap;**

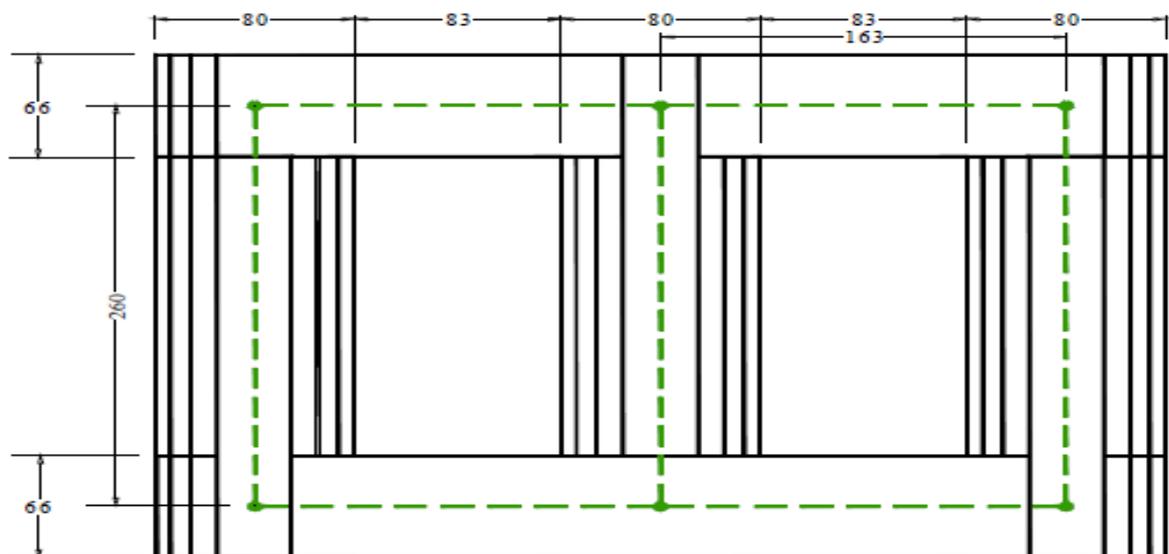
### MODELLING OF TRANSFORMER USING FINITE ELEMENT METHOD

The purpose of the present work is to describe the mesh refinement techniques and error criterion. The h-adaptive mesh refinement procedure has been developed to investigate the variation in the field quantities with the refinement. The procedure (as shown in figure 2) is used to refine the approximation sufficiently to achieve desired accuracy. The adaptive methods basically try to distribute the degree of freedom of the problem in such a way that an accurate solution can be obtained by maintaining low number of unknowns. In analysis of

Transformer, core type transformer is used with the following dimension. The entire dimension shown in the Model of Transformer are in mm unit.



**Fig. 2. Flow chart for the Finite Element method used for simulation of 15 KVA Three Phase Transformer**



**Fig. 3. Model of 15 KVA Three Phase Transformer**

For testing the accuracy of the programme developed for refinement technique, the field distribution inside a portion of transformer core has been considered. The transformer core under consideration is shown in Figure 3 of three phase 15 KVA transformer. The specifications of 15 KVA Transformer are given in table 1.

Table 1 Specification of 15 KVA Transformer

Transformer Rating	15 KVA	
Voltage	220 V	
Net Cross Section Area	Limb	0.0047496 m <sup>2</sup>
	Yoke	0.0050185 m <sup>2</sup>
Width	Limb	0.080m
	Yoke	0.066m

#### ***A. Type of Solver Used***

Maxwell (Ansoft Inc.) has very large application related to Electromagnetic Field. The Maxwell (Ansoft Inc.) has solved for the problems like Electrostatics, Magneto static, Eddy Current and Heat Transfer etc but in the analysis of Transformer ‘Magneto static’ Solver is used. In this tool of Maxwell Ansoft Inc., magnetic characteristics like magnetic flux density, magnetic field intensity, flux lines around the all regions of three phase transformer model is computed.

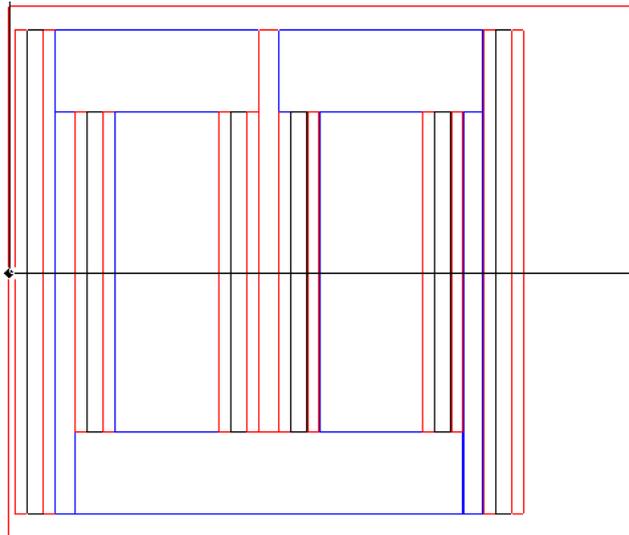
#### ***B. Generating of Core Type Transformer***

The 2-Dimensional Finite Element Analysis Model specifications of Three Phase Core Type Transformer are shown in the Table 1. The Model is created in CAD Tool of Maxwell by using following specifications of table 1 is shown in fig.4.

#### ***C. Setup Materials***

The Model of the core type Transformer consists of the core, Winding region, Insulator and air-gap. There is a material Library in a software from which we can select the material if there is no material, in library which we add the material in the respective transformer section manually. In our present model we assign the following material in various parts of the transformer as shown in fig 5.

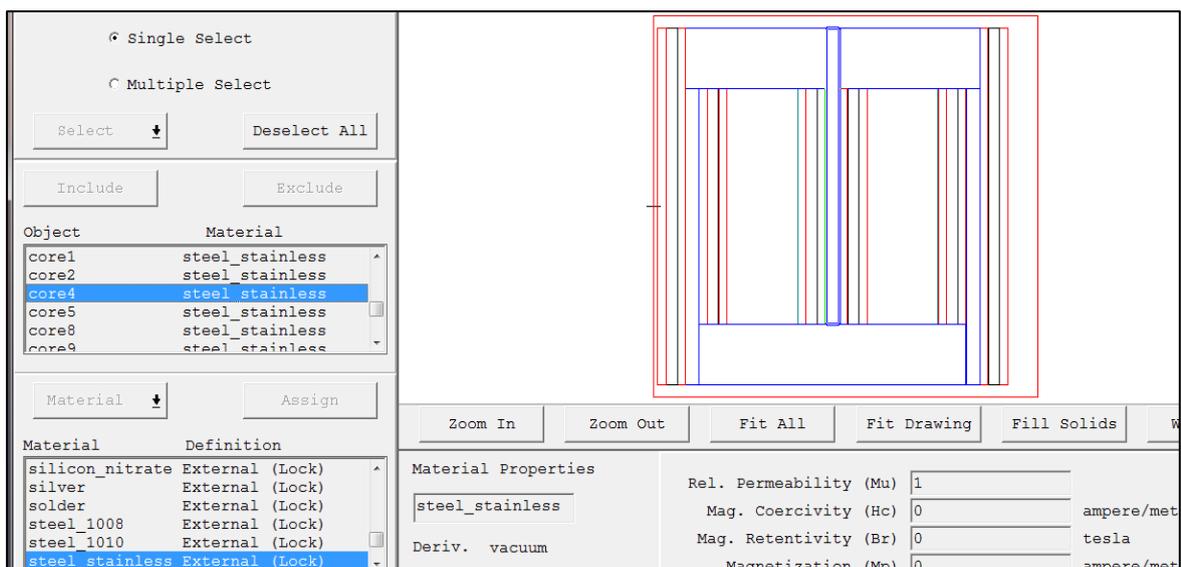
- Core –Stainless steel in 15 KVA and CRGO in 100 KVA Transformer.
- Winding- Copper
- Insulator- Mica



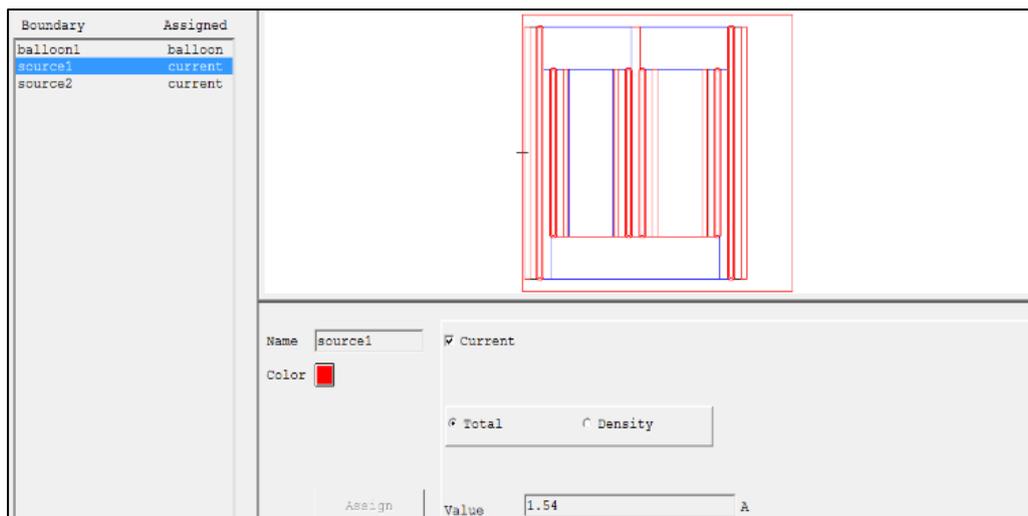
**Fig. 4. Model of 15 KVA Transformer**

***D. Set up Boundary Conditions and current source.***

In the boundary condition tool, the boundary condition is applied in the outer region of Transformer Model and various region of the model is assigned by different region is assign by different current value as shown in fig 6. In this problem primary and secondary region is by the 1.54 A and 2.35 A. The balloon boundary condition is applied at outer region of Transformer Model. The Boundary Element Method (BEM) is a weighted residual technique. It is essentially a moment-method technique whose expansion and weighting functions are defined only on a boundary surface. Electrical engineers are likely to use the more general term moment method to describe an implementation of this technique. Outside of electrical engineering however, the terms boundary element method or boundary integral element method are commonly used.



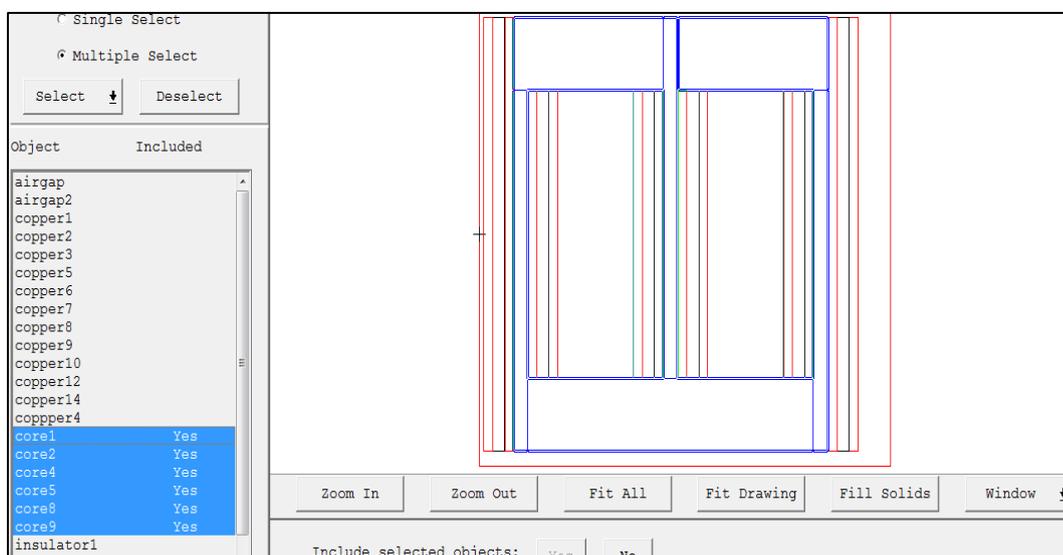
**Fig. 5 Set up material window**



**Fig. 6. Set up Boundary window**

### ***E. Setup Executive Parameters***

In this tool, we assign an executive parameter like force or thrust in the core section of a transformer because when supply is given to the primary side of a transformer, an electromagnetic flux is set up in the core of a transformer. This is done by selecting the core portion of a transformer as shown in fig 7.

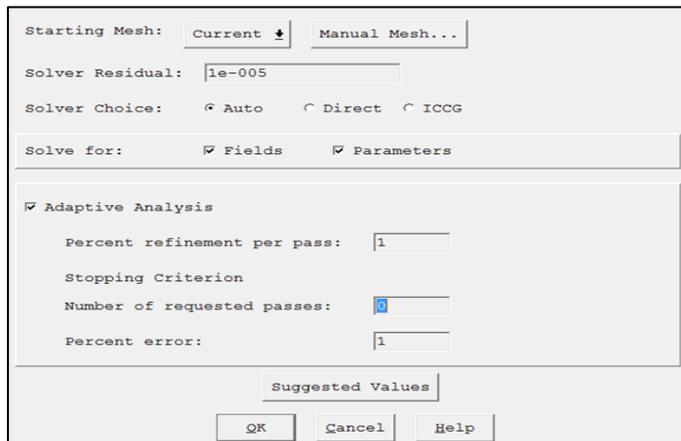


**Fig. 7 Set up executive window**

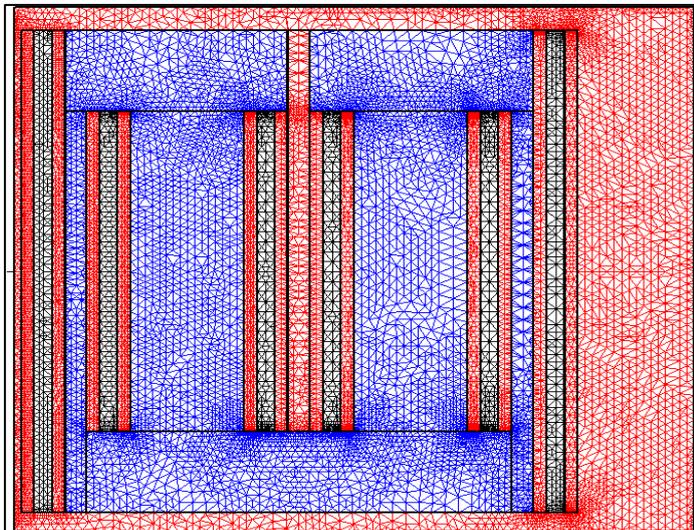
### ***F. Setup solution option***

This is the most important tool of the software that is used for solving the field related parameters. In this, we do the adaptive analysis of transformer by entering the no. of requested passes. There is a suggested value for the software. This solves the electromagnetic equations. This also describes the manual mesh (no. of triangle elements) and how much energy and energy error are present there. However, the mesh generation stage has

always hampered the efficiency of FEM. Thus, mesh generation plays an important role in finite element analysis. One of the main reason for seeking to adaptive mesh generation was the time. It is especially crucial when the problems analyzed had complicated irregular geometries or large gradient variations across the domain.



**Fig. 8. Adaptive Meshing Analysis Tool of Maxwell**



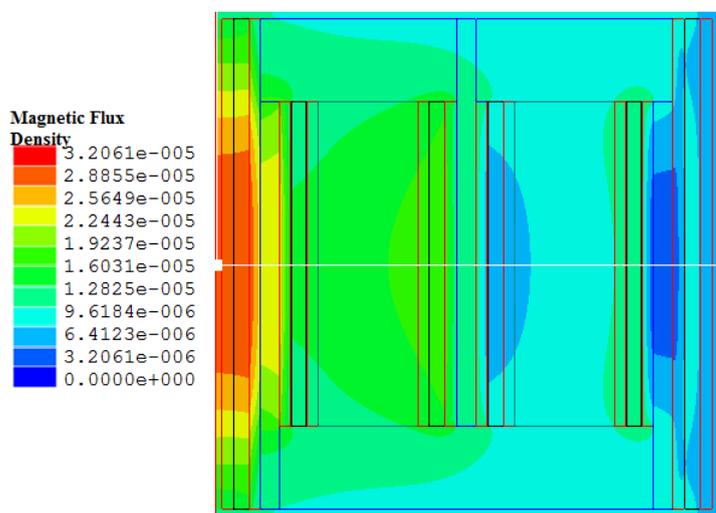
**Fig. 9. Manual Meshing of 15 KVA Transformer**

## SIMULATION RESULTS

Based on the Finite Element method, the 2-Dimensional model of three phase core type transformer is built up by Maxwell (Ansoft Inc.). This tool has a strong ability to solve Electromagnetic field equation. The Analysis of a Three Phase Core Type Transformer is carried out in terms of electromagnetic field equations. To reduce the boundary value problem, the actual slotted structure is replaced with smooth surface and the current

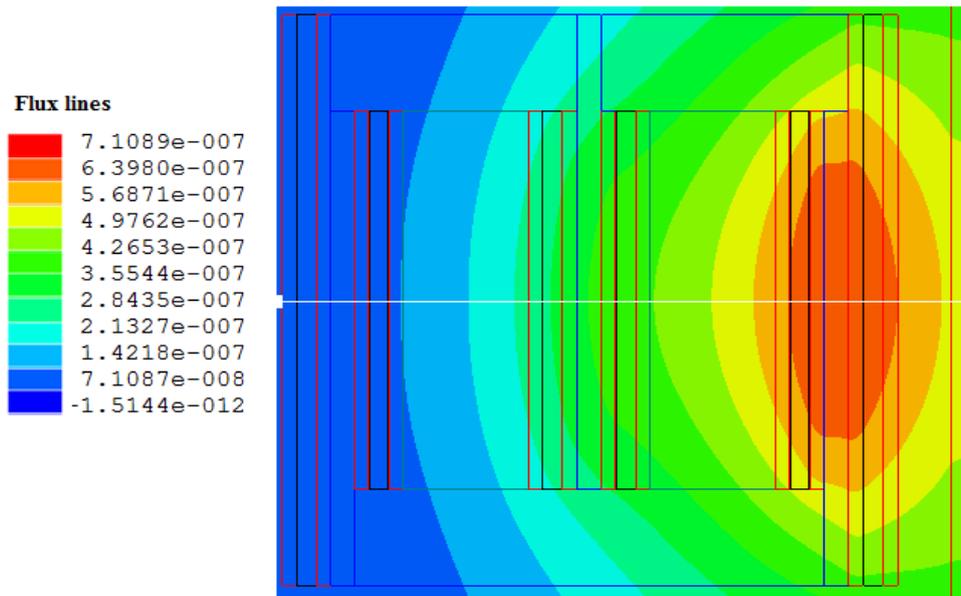
carrying windings are replaced by fictitious, infinitely thin current elements called current sheets, having linear current densities. The current density distribution of the current sheet is the same as that of the slot embedded conductor configurations, such that the field in the air gap remains unchanged. The Three Phase Core Type Transformer has basically three main parts, where the secondary is coupled with single phase copper winding with silicon-steel core, the primary with rectangular core with silicon-steel tooth pole core and air-gap between the primary and secondary.

The magnetic flux density generated by primary coil which is energized by their current value, in which larger the concentration of the magnetic flux density larger the cross section area of magnetic field. The magnetic field is basically produced by the energized coil and permanent magnet field, therefore the thrust is produced because the thrust produced by coil is directly proportional to area covered by magnetic field. The Magnetic Flux Density generated by 15 KVA three phase transformer model shown in fig.10.

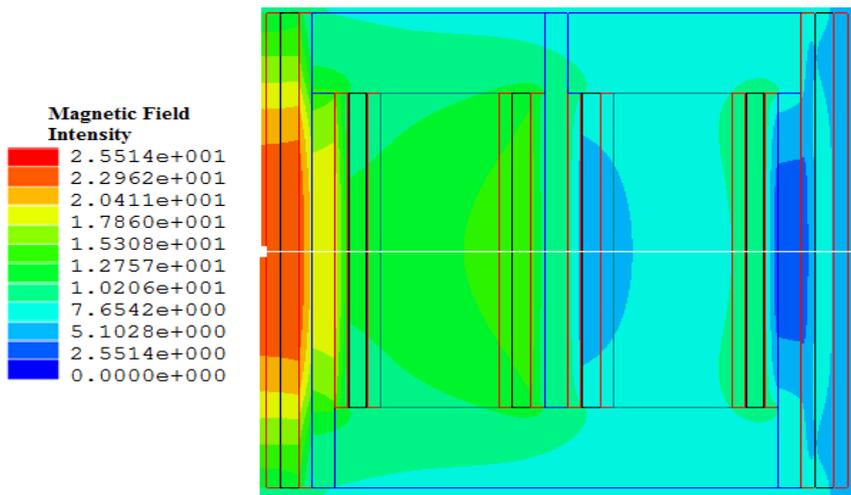


**Fig 10. Magnetic Flux Density (B) of 15 KVA Transformer**

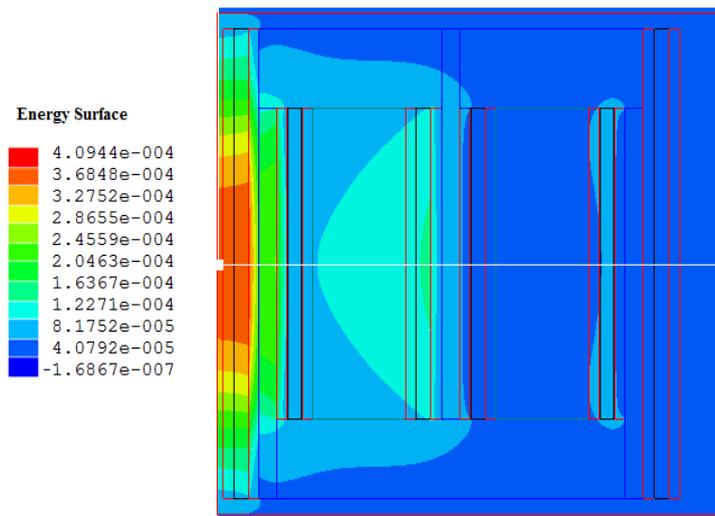
In the Fig 10 shows that the Magnetic Flux Density in the air-gap is uniform long distributed. The higher the value of Magnetic Flux Density in air-gap, higher the Thrust is produced. The Magnetic Flux Density is directly proportional to the force produce by the machine, therefore higher the value of the flux density in air-gap, higher the force is produced. In the Model of 15 KVA Three Phase Core Type Transformer satisfactory result are obtained. The results obtained for specific parameters like Flux Lines, Magnetic Field Intensity and Energy surface are shown in fig.11, 12 and 13. This shows that when current in primary of three phase transformer is 2.34 amperes, the resultant magnetic flux density, flux lines, magnetic field intensity and energy surface would be 3.2061e-005 wb/m<sup>2</sup>, 7.1089e-007, 2.5514e+001 A/m and 4.0944e-004 respectively. The various results obtained for the Simulink model of 15 MVA transformer is tabulated in table 2.



**Fig. 11. Flux Lines of 15 KVA Transformers**



**Fig.12Magnetic Field Intensity of 15 KVA Transformer**



**Fig.13.**Energy surface of 15 KVA Transformer

**Table 2** Various Triangles Element & Energy Error of Three Phase Transformer

Sr. No.	Simulink Model (15 KVA)		
	Triangles	Total Energy	Energy Error (%)
1	33456	1.29542E-005	3.2941
2	35549	1.29548E-005	3.1545
3	37673	1.29553E-005	3.0523
4	39925	1.29557E-005	2.9832
5	42285	1.29562E-005	2.8037
6	44801	1.29562E-005	2.7337
7	47464	1.29571E-005	2.5447
8	50287	1.29572E-005	2.4653
9	53289	1.29576E-005	2.4069
10	56464	1.29580E-005	2.3541

## CONCLUSION

In the present work, the Finite Element Model of 15 KVA Three Phase Core Type Transformer is simulated in Maxwell Ansoft Inc. to evaluate its performance by varying the materials for the core and currents in the primary of three phase core type transformer. The ferromagnetic materials used for the core in the work are silicon steel and CRGO with copper windings. The high permeability, relative to the surrounding air, causes the magnetic field lines to be concentrated in the core material. The magnetic field is often created by a winding around the core that carries a current. The core magnetic flux distribution in its various instants is determined by

imposing the current instantaneous values in the windings, which are obtained through time domain simulations. This change has been recorded in different parameters like force, magnetic flux distribution, magnetic field intensity and flux lines.

### ACKNOWLEDGMENT

The authors are very thankful to OM Sterling Global University, Hisar for providing the support and fruitful environment for the research work.

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## Pharmacological parameters of Novel derivatives of 4-thiazolidinone

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### Abstract:

This evaluation is all about getting a head start on 4-thiazolidinones and thoroughly analyzing this chemical. 4-Thiazolidinones are well-known for their many biological effects. They have a 4-position carbonyl group on the thiazolidine ring. Since such a specific ring system is the fundamental framework in a wide range of artificial substances with a broad spectrum of physiological actions like anti-bacterial, anti-fungal, insecticidal, anti-epileptic, anti-mycobacterial, anti-inflammatory, anti-parasitic, hypnotic, and anti-cancer activities, the chemistry of thiazolidinones has stimulated conceptual interest over the years. Structural changes to the 4-thiazolidinone component, such as substituting the aryl group with a heteroaryl scaffold or adding various groups and moieties (A&B) on the –CH– group of the nucleus, have paved a new study route.

**Keywords:** Antimicrobial agents; isomerism; Schiff bases; spectroscopy; spectrum analysis; 4- thiazolidinone.

### 1. Thiazolidinones:

Thiazolidinones are thiazolidine (a dominant variant of thiazole) analogues containing a carbonyl group at position 2, 4, or 5. The molecular formula and molecular weight of thiazolidinone is  $C_3H_5NOS$  and 269.40

Because of their extensive therapeutic activity and tolerance for various pharmacological receptors, thiazolidine and thiazolidinone precursors are regarded as favored structural components in medicinal chemistry. Since this specific ring arrangement represents the basic configuration in a range of artificial substances with a comprehensive range of biological activity, the chemistry of thiazolidinones has fascinated scientific inquisitiveness over time [1].

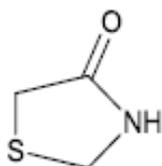
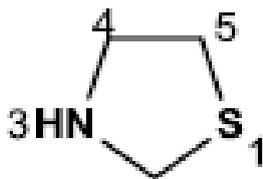


Fig.1 Structure of Thiazolidinone

### 2. 4-thiazolidinones:

4-thiazolidinones (fig. 2), a serendipitous execute, have been the heart of medical chemistry since the 1960s. Moreover, medicinal researchers have been intrigued by essential chemical modifications in a spectrum of groups on the thiazolidine structure, which has led to the research of such physiological substrate into different other heterocycles. As a result, a purposeful attempt is undertaken to selectively modify the thiazolidine structure to generate a wide range of identical yet physiologically functional substrates, specifically 4-thiazolidinones from thiazolidines. As a result, thiazolidine is amenable to various chemo reactions that result in different structural constituents[2].



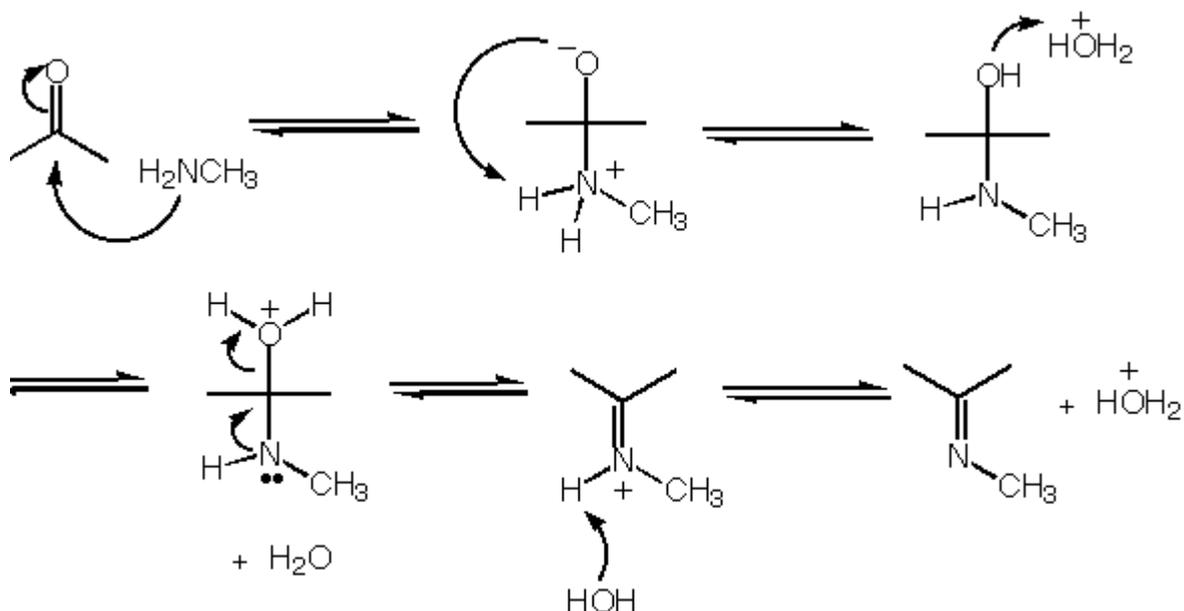
**Fig.2 Structure of Thiazolidine-4**

### 2.1 Synthetic Pathways for 4-Thiazolidinone Fabrication:

The literature is studied concerning selecting techniques for the fabrication of 4-thiazolidinones. There are three reactions: an amine, a carbonyl molecule, and mercaptoalkanoic acid, which can occur in a one-pot three-substrate condensation or a two-step cyclization reaction involving imine or Schiff's base production. The most common among all methods are  $\alpha$ -mercaptoalkanoic acid [3].

The standard technique for synthesizing 4-thiazolidinones is the interaction of mercaptoalkanoic acids with molecules with the formula  $RN=C=X$  also called imines. The manufacture of 2-aryl-4-thiazolidinones has been the only significant usage of  $\alpha$ -mercaptoalkanoic acids in synthesizing 4-thiazolidinones[4].

- A Schiff base usually made from an aromatic or heterocyclic aldehyde is the second element.
- In a non-polar solvent such as absolute ethanol, dry ether, ethyl acetate, or dry benzene, the reaction gets occur with 70-80% yields
- The use of a water separator, such as the DEAN STARK APPARATUS, has been proven helpful, and the reaction's progress may be tracked by the quantity of water stored in the aquifer.
- Mercaptoalkanoic acid produces 4-thiazolidinones with hydrogen linked to nitrogen when reacting with an aromatic or heterocyclic aldehyde or ketone.
- The intermediate products of an aldimine or ketimine are thought to be responsible for the reaction known as imines (fig.3).
- The mercaptoacetic acid attacks the  $>C=N$ - group, adding  $COOH$  to the carbon atom, monitored by the internment of a proton by nitrogen and consequent cyclization.
- Electrophilic and nucleophilic substituents have distinct impacts on the progressive character of the carbon atom or the negative character of the nitrogen atom in the azomethine bond[5].
- As a result, the vulnerability of the carbon to nucleophilic attack by the mercaptoacetic acid anion can be seen in the yields of 4-thiazolidinones.[2]



**Fig.3 Mechanism explaining imine formation**

### 3.3 4-Thiazolidinones Chemistry:

#### *Synthetic Considerations for the Synthesis of 4-thiazolidinones*

- An aldehyde, an amine, and mercaptoacetic acid are used in the significant synthesis pathway to 1,3-thiazolidin-4-ones.
- For the manufacture of 4-thiazolidinones,  $\alpha$ - mercaptoalkanoic acids have been widely employed.
- In various solvents, conjugated and competency  $\alpha\alpha$ mercaptoalkanoic acids react readily with Schiff's bases of aromatic or heterocyclic aldehydes and aliphatic or aromatic amines to produce substituted 4-thiazolidinones.
- Schiff's bases are made by condensing ketones, and aliphatic or aromatic amines can react with alpha mercaptoalkanoic acids to produce 2,2 disubstituted thiazolidinones[6].

#### *Production of 4-thiazolidinones from a mechanistic standpoint*

- The reaction starts with the production of an imine (Schiff's base), which is attacked by the sulfur nucleophile and then undergoes intramolecular cyclization once the water is removed.
- Thioglycolic acid attacks the  $>C=N-$  group first, with the  $SCH_2COOH$  attaching to the carbon atom, accompanied by nitrogen capturing a proton and eventual cyclization.
- Electrophilic and nucleophilic substituents have a significant impact on the carbon atom's electrophilicity or the nitrogen atom's electronegativity in the azomethine bond.
- In the yields of 4-thiazolidinones, the vulnerability of the carbon to nucleophilic activation by the anion of mercaptoacetic acid is essential.
- Azeotropic distillation is the most frequent method for removing water; however, chemical drying agents (scavengers) like DCC and physical scavengers molecular sieves have also been proven.
- Using a DEAN STARK water filter has been proven helpful, and the quantity of water stored in the aquifer can also be used to observe the reaction's progress.

- 1,3-Dipolar cycloaddition is a process that produces a five-membered heterocyclic thiazolidinone ring [7].

### **3.5 4-thiazolidinone Conformational Analysis:**

In particular, certain derivatives 2,3 – diphenyl-1,3-thiazolidin-4-ones were studied for their properties and structural analyses. Because of their position, substituents (X and Y) positioned on the phenyl rings of 2,3 – diphenyl-1,3 – thiazolidin-4- one affect the electron density encompassing both the methine proton (H<sub>x</sub>) and the carbon C(2) and are possibly attentive to substituents (X and Y) positioned at the meta and para positions of both the 2 and 3 phenyl rings, respectively.

The chemical shifts of such atoms compared to the precursor molecule depict such modifications. Substituents on the phenyl rings seem to stimulate the adjacent carbons in the hetrocyclic ring in an identical approach [8].

### **3.6 4-Thiazolidinones Pharmacological Strategies:**

Thiazolidinones are essential compounds with a wide range of physiological functions.

This ring is involved in a variety of therapeutic activities. Thiazolidinones are studied biologically through various mechanisms, including enzymatic action and receptor-mediated mechanisms. The physiological study of thiazolidinones demonstrated that substituting at positions 2, 3, and 5 results in distinct actions. Numerous marketed medications using thiazolidinone substrates have a wide range of pharmacological properties, including antimicrobial, antitubercular, anti-inflammatory, insecticidal, anti-parasitic, anti-cancer, anti-HIV, and so on. [9].

#### ***Thiazolidinones as Antibacterial Agents:***

Numerous -4-thiazolidinones and 5-arylidene analogs were investigated for antimicrobial activity against *Staphylococcus aureus*. More than fifty thiazole and thiazolidinone analogs were tested against several widespread bacteria, and the thiazolidinones were found to be more potent than the thiazoles. When mercurated thiazolidinone substances were tested to nonmercurated analogs, an increase in exercise was noted. They were all highly active against *S. aureus*. The magnitude of the substituents affected the efficiency against *E. coli* and *K. aerogenes*. By an ultimate intensity of 10<sup>-3</sup> M, 2-Aryl-3 benzothiazolyl-4-thiazolidinones inhibited Gram-positive and Gram-negative bacteria by 35-56 % [10].

#### ***Thiazolidinones as Anti-Cancer Agents:***

Antiinflammatory and antinociceptive effects of two minor units of aromatic Schiff bases and 2, 3-disubstituted -1, 3-thiazolidin-4-one analogs. With the attachment of -mercaptoacetic acid to the aromethines, thiazolidinone analogs were produced. In the rat hind paw, both classes of substances showed good efficacy towards carrageenan-induced edoema but only modest efficacy in the mice writhing assay [11].

### **Conclusion:**

The persistence of many ailments and infections necessitates the creation of novel potent pharmaceutical medicines. This thinking prompted researchers to learn more about thiazolidinones and thoroughly examine such chemicals. Thiazolidinone is a physiologically significant five-membered heterocyclic ring with many

pharmacological functions. Many thiazolidinone analogs have been developed and tested for antibacterial, notably antitubercular action, in the quest for novel therapeutically efficacious medicines. These have been easily made by executing a one-pot cyclocondensation of substituted benzaldehyde, anilines, and mercaptoacetic acid, with exquisite efficiencies of the resultant substances. Spectrum investigations of 4-thiazolidinones were used to characterize them extensively. Molecular docking analysis was also carried out to determine certain analogs' docking mechanisms in the enzymes' productive regions that cause the illnesses. As a result, thiazolidinone is a unique theoretically energetic nucleus that also serves as a potential substrate for synthesizing other molecules. The biological actions of 4-thiazolidinone analogs have also been thoroughly examined in this study. Furthermore, based on the findings of this study, 4-thiazolidinone analogs appear to be potential prospects for further study in the quest for novel, more efficacious, and effective drugs. Researchers can create and investigate new approaches for thiazolidin-4-ones and their novel analogs without the drawbacks that have already been identified. Finally, the outcomes of this investigation may assist in further refining and researching other derivatives of 4-thiazolidinones as more effective pharmacological agents and evaluating them as potential future research possibilities.

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**Polyherbal Formulation: A Therapeutic Agent for Wound Healing**

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**Abstract:**

Polyherbal formulations are defined as the combination of two or more plant or plant metabolites. These formulations are better than allopathic formulation in context to their fewer side effects, low cost and non tolerance properties. Polyherbal formulations are also having synergistic therapeutic action than single herbal formulation. Various scientists revealed the importance of polyherbal formulation in treating various ailments or medical conditions. In current review article we discussed the importance of polyherbal v/s single herbal formulation with strongly emphasis on wound healing polyherbal formulations by giving examples of successfully researched polyherbal formulations .Commercially various polyherbal formulations are available for use in market for wound healing property.

Keywords: Polyherbal, Side effects, Wound Healing, Patient Compliance etc.

**Introduction:**

Human body is made up of various organs of which skin covers the largest area and plays a significant role in various body processes. It also act as the first defense mechanism by providing the protective barrier against mechanical impacts, thermal injury and physical injury, Wound is defined as the injury to damage our body.<sup>1</sup> It may be due to thermal, Physical or mechanical effect and can last from minor injury to life threatening. So, effective wound healing mechanism is necessary which consist of various set of processes. Various antibiotics are available in market for the management of wound healing but due to their side effects and resistance, herbal formulations are replacing the antibiotics.<sup>2</sup>

**Polyherbal formulation and its advantage over single herbal formulation:**

Plants do not provide only the nutrients to the human beings and animals but also provide the variety of organic materials necessary to provide the protection against microbial pathogens etc. <sup>3</sup>

Polyherbal formulations are the formulations containing no. of active phytoconstituents/plants which give the required therapeutic effect in combination<sup>4</sup>. The concept of Polyherbalism was discussed in *Sarangdhar Samhita*, an Ayurvedic literature. As phytoconstituents are present in very less amount in plants so combination of different plants constituents provide better therapeutic result than use of plant solely<sup>5</sup>. Polyherbal Formulation provides the synergistic effect, agonist and potentiation effect due to presence of no. of chemical compounds. The pharmacological action provided by Polyherbal formulation is greater than single herbal formulation. Synergistic effect of Polyherbal formulation is associated with the Pharmacokinetic and Pharmacodynamic principles. Pharmacokinetic synergism associated with absorption, distribution, metabolism and excretion while Pharmacodynamic with the action of active principles of same nature on the same receptor to elicit the desired therapeutic effect.<sup>6-7</sup> Use of ployherbal formulation also reduces the frequency and dose of formulation thereby increasing the patient compliance<sup>8</sup>.

**Evidence based Polyherbal formulation having wound healing properties**

Composition	Experimental Model	Formulation	Reference no.
Mitracarpus villosus, Culcasia scandens and Ageratum conyzoides	Wound Contraction	Ointment	9
Psidium guajava and Ficus religiosa	Excision and burn wound model	Ointment	10
Jasminum officinale, Azadirachta indica, Stereospermum suaveolens, Hemidesmus indicus, Pongamia pinnata, Vetiveria zizanioides, Glycyrrhiza glabra, Rubia cordifolia, Symplocos racemosa, Curcuma longa, Berberis aristata, Nelumbo nucifera, Woodfordia fruticosa.	Excision wound model	Jati Kalpa Gharita	11
Terminalia arjuna, Centella asiatica and Curcuma longa	Excision wound model	Gel	12
Zingiberofficinale, Curcuma longa, Aloe barbadensis, Citrus aurantium, Emblica officinalis and castor oil	Excision wound model	Ointment	13
Cassia auriculata, Mangifera indica , Ficus banghalensis , Cinnamomum tamala and Trichosynthis dioicia	Excision, Incision and dead space wound model	Aqueous extract	14
Erythrina indica, Bergenia ciliata, Cissampelos pareira	Excision, Incision wound model	Ointment	15
P sorolea corylifalia, Achryanthes aspera	Excision Wound Model	Ointment	16
Piper nigrum and Curcuma longa	Excision Wound Model	Ointment	17
Seasame oil, olive oil, honey,curcuma longa, psorealac and arnica.	Excision, Incision wound model	Ointment	18
conyzoides Linn. ,Argemone mexicana Linn. , Heliotropium indicum Linn. and bark extract of Alstonia scholaris (L.) R. Brown.	Excision, Incision wound model	Ointment	19

**Conclusion:** Herbal plants and their metabolites are effectively used for various medical treatments from ancient times because of their fewer side effects than synthetic drugs. In 19<sup>th</sup> century researchers started to extract the Phytoconstituents from herbal plants and synthesized them as herbal drugs. In the current article various polyherbal formulations were mentioned whose wound healing property were scientifically approved. Currently many herbal formulations are also available in market and many more under trials for their successful marketing. The example quoted in article also suggests the use of Polyherbal formulation for their wound healing formulation.

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## Enhancing Data Quality of Data Warehouse using ETL

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### Abstract

This article discusses utilizing ETL to improve data quality in a data warehouse setting. In this paper, a conceptual paradigm is given for enhancing the quality of data in data warehouse environments. Factors such as the current data quality, the quality requirements of the respective decision-making process and the potential benefits of data improvement efforts were examined. Those responsible for data quality must be aware of the importance of these factors. For warehouses with a few decision-making processes, it should be sufficient to be aware of these issues and to apply good judgement. For a number of reasons, data storage efforts may fail but nothing is more likely to fail than the lack of attention to data quality. Data relevant to the activities of the organization should be kept. The fact that stored data is utilized instead of for operation for decision-making is a distinctive characteristic. Efforts to implement data warehousing must handle a number of possible issues. ETL (Extract, Transform, and Load) is a database process framework for extracting, transforming and loading data. The aim of loading is to put filtered changed data into a permanent or virtual data store or warehouse for data mining and analysis.

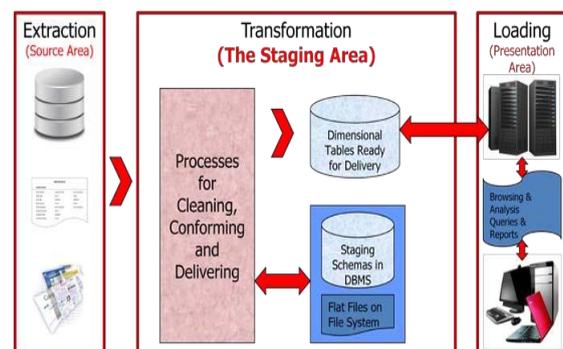
### Introduction

Extract Transform Load is a database process framework tasked with data extraction, transformation and loading. Data from a range of diverse and authoritative sources is extracted and stored in the temporary storage area of the staging zone. Cleaning and cleansing extracted data in the staging storage area using a set of rules and functions is required for data transformation. For data mining and analysis, the loading step saves filtered and modified data in a permanent virtual data storage.

The ETL system is unable to manage huge voluminous data sets due to the exponential growth of data. The growth of the internet has resulted in a massive rise in data production, with the majority of

that data being accessible in the form of web pages. Dealing with this kind of highly unstructured data necessitates a refinement of the traditional ETL process paradigm in order to handle such large amounts of structured and unstructured data quickly, accurately and within the time constraints. An ETL system's data accuracy and timeliness are critical in generating knowledge from a data warehouse because the morphology of these multiple heterogeneous data sources varies, it becomes clear that extraction and transformation algorithms must be able to extract and transform large data sets efficiently and accurately, as inconsistent and incomplete data will result in a weak data warehouse and as a result, inaccuracy and delay in the decision-making process.

ETL is one of the most essential components of any database system since it takes up the majority of the vital time throughout the data warehouse construction process. As a result, improving the





speed and accuracy of the ETL process for big data sets becomes unavoidable. As a result, for knowledge discovery from data warehouse, a big

data set-based ETL process model with enhanced, optimized extraction, transformation and loading algorithms must be created and built.

### **Challenges in the ETL Framework**

Data sources may be homogenous, heterogeneous, organised, semi-structured or unstructured and geographically and logically dispersed. Shu et al. made the first effort to alter data using their planned EXPRESS system, which used non-procedural expressions as input. Wrapper-based transformation was suggested by Roth et al. to solve the data integration issue in any database system.

Before the year 2000, ETL was regarded as a tool but it has now gained independent acceptance from the scientific community. With this, the focus is on Conceptual modeling of ETL operations, as suggested by Vassilidis et al., which uses ideas and characteristics to define the internal structure of data warehouses through a connection. The target attribute is transformed through a transformation node, which contains several transformations.

The ETL (Extract-Transform-Load) framework is a three-layered architecture for filling the database warehouse. The three levels each have their own capabilities for working with the data. Extraction is in charge of extracting essential information from a large quantity of data. The so-called massive quantity of data may be organised or unstructured, requiring pre-treatment before being saved in the database warehouse.

As defined below, the template detection algorithms have certain limitations especially with the increase in a load of web pages and therefore a need arises for the development of an algorithm

with better performance in the presence of higher load of web pages.

The most essential layer of an ETL system is the first phase, which is responsible for collecting data from various data sources.

The World Wide Web (WWW) allows users to access information from anywhere on the planet. The web pages include both structured and unstructured data, and web users may utilise templates to access the data. Because they offer a uniform framework to the web pages, templates make it simple for visitors to navigate. As an example,

Similarly, Amazon India's web sites feature a similar style for comparable product information, although they are not identical to Flipkart's. URLs cannot be used to organise web pages. Despite having the same URL, the sites may seem to be quite different. Unknown templates may reduce the efficiency of the data extraction process by including unnecessary words. Since a consequence, template identification and extraction is gaining popularity these days, as it has the potential to improve the productivity of a wide range of online applications, such as search engines, web page classification, and data integration from many sources. HTML-formatted codes may be found in templates. They don't have any data in them. They may be used by web designers to create websites by substituting information about their product or organization for the extensive information in the templates.

### **Literature Review**

The data warehouse's basis is the ETL process model. The data sources may be homogenous, heterogeneous, structured, semi-structured, unstructured, geo-graphically or logically dispersed and so on. Initially, the majority of research for ETL process optimization was focused on structural optimization of the ETL process model.

Shu et al. (1977) made the first effort to alter data with their proposed EXPRESS system, which used non-procedural expressions as input.

Aside from conceptual modeling, logical level description collects meta-information for ETL operations, focusing on metrics for identifying key characteristics of an ETL design.

Trujillo et al. (2003) suggested UML modeling for ETL processes using conventional techniques rather than Vassiliadis et al. template's transforms. As design procedures for ETL systems, source data join the author suggests source selection, attribute mapping between source, source data transformation, goal selection and target data for data loading.

According to Kimball et al. (2004), a well-designed Extract-Transform-Load process model can harvest data from a source, impose data quality and uniformity protocols, compile data from various sources for aggregation and converge the final output in a standard format for designing applications and assisting end users in decision-making through data analytics visualization.

Luján-Mora et al. (2004) presented a standard UML-based data mapping diagram for capturing attribute connections as UML modelling, where relations are regarded as classes and attributes as proxy classes and they are connected together as a "Contain" relationship.

Vassiliadis et al. (2005) established metrics that indicate the size, cohesion, linkage and complexity of a built-in ETL process, based on the strict framework of graphical software structures.

Tziovvara et al. (2007) claimed that there are a large number of save points to assist quicker restart in the event of a failure and they suggested a technique for generating an optimum Scenario of physical level given its logical representation as input. The ETL input process is represented in this instance as a guided acyclic graph. A logical level

activity matches a template, which is an abstract operation that is tailored for the ETL situation in question using schema and parameter information. Each physical operator has a varied cost and resource requirements depending on the sequence of the incoming stream of tuples.

There are two types of transitions:

**(a) Physical implementation is replaced.**

**(b) Sorter activities are introduced.**

They are carried out to sort their tuples according to the values of certain key criteria for sorting. The main idea behind the development of sorters is that order-conscious implementation may be considerably faster than their order-neutral equivalents, which may offset the data sorting cost. Xudong Song et al. (2009) presented a concept to incorporate a data warehouse modeling framework that aided the creation of an ETL model during the early stages of development. It allowed for seamless data warehouse and ETL connection. The majority of the study is focused on the creation of an ETL meta model based on a UML profile.

Mrunalini et al. (2009) suggested an OOP-based UML 2.0 method for securing data extraction during the early development phase, which is missing from the UML 1.0 approach. General software-based techniques for the optimization of ETL processes based on RDBMS principles were suggested by Tang Jun et al. (2009).

For a conceptual perspective of ETL, Kevin Wilkinson et al. (2010) suggested the usage of business process models. The authors connected a conceptual perspective to current business processes and translated this conceptual view into a logical ETL view that can be improved, allowing a business view of the ETL to be converted into a near real-time picture of the whole company.

Mohammed M I Awad et al. (2010) presented an extensible ETL framework for leveraging service oriented architecture to enhance ETL services. This

made it easier to expand the closely linked ETL architecture. This approach also suggested a Classified-Fragmentation component to improve report production speed, however it was discovered to be only appropriate for RDBMS-based data warehouses.

Ying ying et al. (2010) presented an ETL workflow optimization system based on intelligent task segmentation and parallel processing. The authenticity of the task performance was shown using standard RDBMS software.

George Papastefanatos et al. (2012) investigated methods for evaluating the quality of ETL designs using a set of graph-theoretic criteria to estimate evolution effect in a real-world ETL scenario.

Mário Sergio da Silva et al. (2012) presented an ETL system development framework for the creation of domain specific ETL tools that may be adapted for ETL operations in an integrated environment.

Jinluan Huang et al. (2012) reported work on an ETL distributed workflow model for improving throughput via distributed and parallel execution of ETL procedures, as done by different researchers utilising Multi Agent System.

In a distributed computing environment, Ping Yang et al. (2013) proposed a parallel processing method by breaking large and complicated SQL queries into tiny parts. The suggested approach attempts to reduce computation costs while maintaining data integrity across linked tables.

Anastasios Karagiannis et al. (2013) addressed the question of scheduling the implementation of ETL activities such as transformation, tasks and operations with the goal of decreasing ETL time and allocating memory. The author proposed three programming methods compared to the fundamental Round Robin schedule: minimum cost prediction, minimum memory prediction and mixed policy.

## Research Methodology

### Quality check best practice during transformation of research information

Assure the quality of research information in an institution's internal and external data sources when linked to RIS. Institute of Research and Universities answers questions to this demand. The following article considers and examines these approaches (e.g. cleaning, transformation, computers 2019, 6, 108 out of 13 harmonizing and merging methods) as well as strategies (e.g. schema mapping and schema integrations) for information integration within the framework of RIS. It thus serves as a solution to the problem. Due to the important component of data integration and data quality assurance, this paper focuses on analyzing data quality issues during ETL process transformation. Data transformation eliminates issues of quality caused by uneven representation or structural conflict. The entire process is based on well-defined transformation principles. In the RIS transformation phase, we will explore ways to eliminating any issues resulting from both internal and in particular, external data sources. Data quality issues may be detected via column checks when the research material is integrated into the RIS. A practical advice in the framework of the RIS is addressed in the following subchapters:

1. Key Treatment.
2. Data Type Adaptation.
3. Conversion of codes.
4. Strings and dates unification.
5. Attribute value separation and combination.
6. Connecting (junction) and combining (union) multi-data sources data. Calculation of Derived Values.
7. Aggregation.

### ETL Extraction Process

When dealing with the extraction of source data, which needs numerous insertions, update and delete operations, the job of extraction in ETL changes dramatically.

Lindsay et al. (1986) developed a timestamp-based method for identifying actions such as insertion, update and deletion in two snapshots. A basic method is given to record changes using timestamps and to compare values for tuples which have changed since the last comparison.

Labio et al. (1996) presented a state-of-the-art differential snapshot approach can even work with the tuple compression technology based on a variety of methods (including window algorithms, outer joins and partitioned hash joins). Within two snapshots, the window algorithm assumes that the same tuple exists at the same place. An input buffer and an ageing buffer are utilized in this method for each snapshot, with the input buffer being filled and compared to its contents. Tuples with the same buffer are not taken into account. Misses are now compared to the other snapshot's ageing buffer and tuples are ignored if a match is found. The tuples in the input buffers are insertion and deletion candidates and are moved to the ageing buffer of your snapshot. When an ageing buffer approaches the end of its useful life, it is drained. This will need the use of a queue.

A collection of pointers tracks the order of the tuples entering the buffer; if the buffer is complete, the oldest tuples are vacuumed. The method is highly efficient and safe if the identical data is physically stored in the vicinity of both images and the experimental data have shown that this is a reasonable assumption.

Information extraction may be done immediately or later. Immediate extraction is concerned with the extraction of data in real time while the source system is executing transactions. Real-time data is collected via source database transaction logs,

database activates and extract files from basis systems. Deferred extraction is used to deal with data that isn't collected right away during a transaction. Time stamping and file comparison algorithms were used to collect data in delayed methods.

The literature study is divided into four categories: ETL framework optimization, component processes, Big Data ETL process model and patent information. The current research shows that significant efforts have been made to improve the ETL Process architecture and its components. However, the traditional ETL method, as explored in the literature, is unable to deal with the constant inflow of huge datasets with mostly unstructured data. The traditional

The ETL system under investigation is fundamentally dependent on the basic idea of RDBMS, necessitating the creation of a better ETL system.

The demand for an enhanced ETL system arises from the ever-increasing datasets produced by streaming data in the form of web pages, social media feeds and RSS feeds. The amount of data is also growing at an exponential pace, making it almost difficult for traditional ETL systems to handle big datasets. The inherent advantages of ETL systems, as well as the fact that many organizations store their data in RDBMS format, need the enhancement of traditional ETL systems to effectively handle such datasets.

The endeavor, as described in the literature, is focused on improving the ETL model as well as its related procedures. Due to the problem of storage and turnaround time for obtaining stored data from the data warehouse, this architecture is inflexible and cannot handle a constant stream of data and its analysis. The current model has to be enhanced in terms of storage flexibility and request and retrieval

of required information turnaround time. Individual ETL operations must also be more efficient in order to minimize delay in data extraction, transformation and storage in the information warehouse.

As previously mentioned, the Big Records ETL process model is an effort by different academics and writers to enhance the ETL model so that it can handle data in terabytes and beyond.

The literature reviewed in this chapter further emphasizes the use of patent data in research. The amount of patent data is growing exponentially and analyzing patent data from various sources that are fundamentally dissimilar necessitates the use of strong transformation methods.

### Results and Discussions

The fuzzy C-means clustering and the k-means clustering are compared. The data is entered as synthetic data and both algorithms are run on the 200\*2 matrix of synthetic data, with observations recorded. This chapter's comparison is based on the amount of time that has passed. According to the results in Table 1, the k-means method takes less time to cluster data than the C-means technique. The best overall sum of distance is 249.432 seconds, while the k-means clustering method takes 0.196652 seconds (elapsed time). The C-means clustering method takes 1.060253 seconds to complete. In addition, the comparison is based on the temporal complexity of both algorithms K-means and C-means. K-means. The time complexity of k is  $O(ncdi)$ , while the time complexity of C-means is  $O(ndc2i)$ , where n indicates the number of data points, c indicates the number of clusters, d indicates the dimensions and I the numbers of iterations.

**Table 1: Comparison between Clustering Techniques**

PARAMETERS	K-MEANS	FUZZY	C-
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		MEANS
ELAPSED TIME	0.196652	1.060253
TIME COMPLEXITY	$O(ncdi)$	$O(ndc2i)$
EFFICIENCY	FAST	SLOW

Data taken as input is synthetic data of 200\*2 matrix. k-means and N k-means are performed over the synthetic data. Comparison is made on the elapsed time as shown in Table 1. The k-means method takes 0.196652 seconds, whereas the N k-means algorithm takes 0.178130 seconds.

### Conclusions

The quality of the data specified by the components of extraction and transformation is essential for RIS success. The ETL method systematically develops the capacity to build complex modeling and analytical processes quickly and openly. The research showed that diverse data sources are handled during the ETL method transformation stage. In IT departments, the question of integrating data collection into the RIS has long been a heated subject. Many organizations want to understand how data may be collected from a range of sources in different formats and transferred into a single or many data warehouses. It is also a tough job to summaries data from multiple IT systems with different data formats. The objective is to develop the ETL method to tackle these problems. It enables filtering, aggregation, harmonisation, connection, cleaning and authenticity of data already aggregated in the RIS in order for new information of special value to an institution to be produced. Several commercial ETL solutions (such as Clover ETL etc) in the open source environment help integrate the diverse RIS research information source system landscape throughout the ETL process.

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**JAPANESE ANIMATION AND ITS INFLUENCE ON MENTAL HEALTH OF YOUNG ADULTS**

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**ABSTRACT**

Japanese Animation is in the spotlight not only in Japan, but over the whole world. Japanese animation is a popular among the young generation. Anime is a popular culture rising in our India as well. The infusion of daily life issues and powerful relationship are one of the main aspects in anime, the most distinctive form of anime is they focus on adult watchers as well as young kids. Research suggested that people are getting addicted to internet as well as its effecting their sleep pattern and habits. There are a lot of anime studies which shows adverse impact on the mental health of youngsters. The current study is a comparative study between Otaku and non- anime fan. The study is conducted on 18 to 25 years old young adults. For assessing the impact of watching anime the questionnaires (sleep quality scale, Internet addiction, and UCLA Loneliness scale) was administered on the youngsters. They were interviewed and selected based on their experience in watching online anime. With the score statistics the current study showed that the Japanese anime has significant effect on the mental health of young adults.

**Keywords: Animation, Otaku, weeps, Sleep, Addiction, loneliness**

The Japanese animation have become mainstream and spotlight over the whole world. Japan began producing animation in 1917- still the age of silent films. In India it started during the late 2000's as the globalization began in 1990's. But due to the poor status and society in India it came in the contact in 1997's to 1999's. The animation was first aired in India in 1995 reaching most of the rural part in 2000's on the channel called "cartoon network". The first generation who came in the contact with animation from worldwide with shows like, "Tom and Jerry," "Astro Boy", "Oswal," "Doraemon," we were exposed to anime during that era but we were unaware of the anime fact. As Cartoon Network started airing "Naruto", "Pokemon" and "animax," that aired only Japanese animation with the multiple anime shows like "Fairy Tale, Maid sama,". It has captured the unique interest and understanding in our young teenagers and adults mind. The portrayal of the themes and characters have imprinted a certain patterns of culture in the viewer's. With the span of time the level of anime also increased and new anime were introduced by cartoon network channel that was Dragonball series which has number of episodes and millions of manga book.

Japanese animation it has a broad history related to World War II and WWII harshly influenced the culture of Japanese animation which was shown in "Astro Boy" and it continued to flourish in 21<sup>st</sup> century, there are many production which produce different anime of different genres related to the early era. Hayao Miyazaki founder of Studio Ghibli animated and produced number of anime which we can experience, but these genres have recently come in 1980's to 1990's with the rise of "Dragon Ball Z" in 1989 till present which is totally an exaggeration of a power full human and alien that can turn into a god called, "Super Saiyan", " Grave of the fireflies" with the huge impact on audience, this anime portrays the issues in the World War II and " My neighbor Totoro" which is a simple magical anime in 1988. In this generation " One Piece and Naruto" have

been one of the most popular anime and it hit globally as “one piece” still continue to air every week. There are so many anime which are sharing different genres like historical, adventurous, slice of life, romantic, comedy, horror etc.,

The anime has recently sky rock in young adults as well as adolescents giving a great success to the media and the anime by giving the famous masterpieces like “Kimetsu no yaiba”, “one piece”, “Death note”, etc,. It has left people to view Japan in a certain perspective as portrayed in the animation. Animation is gaining popularity of sushi to origami and any other form of entertainment. The rising of anime and content on Internet site helps them to explore more about anime and different genera according to their preferences and choices. “Otaku” is a term used for people who focuses their life and hobbies entirely in watching anime, it’s a disgrace term in japan, but internationally this term is a badge of pride. And recently it changed into “weebs” to express their love and loyalty toward anime and its community. The anime community is increasing in India and manly are youth. Through anime and its continuous growth in India it unconsciously cultivating the viewer’s mind to reciprocate “Japan” as a paradise country for most of these weebs. The growth of this communities shows the strong connection of the audience have towards the characters as they grow along.

The growth of anime can also seen in the tourism, fashions, cosplay, books in terms of manga, video games, music etc.,.Anime episodes always starts with a kick start hyped music which plays an important role in our mind and also a song to match with themes of a specific arc or role in the end. There are many consumers which have shown interest in art skills depicting anime or manga, anime is an inspiration for many people in India.

The growth of anime is due to its genres because Japanese animation mainly focuses on the social issues that human face in everyday life which allows the viewers to feel satisfied with their life. Now a days our youth is more like introvert and lonely who just want to bother about themselves and this is one of the source that keep them busy with their own self and made them satisfied because the Japanese anime genres are feel so real that audience they become more indulge in anime. The excessive use of network and internet for watching anime leads them to internet addiction and sleep disturbance. And this is the rising issue in anime viewers.

**Problem statement:** To study the impact of watching Japanese animation on the mental health of young adults. (18 to 25 years old)

### **Review of Literature**

This review of literature discusses different researches, articles which talks about how Japanese animation is influencing and rising as a positive and negative factor in society and worldwide. As coming into the researches:

#### **The influence of Online Anime towards children (2013)**

This research was investigated by the universities of Malaysia, which discusses that the online anime has been a major influence towards the growth of children in Malaysia. Therefore this study also discusses the influence of online anime that contributed to positive interaction in the discussion between the children. The study involves the students of Putrajaya. The children were selected on the based on their experience in watching online anime. They discussed about the characters, setting and storylines from the online anime that they had watched and the

conservation were taped and analyzed by using the discourse analysis method. It is found that the subjects were happy and contented to be like the characters in the story.

### **The influence of Japanese anime on the value of adolescent (2019)**

Lu Sen, Zhang Rong investigated on the influence of anime on the adolescence of China. Japanese animation has positive effect on the formation of correct values for adolescents, and the violence and pornography also have a negative effect on the formation of adolescent value. It discusses the advantages and disadvantages of watching Japanese anime on the values of Chinese youth mentally and physically.

Lu Sen discusses the positive influence on the teenagers Japanese anime has the effect of relieving psychological pressure on young people. As the pace of society continues to accelerate, many young people in modern society are facing increasing pressure and growing. In this case it is difficult to solve the real pressure, many people only have some way to relieve and release pressure, including the animation works. It also cultivate the strong will in young people who are not afraid of setbacks.

On the other hand there is negative effect of Japanese anime on teenagers there are many bad behavior in the anime character which influence teenager. Even lack of judgment and cognitive ability, blindly recognize or even imitate them. And there are many scenes of violence, blood and pornography in anime which have negative impact on the physical and mental development of young people.

### **A study of Japanese Animation (2001)**

This research was given by Michele Gibney, in 2001. Research discusses about how Japanese animation is promoting culture worldwide. He focuses on Japan as a country, as a societal whole. They showed the effect of japan in the other part of Asia and other country. And its influence on the college level age groups and the youngest generation. Also introduced the historical concept behind the anime.

### **Anime: From cult following to pop culture phenomenon**

By Samantha Nicole Inez Chambers (2012)

This study examined the scope of influence that Japanese anime had on American people born in the 80s and 90s. Relying on secondary research and survey using a convenience sample of 107 students and young adults, this study found that anime conveys a negative image associated with violence and fringe culture, but people see anime as more of an art form than tasteless violent film. And somehow there is an extents of catharsis theory of media. The study also found that piracy, though not overly common, was still practiced in the case of Japanese media, but some major studios are not impending these fan subbing movements. They believe that fan subbing promotes their brand and that merchandising can help recover the profits lost on film sales.

### **Anime and social Disorders among secondary School Adolescents (2021)**

Social problem among adolescents have been giving a huge impact on the formation of people in a community who live in the world of modern technology. Social problems are oftenly associated with fast paced mass media that come with information technology and sophistication. Anime is the entertainment brought by the mass

media for the children, youth and adults who have dominated the world of animation today. The difference in the character, morals and cultures are believe to be a major for moral declination among teenagers. The elements of violence, sex, fantasy and superstition can be damage teenagers mind. A lot of anime studies show adversely and positive effect to the teenagers. A pilot study was conducted on the teenager aged 13 and 16 years old by using quantative methods. Results showed that there was a positive effect of watching anime, while the reminder showed that there is no significant relation between social problem and anime.

### **The use of Anime in teaching Japanese as a Foreign Language**

By Chan Yee Han and Wong Ngan Ling (2017)

The study of Japanese animation is now included in the education. It discusses that the student's interest in anime has driven much of enrolment in Japanese language courses, the impact of using anime as a teaching tool has not been studied thoroughly in the teaching Japanese as a foreign Language classroom. This article attempts to propose a model that can be used to plan lessons by using anime as a teaching tool in classrooms. By introducing the teaching idea of using anime in a Japanese language classroom, this article is hoped to able to encourage more Japanese language teacher to consider the use of anime in teaching. This study have shown the positive influence of Japanese animation in the context of educational tool.

### **Anime in Academia**

By Jaqueline Berndt (2018)

The transcultural consumption of japan-derived popular media has prompted a significant amount of academic research and teaching. This article investigates the interplay of anime research and the institution of japan studies outside of japan, addressing recurrent methodological issues, in particular, related to representation and mediation, intellectual critique and affective engagement, subculture and national culture. The inclination towards object and representation in socio-cultural as well as cinema-oriented Japanese- studies accounts of anime is first introduce and after considering discursive implications of the name anime, contrasted with the media- studies approaches that put an emphasis on relations, modalities, and form. In order to illustrate the vital role of form, including genre, similarities between TV anime and Nordic Noir TV drama series are sketched out. Eventually, the article argues that the study of anime is accommodated by going beyond traditional polarizations between text and context, media specifically and media ecology, area and discipline.

### **A study of apocalyptic themes in Japanese popular culture**

By Thomas M. Coar (2017)

While consuming Japanese popular culture, it is easy to notice the reoccurring themes of the apocalypse though they are often very different in their presentation to audience. Via investigation the study found that the Japanese people draw their understanding of the apocalypse from many different religions and ideologies, also known as religion pluralism. An influential aesthetic inspired by Buddhist doctrine of impermanence in japan in mono no aware which is the idea of seeing the beauty in the chaos and destruction, With sadness and compassion, including the apocalypse. Stemming from the ideologies of reincarnation and masse, the Japanese

have a unique viewpoint of the end of times, seeing it as the beginning of a new era. This ideology as well as themes of death and renewal, is represented in many artistic works such as Osamu Tezuka's phoenix and Yoshinobu Nishizaki's space Cruiser Yamato. Via exploration of anime and Japanese popular culture, the apocalyptic theme change over time to reflect the social and political views of the Japanese people during that period.

### **Objective**

- To compare the mental health differences between the Otaku and non- anime viewers by assessing sleep disturbance, Internet addiction and Loneliness.

**Hypothesis:** There shall be significant difference between the sleep disturbance, internet addiction and loneliness of anime viewers and non- anime viewers.

### **METHOD**

This study uses a quantitative approach using a three sets of questionnaires that have been combined by the researcher to collect data. These questionnaires was built to measure the influence of anime on the otaku or anime viewers and to see how non-anime viewers are different from them by comparing the sleep, loneliness and internet addiction.

This set of questionnaires examines the level of anime influence on the adults. The data collected will be analyzed by using SPSS software and will be evaluated as primary data in this study.

### **SAMPLE: Purposive and convenient sampling the data with the help of google form.**

This study was conducted on the adults from different parts of India. Respondents are limited to the age range of 18 years to 25 years only, all the three set of questionnaire consisting of male and female who are exposed to anime viewing and those who don't choose to view anime. After the screening only – respondents were involved with the questionnaire study. Filters were made to divide the participants into two group one is of anime viewers and other was of non anime viewer. The data also show that the 21years old respondent are higher than other age group. The majority of overall respondents are from Haryana and others are from Maharashtra, Uttar Pradesh, Uttarakhand, Karnataka, Rajasthan, Chhattisgarh, west Bengal etc., The majority of respondents were students.

### **Research Instruments**

The research instrument used in this study to suit the objectives of the study. In total there are three questionnaires. Sleep Quality scale consist 28 items of sleep, Internet addiction test consist 20 items internet addiction and UCLA loneliness scale consist 20 items to measure loneliness.

All the three questionnaires are used to measure the impact of anime over sleep, internet addiction and loneliness.

Sleep Quality Scale

It is consisting of 28 items. The scale has been validated in individual aged 18-59 years. An initial psychometric evaluation conducted by Yi and colleagues found an internal consistency of .92, a test-retest reliability of .81, The SQS is strongly correlated with the results obtained on the Pittsburgh sleep quality index. Scores achieved by the insomnia sample were significantly higher than those of control, indicating good construct validity.

#### Internet Addiction Test

This scale is used for measuring the addiction of internet among adults. It consist 20 items. The Cronbach's alpha coefficient for the internal reliability of the scale was found to be 0.91. For each subscale, the internal consistency score was approximated and detected as 0.76, 0.74, 0.69, and 0.63, for the first through fourth factor, respectively.

#### UCLA Loneliness Scale

It is consisting 20 items. The scale shows high internal consistency for a scale of only 20 items. For the total the coefficient alpha was .96. The UCLA loneliness scale was examined the relation to several validity criteria. The correlation between the subjective self-report question about current loneliness and the loneliness scale score was highly significant  $r(45) = .79, p < .001$ .

Respondents were asked to list how many hours they spend on watching anime and the reason behind watching and preferring anime over other video and series. And what they think is anime influencing their mental health.

#### Procedure

This study was conducted on the adults through online google form due to the Covid 19 situation. The participant were selected on the basis of initial screening. The google form was provide to the subject and they were instructed to fill the questionnaire carefully after reading all the instruction and questions and they were asked to fill it honestly. The subjects were asked to clarify doubt if any. And submit it online after filling it.

#### RESULT

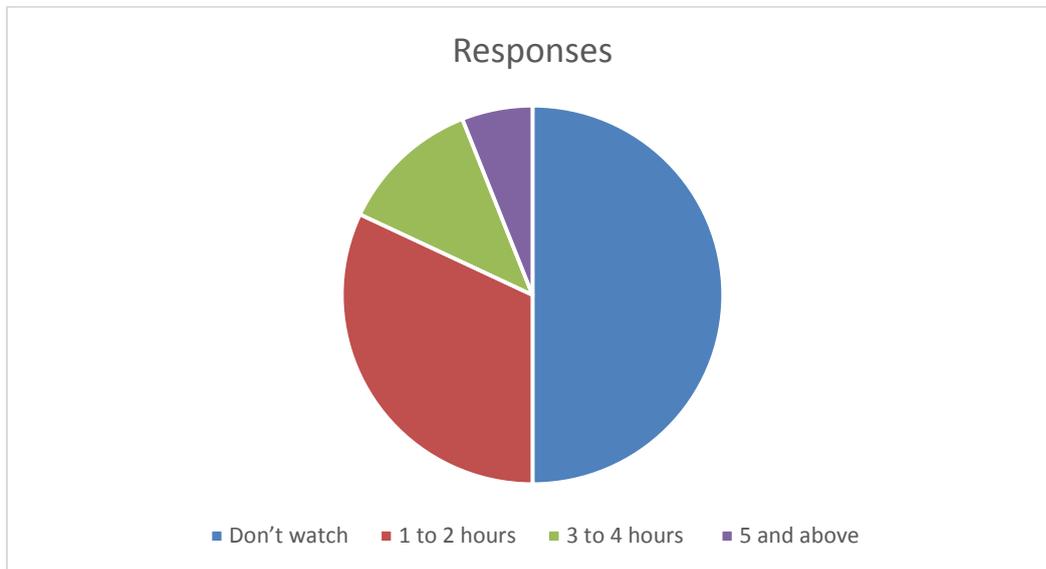
##### Demographic

The following is a table related to the demographics of the respondents involved:

Items	Frequency ( number of , percentage)
Gender	Male: 49 (49%) Female: 51 (51%)
Respondent	Viewers: 50 (50%) Non- anime Viewers: 50 (50%)

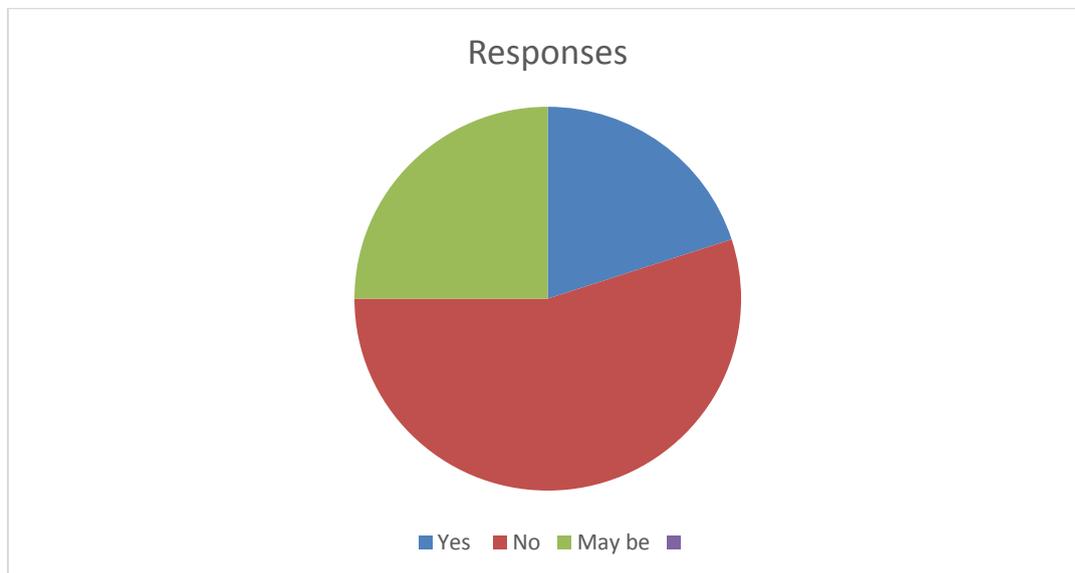
Demographics from the study showed that the number of female respondents are higher than the male respondent. The respondents are equal in numbers in both the group. In the anime viewers group it 50 respondent and in non-anime viewers its 50 respondents.

The respondents were asked few questions that how many hours they spent on watching anime?, what do they think is anime effecting their mental health ? and why they prefer watching anime over other series and videos? . Their responses are as follows.



Pie chart 1: showing the number of hours spending on watching anime.

This chart shows how much time they are spending on watching anime per day. Which is also affecting their daily life routine.



Pie chart 2: showing the responses of whether watching anime is impacting their mental health.

Group Statistics					
	ANA	N	Mean	Std. Deviation	Std. Error Mean
SD	1.00	50	33.7800	9.84428	1.39219
	.00	50	35.7400	9.47135	1.33945
IA	1.00	50	37.0200	18.59064	2.62911
	.00	50	35.1400	16.29575	2.30457
LO	1.00	50	48.2000	7.41757	1.04900
	.00	50	45.3400	4.21179	.59564

Respondents also come up with the reasons why they prefer watching anime over other series and videos. They stated that:

- “It’s much more realistic than cartoon and personally. I’ve learned a lot about life and importance of friendship from it.”
- “I watched because the level of imagination or fiction they involved in the storyline is mind- blowing. It was something I didn’t witness anywhere else..Theyhave unique concepts, dimensions involved, which got people enthralled.”
- “Anime produce a more realistic approach to life compared to cartoon, it intrigues a person to dive into its world and the emotional touch between a show and its audience is much more compared to what’s shown in the anime. It has much better storyline, plot and the characters.”

These are the some statements that states that the anime viewers they prefer watching anime because of the emotional connection, teaches something to them, mind blowing content etc., they all presented their own reasons behind watching.

Table 2 showing the group data of anime viewers and non anime viewers.

The data in the table 2 indicates the impact of watching anime on anime viewers. The total number of samples were 100 in which two groups were divided with the 50 members in each group. In the area of Sleep Disturbance the anime viewers mean score is 33.7800. On the other hand non anime viewers mean score is 35.7400. In the area of internet addiction the viewer’s mean score is 37.02. And non anime viewer’s mean score is 35.02. In the Loneliness area the mean score of anime viewers is 48.2000 and the non anime viewers is 45.3400.

<b>Independent Samples Test</b>					
		t-test for Equality of Means			
		t	df	Sig. (2-tailed)	Mean Difference
SD	Equal variances assumed	-1.015	98	.313	-1.96000
IA	Equal variances assumed	.538	98	.592	1.88000
LO	Equal variances assumed	2.371	98	.020	2.86000

Table 3: showing the scores of independent sample test.

The data in the table 3 discusses the analyzed data which depicts that in social science researches there is 5 % of error assumption. There is a 0.20 confidential interval in loneliness which states that the difference between anime viewer's and non-anime viewers is significant at 0.5 level on loneliness. Whereas the difference between the sleep disturbance and internet addiction is not found significant. The mean of loneliness for anime viewers is 48.4 where non anime viewers is 45.3 which indicates that the loneliness is more among anime viewer as compare to non anime viewers which causes the excessive use of internet and also effecting their mental health. Thus there are others study as well which says that the loneliness is more among anime viewers or those who are encounter to web series.

## DISCUSSION

Based on the findings of the above study, it was found that anime has adverse effect on the loneliness, sleep disturbance and internet addiction. It was found that there is no significant difference between the sleep disturbance and internet addiction in anime viewers and non anime viewers but there is more loneliness among anime viewers that non anime viewers which is also affecting the usage of internet as well as their mental health.

The data of this study is indeed surprising since most of the viewer's still have positive perception about anime. Many study has found negative impact on anime when viewed excessively, but rather studies also found that there is a slight impact of anime on loneliness.

There are three areas in the study which were measured. The first area is sleep disturbance which shows that there is no significant difference between the anime viewers and non anime viewers with -1.9, in internet addiction area the study shows that there is no difference between the viewers and non-viewers with 1.8. But In the area of loneliness there is a significant difference between the level of loneliness among viewers and non anime viewers with 2.8.

## CONCLUSION

These findings are primarily findings on the impact of Japanese animation on the young adult. From the above finding, it can be concluded that there is no difference between the sleep disturbance and internet addiction of anime viewers and non anime viewers. But it differs when it comes to loneliness area. This may be because of the personal reasons of why they prefer watching anime.

In summary this preliminary research accept all results of anime related studies that had a negative impact on youngsters. However, this study only represent a small part of the sample of respondent involved in the polite study. Findings may differs in large samples and broader scope of location are involved.

Therefore this study concluded that there is no significant difference between sleep and internet addiction. But there is significant difference between loneliness in anime viewers and non anime viewers.

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## Elements of JIT in manufacturing industry of Punjab-An Empirical Investigation

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### Abstract

JIT is a management approach focused on time delivery of the product, right place and right time. This study is an attempt to assess the importance of JIT elements in manufacturing industry of Punjab. Questionnaire has been generated to assess its role towards performance improvement, important barriers in implementing JIT, and important benefits achieved after implementing JIT. Various statistical tools like cronbach's alpha, student *t* test, correlation and multiple regression are calculated to the excel sheet prepared. Results of investigation demonstrated that JIT approach significantly aimed at reducing cost. Continuous improvement approach is helpful in involving people in JIT activities, preventive maintenance and flow layout is rated most for improving plant and machinery. Ineffective measurement techniques are rated most important barrier in implementing JIT approach.

**Keywords:** Just in Time manufacturing, Questionnaire, continuous improvement

### 1. Introduction

Just-in-time (JIT) manufacturing is a management technique of producing the right product, at the right time and at right place. It has been introduced by Japanese manufacturing company in 1970s so as to recover economy after world war 2nd. With effective implementation, JIT is capable of controlling production cost, elimination of waste, and compete in this competitive world. It is an advanced approach of improving effectiveness, reducing cost of manufacturing and improved flexibility (Gunasekaran and Lyu, 1997). It is a strategic weapon of improving productivity through elimination of seven types waste, quality orientation, cost effectiveness and by streamlining the manufacturing processes. It simplifies processes, set up time reduction, effective material flows, emphasized on preventive maintenance, eliminating excess inventories an effective utilization of available resources (Kannan and Tan, 2005).

JIT is a Japanese technique which as been firstly applied in 1970s in Japanese company. JIT may be a Japanese management philosophy which has been applied in practice since the first 1970s in many Japanese manufacturing organizations. Taiichi Ohno was the father of JIT and applied it meet customer demands within less time (Fiedler et al., 1993).It is then applied by oil embargo in 1973 and daily and daily there is a wide spread of JIT manufacturing. This technique mainly focused on people, system and plants. Toyoto realized that JIT will be successful if every one in the organization is committed to it and if the processes were maintained for maximum output and efficiency.

In this competitive world, manufacturing organizations are focusing on organizational potential, incremental improvements and small changes using advanced techniques like JIT, total quality management, and total productive maintenance. Right time delivery of product is needed to satisfy customer for staying in competition. JIT methodology ensures right time delivery of product by improving the performance of current manufacturing processes. Research is still lacking to check the performance of such management approaches in manufacturing

industry of Punjab. Literature review has been performed to identify different parameters of JIT approach and questionnaire has been prepared followed by questionnaire filling and analysis of preliminary data.

## 2. Literature Review

**Gupta and Garg et al.(2012)** justify that JIT improves the efficiency by eliminating non value added activities. Successful implementation of JIT practices plays an important role improving the performance of current manufacturing system processes. This study provides motivation to small –medium enterprises to fully implement JIT in systematic manner.

**Gupta et al. (2012)** defined that JIT may be described as an extension of then original concept of managing the material flow in a factory to reduce the inventory levels. In fact, there's far more involved during a manufacturing organization than reducing inventories to regulate costs. Manufacturing has got to affect other issues, like process control, level of automation, flexible manufacturing, machine found out times, direct labor productivity, Overhead, supplier management, engineering support, and the quality of product delivered to customers.

**Omar et al. (2012)** considered a just-in-time (JIT) manufacturing system during which one manufacturer procures raw materials from one supplier, process them to supply finished products, then deliver the products to a single-buyer. The customer demand rate is assumed to be linearly decreasing time-varying. In the JIT system, so as to attenuate the suppliers also because the buyers holding costs, the availability of raw materials and therefore the delivery of finished products are made in small quantities. In this case, both the availability and therefore the delivery may require multiple installments for one production lot. We develop a mathematical model for this problem, propose an easy methodology for solving the model, and illustrate the effectiveness of the tactic with numerical examples.

**Pai et al. (2013)** claimed that JIT is capable of reducing inventory and hence cost of carrying inventory. It is logistic technique capable of reducing inefficiencies time which is unproductive. The study deals with the simulation in company where assemblies are made as per the forecast of production and improving cycle time.

**Kootanaee et al. (2013)** investigated the utilization of Just in time (JIT) concept for the aluminium foundry industry and explores the difference of the manufacturing approach to metal foundry, where raw materials are imported in a highly unstable economy. The Authors were observed that JIT was applied to enhance cost effectiveness of operations, quality and to realize world class benchmarks on all facets of the engineering entity as competitiveness in product delivery is going to be mandatory for business survival.

**Qureshi et al. (2013)** called inventory management is continuous challenge for all organizations not only due to heavy cost associated with inventory holding, but also it has a great deal to do with the organizations production process. Cement industry may be a growing sector of Pakistan's economy which is now facing problems in capacity utilization of their plants. This study attempts to spot the key strategies for successful implementation of just-in-time (JIT) management philosophy on the cement industry of Pakistan. The study uses survey responses from four hundred operations' managers of cement industry so as to understand about the benefits and benefits that cement industry have experienced by Just in time (JIT) adoption. The results show that

implementing the standard , product design, inventory management, supply chain and production plans embodied through the JIT philosophy which infect enhances cement industry competitiveness in Pakistan. JIT implementation increases performance by lower level of inventory, reduced operations & inventory costs was reduced eliminates wastage from the processes and reduced unnecessary production which is a big challenge for the manufacturer who try to take care of the continual flow processes. JIT implementation may be a vital manufacturing strategy that reaches capacity utilization and minimizes the speed of defect in continuous flow processes. The study emphasize the necessity for top management commitment so as to include the required changes that require to require place in cement industry in order that JIT implementation can take place in an effective manner.

**Singh and Singh (2013)** defined that JIT is an innovative management philosophy, which has potential to excel an organization in the most competitive and ever changing dynamic environment. It aims at rationalization of the assembly system, which may be achieved through elimination of wastes, reduction in defects, increase in machine's utility, improvement in man- power efficiency and reduction in other non-productive works. It is important to notice that working with low level of inventory requires waste, breakdowns, process bottlenecks etc. to be essentially reduced to their minimum level and JIT happens to work most effectively under this condition.

### 3. Research Methodology

The methodology for the research is shown in figure .1

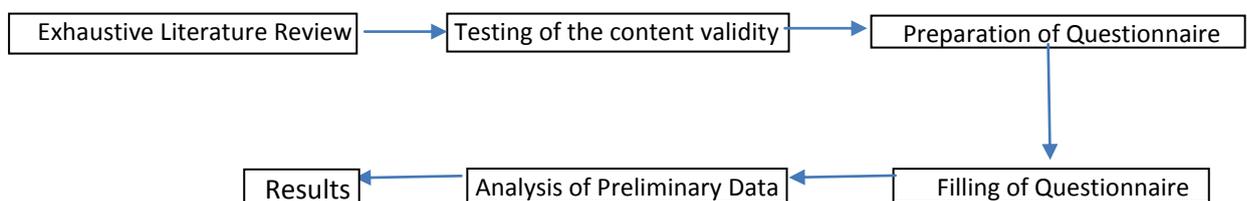


Figure .1 Research Methodology

### 4. Research Instrument

For this research, questionnaire has been prepared which consists of four sections, first section consists of general organization information, name of the organization, product manufactured, respondent designation; measurement of other three sections has been done on four point likert scale.

Table 1 Measurement of other three sections

Elements of JIT	Measurement of level of importance
	<ul style="list-style-type: none"> <li>• Not at all important</li> <li>• To some Extent</li> <li>• To a moderate Extent</li> <li>• To a large Extent</li> </ul>

Barriers in implementing JIT	Measurement of important barriers <ul style="list-style-type: none"> <li>• Not at all barriers</li> <li>• To some Extent</li> <li>• To a moderate Extent</li> <li>• To a large Extent</li> </ul>
Benefits of implementing JIT	Measurement of important benefits <ul style="list-style-type: none"> <li>• Not at all important</li> <li>• To some Extent</li> <li>• To a moderate Extent</li> <li>• To a large Extent</li> </ul>

## 5. Respondent characteristics and types of manufacturing industry surveyed

The majority of the respondents (28) are proprietors, managing partner, managers, senior engineer, and engineers. The manufacturing organizations surveyed include those manufacturing auto parts, cycle parts, scaffolding assembly, fasteners, tractor parts and billets.

## 6. Results and Discussion

### 6.1 Reliability Coefficient

From the filled questionnaire, master sheet data has been converted to SPSS software. Cronbach's alpha has been calculated for each input and output parameters. All values are above 0.7 which is useful for industrial engineering research.

Table 1 Reliability Coefficient

Elements	Cronbach's Alpha	
<i>Elements concerning to Organization and People</i>		
Continuous Improvement	0.76	
Employee Involvement in Decision Making.		
Flexible Workforce.		
Teamwork.		
Quality Circles.		
Quality Function Deployment.	0.85	
<i>Elements Concerning to Plant &amp; Machinery</i>		
Flow Layout		
Preventive Maintenance		
Total Productive Maintenance		
Group Technology	0.85	
<i>Elements Concerning to Process and Production</i>		
Process Flexibility.		
Standardization.		

Product/ Process Simplification	0.79	
House Keeping.		
Kanban Card.		
Standard Containers		
Statistical Process Control.		
Waste Reduction.		
Zero Defects		
Set-Up Time Reduction		
<i>Elements Concerning to Suppliers/Vendors</i>		
JIT Purchasing	0.82	
Buffer Stock Removal		
Inventory.		
Lead Time Reduction		
Small Lot Size	0.74	
<i>Benefits</i>		
Product cost reduction		
Quality improvement		
Design improvement		
Productivity improvement		
Flexibility in the system	0.74	
Improved administrative efficiency		

## 6.2 Validity of Constructs

### a) Predictive Validity

Predictive validity is established when a criterion external to the measurement instrument is correlated with the factor structure (Nunnally, 1978). The predictive validity of the manufacturing flexibility dimensions was measured by finding the correlation of each one of them with mean scores of economic performance and satisfaction performance perceived (both being external criteria) using Pearson correlation. All the correlation coefficients were positive and significant at a significance level of 0.05. The result of correlation analysis is shown in the table 2.

Table 2 Results of Predictive Validity

	Product cost reduction	Quality improvement	Design improvement	Productivity improvement
Elements concerning to Organization and People	0.79	0.65	0.74	0.62
Elements Concerning to Plant & Machinery	0.84	0.66	0.72	0.68
Elements Concerning to Process and ProductionSystem	0.74	0.64	0.73	0.68

Elements Concerning to Process and ProductionSystem	0.69	0.75	0.74	0.74
Elements Concerning to Suppliers/Vendors	0.76	0.64	0.79	0.74
*All correlations are significant at 5%				

Table 3 Results of Discriminant validity

Determinant	Product cost reduction	Quality improvement	Design improvement	Productivity improvement
Elements concerning to Organization and People	<b>0.976</b>			
Elements Concerning to Plant & Machinery	0.678	<b>0.810</b>		
Elements Concerning to Process and ProductionSystem	0.343	0.072	<b>0.785</b>	
Elements Concerning to Process and ProductionSystem	0.264	0.050	0.457	<b>0.766</b>

#### b) Discriminant Validity

Discriminant Validity has been measured for various determinants of manufacturing flexibility. Discriminant validity measures the degree to which a construct and its indicators are different from another construct and its indicators (Bagozziet *al.*, 1991). Fornell and Larcker (1981) suggest that for discriminant validity, square root of the average variance extracted for a given construct, should be greater than the absolute value of the standardized correlation of the given construct with any other construct in the analysis. The square root of AVE (Average Variance Extracted) for each of the factor is shown in the diagonal cells, and the correlation coefficient of a factor with the other factors is shown in the non-diagonal cells of the Table 3

#### 6.3 Student t test

Table 4. Results of student t test

	<i>Mean</i>	<i>t-statistics</i>
<i>Elements concerning to Organization and People</i>		
Continuous Improvement	2.7692	5.675*
Employee Involvement in Decision Making	2.4615	8.762*
Flexible Workforce	2.7307	7.372*
Teamwork	2.5384	6.542*
Quality Circles	2.7207	6.358*

Quality Function Deployment	2.5384	4.356*
<i>Elements Concerning to Plant &amp; Machinery</i>		
Flow Layout	<u>2.4615</u>	5.436*
Preventive Maintenance	2.5	5.356*
Total Productive Maintenance	<u>2.4615</u>	6.543*
Group Technology	2.2692	5.438*
<i>Elements Concerning to Process and Production System</i>		
Process Flexibility	3	4.345*
Standardization	2.6538	6.543*
Product/ Process Simplification	2.8461	5.432*
House Keeping	2.7307	7.653*
Kanban Card	2.6208	5.437*
Standard Containers	2.556	8.456*
Statistical Process Control	2.5384	5.643*
Waste Reduction	2.7307	6.873*
Zero Defects	<u>2.884</u>	4.345*
Set-Up Time Reduction	2.769	6.543*
<i>Elements Concerning to Suppliers/Vendors</i>		
JIT Purchasing	2.7692	5.456*
Buffer Stock Removal	2.8077	4.678*
Inventory	2.7225	5.567*
Lead Time Reduction	2.6538	6.745*
Small Lot Size	2.6154	5.673*
<i>Benefits</i>		
Product cost reduction	2.8077	5.456*
Quality improvement	2.692	6.453*
Design improvement	2.5	3.457*
Productivity improvement	2.615	6.567*
Flexibility in the system	2.5	4.567*
Improved administrative efficiency	2.6923	7.653*
*Significant at 5% level		

### 6.3.1 Results Discussion of the findings

Kaizen or Continuous Improvement is rated most important followed by Flexible Workforce, Quality Circles, Quality Function Deployment and Teamwork, Employee Involvement in Decision Making and Quality Function Deployment, Employee Involvement in Decision Making in terms of organizations and people; Process Flexibility is rated most important Zero Defects is rated most important followed by Product/ Process Simplification, House Keeping and Waste Reduction, Standardization, Kanban Card, Standard Containers, Statistical Process Control in terms of process and production; Buffer Stock Removal is rated most important followed by JIT Purchasing, Inventory, Lead Time Reduction, and Small Lot Size in terms of suppliers/vendors.

### 6.4 Correlation between elements and benefits of JIT

To assess the linear relationship between elements and benefits of JIT, Karl Pearson coefficient of correlation has been calculated on Microsoft Excel 2007. Table 5 shows values of Karl Pearson coefficient of correlation.

Table 5 Karl pearson coefficient of correlation

Determinant	Product cost reduction(Z1)	Quality improvement(Z2)	Design improvement(Z3)	Productivity improvement(Z4)
Elements concerning to Organization and People(X1)	0.875	0.784	0.779	0.764
Elements Concerning to Plant & Machinery(X2)	0.765	0.674	0.753	0.657
Elements Concerning to Process and ProductionSystem(X3)	0.825	0.763	0.873	0.743
Elements Concerning to Process and Production System(X4)	0.768	0.774	0.876	0.654

### 6.5 Validation of correlation

The validation of significance of significant correlation has been done using multiple regression.

Table 6. Multiple regression analysis between different variables

Dependent	Independent	Beta value	t value	p value	R-square	F value
Z1	X1	0.1365	2.7434	0.0513	0.156	8.7727
	X3	0.5813	4.7924	0.0643		
Z2	X1	0.8561	2.7441	0.03474	0.1301	11.6459
	X4	0.7675	4.5424	0.00516		
Z3	X3	0.7476	2.7306	0.05081	0.6316	8.5611
	X4	0.2619	6.0185	0.05985		
Z4	X1	0.2599	3.7066	0.00436	0.488	7.4404
	X3	0.3294	4.3834	0.0695		

#### 6.5.1 Results Discussion of the correlation findings

Elements concerning to organization and people highly aims at reducing product cost followed by quality improvement, design improvement, and productivity; elements concerning to plant and machinery highly aims at cost reduction followed by design improvement, quality improvement and productivity improvement; Elements Concerning to Process and Production System highly aims at improving design, Elements Concerning to Process and Production System highly aims at improving design.

### 6.6 Important barriers in implementing JIT

Barriers	Mean	t-statistics
Poor planning	2.461538462	6.567*
Lack of management commitment	2.5	7.256*
Resistance of the workforce	2.461538462	8.653*
Lack of continuous training and education	2.269230769	9.734*
Teamwork complacency	3	4.567*
Use of an off-the-shelf program	2.65384615	4.345*
Failure to change organizational philosophy	2.846154	5.647*
Lack of resources	2.73077	4.678*
Inability to change organizational culture	2.62088	5.556*
Inability to build a learning organization that provides for continuous improvement	2.538	4.556*
Incompatible organizational structure and isolated individuals and departments.	2.53846	5.455*
Inappropriate reward system	2.73077	6.775*
Ineffective measurement techniques	2.88462	8.556*
Paying inadequate attention to customers	2.769	9.764*
Inadequate use of empowerment and teamwork	2.7692308	5.674*

In effective measurement technique is the most significant barrier in implementing JIT.

## 7. Conclusions and Limitations

From the results and discussion, following conclusions are drawn:

- JIT approach is highly helpful in reducing cost of production in manufacturing system processes.
- Small incremental improvements are highly helpful in to involve people in JIT activities.
- Preventive maintenance is helpful in maintaining plant and equipment.
- People and organization involvement significantly aimed at reducing cost.
- An ineffective measurement technique is the most important barrier in implementing JIT.

### Limitations

- The selection of industry is based on snowball sampling technique.
- There is possibility of method variance since there is only one respondent from each company.

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**Security in Cloud-Based Enterprise Resource Planning Solution: A Review**

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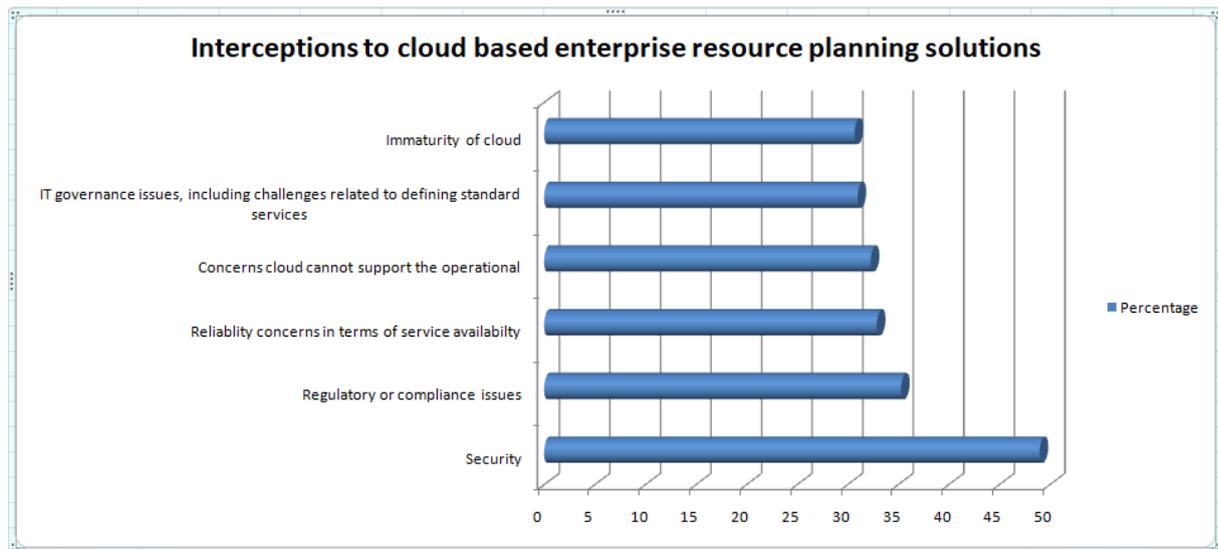
**Abstract:** This review focuses on security in Enterprise Resource Planning (ERP) system to propose a better and efficient solution. This research work discusses the challenges that are in ERP solutions. It also consists of a proposal of security framework to resolve existing issues in traditional systems. In addition to this, this research work provides us a review of existing researches and modules used under cloud based security. However there are several researches in this field. A lot of techniques are used in organizations which help to maintain secure systems. But it is observed that these traditional security approaches have their own limitations. It is glad to say, deployment of security systems in real-time ERP solutions has become possible only because of the progresses which takes place in the technology of Enterprise Resource Planning solutions from last few years. The security under ERP solutions help to provide an extensible framework for defining the access to the portal and data. The work would be preferred as a brief review of ERP security system. In this work, there is a section in which the issues and problem of existing research are discussed which would be very helpful for researcher who wants to propose a better solution in this field.

**Keyword:** ERP, Security, Privilege, Duty, Permission

**INTRODUCTION**

ERP security is the need of the hour for all organizations because leakage of the company's sensitive information can lead to various dangerous repercussions. It plays an important role when it is used to protect company's finances and reputation. ERP can be considered as a backbone for the organization and also a virtual treasure trove of data. From the past records, it comes in to limelight that security is the biggest challenge for enterprise resource planning solutions. The basic reason behind this is the lack of integration between technical and functional aspects of customizations. Due to this, security of the portal is highly compromised. In most of the organizations, proper security extensible and customizable framework is not properly implemented. This is considered as one of the main reason due to which the interception rate of security is the highest. Because of this, various organizations face issues related to data security, access control, data migrations, customizations etc.

It is possible to integrate the functional and technical aspects to formulate an extensible security framework. This can help to define and regulate the access to the system and data. The responsibilities and privileges assigned to the user can be controlled by maintaining the access level. This will help to enhance the security in organizations and help to eliminate the susceptibility of data leakage and misuse of ERP solutions.



**Fig 1 Bar chart depicting the percentage of threat provided by various factors in the field of ERP solutions**

**SECURITY FRAMEWORK FOR ENTERPRISE RESOURCE PLANNING SOLUTIONS**

From the last few years, in the field of security framework for cloud based solutions, different new technologies are put in to place in first time. Out of these technologies, ERP security is the most important. Its plays an important role when it is used for automating and streamlining the business processed in organizations. An extensible framework can be provided for defining access to the system and data by using security. It becomes possible due to the integration of technical and functional aspects of the ERP solution.

<b>Extensible security framework for ERP</b>
User id will be created in the portal.
Entry points will be made for the forms which need to be visible under the required modules.
Privileges will be made for the required menu items.
Duties will be made having the required privileges.
Roles will be made accurately as per the requirements containing appropriate duties and privileges.
Roles will be assigned to the corresponding user.
User id will be created in the portal.
User will be assigned the access to the module with the help of previous algorithm.

A query will be written using X++ with embedded sql which will help to filter the data according to requirements.
The query will be used in the list page.
Entry point will be made for that list page.
Appropriate duties and privileges will be created with required entry points.
Role will be made containing the accurate duties and privileges.
Role will be assigned to the respective user.

**Fig 2 Extensible security framework for ERP solutions**

Due to the integration of functional and technical aspects, access control can be customized for users in the organization. The security role can be related to the job role which the end-user has within the organization. The duties, privileges and permissions need to be established for the security implementation. Role and duties need to be managed by the system administrator in the rich client whereas privileges and permissions need to be established by the developer in the developer workspace. The role needs to be assigned to the end-user. The role helps to identify the behavior pattern which the user can play in an organization. The duties need to be assigned to the user role. The duties actually resemble the responsibilities which the user possesses in the organization. Privileges specify the access which is required to perform the responsibilities in the organization. Permissions specify the level of access the user has to the securable objects required to perform a specific function.

#### LITERATURE REVIEW

There are several researches related to security implementations for cloud-based systems. A review of existing researches is stated here:

**“Regulatory Issues in Cloud Computing – An Indian Perspective” (Menon, G, 2013)**

This paper gives the background of cloud computing models depends upon resources and data sharing which allow organizations to get their applications up and operation faster, with easier operating and less maintenance, and helps IT to fiddle with more quickly. Due to huge deliberation of data at one center, it has become more vulnerable to cyber-attacks. In order to resolve such issue, this paper helps to understand the cloud computing aptness in India, knowing that India does not have any organized framework for the support of the same. Being deficient in privacy norms and data protection norms, insufficient data security, inapt data erasing machinery, poor watch over data handling, licensing and jurisdictional issues etc. can be attributed as the reasons for cautious acceptance of cloud computing in India.

**Research Gap:** This paper lacks about NIST Framework which gives all technical standards and use-case needs to follow by each and every service provider. Also failed to mention THE PERSONAL DATA (PROTECTION)

BILL, 2013 under which the government gives the protection to all the customers and guidelines to all the enterprise to protect their data whether it is stored physically or electronically i.e. cloud server. However, author has tried to relate with Information Technology Act, 2000 but not in detail like what section relates to which offence. For Example, Section 43A of the Act deals with compensation for failure to protect the data by any of the body corporate. Not properly discussed about government agencies dealing with such security and what should be the policy to be made available to overcome such issues.

**Understanding the Security, Privacy and Trust Challenges of Cloud Computing** (Nayak, D., & Huawei, B, 2012)

The notion of security, privacy and conviction challenges under cloud computing have been considered in this paper. The proposition related to strategy and interference has been given which helps to ensure protection for Indian users and to fortify India cloud network. Cloud computing is becoming essential for policy authorizations and regulatory establishments. The Indian supervisory body has to expand a “pan-Indian cloud strategy” which may provide sustained enlargement, jobs and construct a novelty lead for India. It is the matter of concern that the risks related to security, privacy and trust pose multiple challenges which are difficult to deal with. Also, these may destabilize the achievement of these policy aims.

The analysis for the technical, equipped and legal niceties have been commenced under the approach for cloud computing. This also has taken into consideration the Indian facet, the welfare and objectives of all collaborators (populace, personage users, cloud service purveyors, organizations, authoritarian bodies and pertinent communal establishments). This manuscript helps in metamorphic succession towards perceiving the imputations for security, confidentiality and reliance by cloud computing. The challenges in the field of cloud have been defined and considered in the thesis. Also, the genuine case study executions help to analyze and consider related policies for cloud computing. This study provides great help for legislators because it provides supplementary value beyond an inclusive perception of the existing hypothetically or empirical consequential substantiation base, which will recognize the cloud computing and the linked general questionnaire adjoining security, privacy and trust issues.

**Research Gap:** This paper lacks about Indian Regulatory Framework policies in detail and also failed to mention discuss about NIST Framework which gives all technical standards and use-case needs to follow by each and every service providers, THE PERSONAL DATA (PROTECTION) BILL, 2013 under which the government gives the protection to all the customers and guidelines to all the enterprise to protect their data whether it is stored physically or electronically i.e. cloud server. However, author has tried to mention issues in regulating the cloud but not in detail like specific state privacy laws, also able to identify that which law is applicable in cloud and what are the challenges should be taken care by regulators in cloud security. Not able to mention or discussed about laws or policies in details and their challenges also methods to overcome.

**MeghRaj Policy- A Cloud Environment for E-Governance in India** (Srivastava, N, 2018)

The author had discussed how e-governance adopted by the Government of India and many projects and services are made available online for easy delivery of the facilities to the general citizen. He also discussed that cloud computing is more economical, scalable & more secure and how the government is incorporating the

cloud in e-governance. This paper mentioned all the programs launched by the government related to cloud and development of MeghRaj Policy which also known as GI Cloud and the objectives behind the initiative of GI Cloud.

**Research Gap:** The author fails to discuss about the previous law or policies related to cloud and what are the challenges or issues in GI Cloud. How much this policy will be helpful, and is it really secured. The security guidelines discussed under MeghRaj Policy is sufficient, whether it should be compared with Data Protection Act or Information Technology Act or ISO 27001.

#### **The Purpose and Impact of the CLOUD Act (U.S. Department of Justice-White Paper, 2019)**

In this paper, the author discussed about Cloud Act established by US government which helps in the rapid admittance to electronic information detained by U.S. based worldwide to speed admittance to electronic data held by U.S.-based global contributors which is significant for distant partners' investigations of solemn felony, intimidation, aggressive crime, sexual mistreatment of children and cyber-crime etc. The incompatible lawful obligations have also been discussed which could have been come to pass when a CSP obtains a command from one government needing the disclosure of data, however the data access to the same has been restricted by another government. This paper has analyzed the Cloud Act perilously and stated that it has two distinguish parts. First is that the Act provides U.S. the authorization to come into managerial accordance with other countries which meet definite criterion. Second is that the clarification has been made in the U.S. law by the CLOUD Act which states that an organization under the country's authorization can be needed to reveal the information which the organization reins, despite of the fact where the data is stored at any given particular instance. The reasons for the founding of Cloud Act and the advantages of such norms have been discussed in this study. A new paradigm has been represented: "an efficient, privacy and civil liberties-protective approach to certain the effective access to electronic data which lies beyond a requesting country's reach due to the revolution in electronic communications".

**Research Gap:** The author fails to discuss about cloud security standards or guidelines to overcome the issues and the legal implication on such standards. It is also not able to recognize different Acts for different field of Organization to control and secure the data like HIPPA for Health Organization.

#### **Cloud Computing Security Issues and Challenges (Kuyoro, S. O., Ibikunle, F., &Awodele, O, 2011)**

In this paper, the author tried to discuss what all issues and challenges related to security in cloud computing. Highlighted cloud deployment models and its types also cloud service delivery models. Additionally, basic challenges associated with cloud computing that are:

- i) Security
- ii) Costing Model
- iii) Charging Model
- iv) Service Level Agreement

## v) Cloud Interoperability Issue

**Research Gap:** Author, in the paper only tinted key security considerations and the challenges which are being currently faced in the field of Cloud computing with technology advancements, but no solution was mentioned by author to overcome.

**GI CLOUD-MEGHRAJ'-KEY PILLAR OF e-GOVERNANCE SYSTEM IN INDIA** (Srivastava, N, 2018)

In this paper, the author discusses about Government of India's vision and policy towards establishing and implementing the GI Cloud. It also identifies the potential risks and challenges of GI Cloud, and its key drivers and benefits; how this newly emerged paradigm of Cloud Computing Services can be helpful for e-Governance in India.

**Research Gap:** Author fails to mention about other policies/ bills passed by government related to cloud, to lay down the standards to protect the cloud which need to be followed by providers as well as users.

**Secure Cloud Computing Information System for Critical Applications** (Gnatyuk, S., Kishchenko, V., Tolbatov, A., & Sotnichenko, Y, 2020)

In this document, the author has discussed about the advantages which cloud computing has given not only to the large companies but also to the SME's. The author has also discussed about the increased problems of cyber threats which inseparable. Any person can build their own cloud service and providing information security is the responsibility of the service provider and the resolution for this problem can be initiated by the use of various cyber threat recognition methods, IDS / IPS systems and cyber incident response modules etc.

**Research Gap:** The author only discussed theoretical concept of cyber threat in cloud services and its architecture but fails to provide practical solution to deal with such issue as well as to identify laws related to it.

**"A Study of Security Threats in Cloud: Passive Impact of COVID-19 Pandemic"** (Mandal, S., & Khan, D. A. 2020)

In this manuscript, the author has discussed about the impact of corona virus (COVID-19) which has led to high usage of cloud due to which cyber security is at the huge leap. Now cloud helps in education, e-commerce, and healthcare. Author in this paper has discovered challenges related to security while using cloud services without adequate precaution.

**Privacy** (Kumaraswamy, S., Latif, S., Mather, T, 2009)

One of the most important concerns of cloud computing i.e. the privacy has been highlighted in the chapter of privacy. Various noteworthy challenges under the field of cloud computing for the companies which need to adhere to the worldwide privacy norms and adopt a methodical approach to address the cloud privacy have also been mentioned in this book. Also, the problems in dealing with the trans-border data flows have also been mentioned. Numerous intercontinental legislative jurisdictions, complexities enlarged due to incompatible norms and authoritarian insinuations have also been mentioned.

**Research Gap:** Author able to identify legal complexities and challenges of privacy in cloud computing but not able to provide legal solutions relate to privacy and jurisdiction conflicting issues. However, the solutions suggested by author were hypothetically possible but not in real life.

**“Privacy, Security & Trust in Cloud Computing”** (Yee, G., Pearson, S, 2013)

Various major problems linked to security and confidentiality in the field of “cloud computing” has been addressed in the chapter of “Privacy, Security & Trust in Cloud Computing”. Also, the base for some approaches which inscribe the situation have been considered. Also, the cloud service models which are related to Big Data dispensation and comprehensive data mining which is based on enlarged value of individual data has also been considered. It has also considered the challenge related to discretion of data under cloud services as the data is present in the unencrypted form on a appliance owned and A challenge faced by cloud services inherently related to data confidentiality because of data being present in unencrypted form on a machine owned, handled and managed by an organization different from the data possessor. The stress has been laid on the security and privacy of the private data for the betterment of companies and individuals.

**Research Gap:** The author fails to provide legal solutions to control or overcome the privacy and security issues. Fails to address security compliance to be followed by service providers; Indian or International regulations/ policy/ laws are missing. Latest International standards like ISO, CSA to be followed by providers or organizations are also missing.

**“Eucalypts Cloud to Remotely Provision e-Governance Applications”** (PRABHU, C, 2013)

“National e-Governance Plan (NeGP)” for the implementation of “e-governance projects” for the country in cooperation with state and central level has been discussed in this chapter. It has been explained how Network Informatics Centre works and helps in establishing a network spine and hold up to “Central Government, State Government, UT Administration, District & other Government bodies”. It also includes the discussion related to the accomplishment of structural design for distinctive “e-governance service”. It also discussed how Application Framework Layer, Content Management Layer, Channel Layer, Service Mediation Layer etc. helps to provide services over cloud to government and can be a part of e-governance policy. It also explains how summarization can be done for authorizing the technologies and how the “e-governance applications” can be implemented as web based services to endow with integration, standardization etc.

**Research Gap:** The author only able to discuss technical aspect of cloud services, its layers, but fails to mention challenges/ issues involved in cloud and by service provider. And also fails to mention other legislations laid down Government of India related to cloud.

**“Competing Jurisdictions: Data Privacy across the Borders”** (Edoardo Celeste and Federico Fabbrini, 2019)

The abrasion amid the EU data fortification advancement and information seclusion model of US in the department of cloud computing has been discussed by the author in this chapter. It has discussed the emergence of EU data fortification law and US model concurrently in 1970’s. It has also discussed that EU served the cherishing of personal rights for the respect of confidential and family life, by the European principle on Human

Right enshrined the personal right of respect for confidential and family, communication and home. US, on the other hand, give the centralized law which helps to identify the significance of confidentiality and draft Bill of Rights. Also, development which has been made in regulating borderless cloud computing has been discussed; EU & US laws have also been discussed to save from harm by such issues, for example enactment of Cloud Act.

**Research Gap:** Authors fails to identify present issue or loopholes in laws or acts of US or EU related to cloud computing and jurisdictional issues faced by government of different agencies.

#### PROBLEM STATEMENT

However there have been several researches under the field of ERP security but these researches have done limited work. There is a need to propose a mechanism which would be faster, flexible and customizable than traditional approaches. There is a need to integrate the functional and technical features of the enterprise resource planning solutions to implement security. This concept could provide better approach to achieve this objective.

It is observed that the existing techniques or modules are not efficient. These are non-extensible and not up to the mark. In today's instant era of modernization, ERP is the upcoming most widely used technology, making ERP highly susceptible as it is attractive target for anyone looking for stealing private information. Therefore, an extensible framework can be provided for defining access to the system and data by using security. ERP security is the need of the hour for all organizations because leakage of the company's sensitive information can lead to various dangerous repercussions.

#### CONCLUSION

In this era of technology and internet, cloud computing is a fastest growing technology in each and every field. However, the more advancement in cloud means more threat to its data. Cloud based - Enterprise Resource Planning is a concept which is gaining importance and popularity day by day. ERP is considered as the backbone for any organization. Along with this, the security related issues have also posed dangerous repercussions in this field. The users' access needs to be controlled to the system and proper authentication should be required. Users should be able to access the data relevant and appropriate to them. Therefore, there is an urgent need to propose a security mechanism which is faster, flexible and customizable than traditional approaches.

This can be achieved by integrating the functional and technical features of the enterprise resource planning solutions to implement security. Proposed mechanism is found capable to ensure the security in ERP with respect to the access control of the system as well as data appropriately. This research has considered the limitation of traditional research works. This proposed framework is also capable to group the users with same job role and use a single customized source code for security implementation. The integration of functional and technical customizations using X++ code enabled the security implementation in ERP system. Role and duties need to be managed by the system administrator in the functional workspace whereas privileges and permissions need to be established by the developer in the developer workspace.

With the help of the proposed implementation, the users can be assigned limited access from the business perspective. The access control can be customized as per the requirements stated by the system administrator. The access control can also be maintained with respect to the data as well with the help of the security policies and sql based customized query. The malicious users will not be able to access the system. The confidential data will also be secure as the users will not be able to access the private data belonging to other users. Therefore, this extensible and customizable security framework would pose to be highly fruitful and beneficial for all the organizations.

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## **Strategies for the Improvement of Metal Complexes as Drugs and Therapeutic Agents**

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### **ABSTRACT**

With the growing number of safe multi-drug microbial organisms and compelling emerging diseases, treatment of overwhelming contaminants remains a benchmark. However, an immense number of serum toxins and chemotherapeutic agents are open to a curative explanation. Improved microbial deterrence has discovered a great clinical need for new antimicrobial agents. There is a new need to reveal new compounds that promote antimicrobial activity. The objective of the proposed work is to mix the structures of the metals of progress with drugs and their representation. There is a good chance that another complex can organize itself into a bioinorganic substance approach to solve the problem. Each of Progress Metal and Meds' established structures is represented by: real tests, molar conductivity, normal evaluation, electron and IR spectroscopic examination, X-bar diffraction, hot evaluation, and antimicrobial development.

**Keywords:** Therapeutic Agents, Complexes, Metals

### **INTRODUCTION**

There is no doubt that the strategy of action of these new compounds does not correspond exactly to that of the dominant classes of antimicrobial agents, since the organisms in question are now impervious to them. This is another test for researchers to promote new antibacterial agents. There is an unexpected scene of overwhelming suffering plagued by various tiny pathogenic creatures and advances in antimicrobial resistance. Therefore, experts are looking for new antibacterial agents and a combination of nano technological materials to treat safe bacterial diseases.

Any compound substance that causes a change in the normal function of a living natural element is called a drug. A drug is a synthetic substance used to treat, diagnose, and prevent infections. The drugs can be called comprehensively antibacterial, antifungal, energizing, synthetic, etc. compounds. Vaccines, which include injections of lost or incapacitated or escaped tiny living things, are used to increase safety from the resulting diseases, sometimes called medications.

Therapeutic science has been associated with normal connections and common things for the past thirty years. New research has given metal buildings due importance as illuminating agents or as chemotherapeutic agents.

### **Meaning of the complexes of metallic active principles:**

Metal can draw legends in a special three-dimensional arrangement that works with the molecule to see and support a different nuclear target. Metal buildings participate in the normal science of redox and are also

associated with natural particles derived from their properties of undergoing redox reactions and ligand substitution.

Fortschrittsbauten physical metal has as bioinorganic to the inorganic, metal normal approach because in many areas of science of materials the applied sciences.

The possibility of belonging to the care group has led to asserting the normal objections to the goal, since DNA, synthetic substances and protein receptors also depend on the principles imagined by the ligands.

### **Drug effects (general)**

Pharmacologists have discovered that there is a link between the developments. To enhance the sufficiency of a drug, nuclear relationship between the target portion of the cell and the drug. In general, membership involves the free and reversible inclusion of the drug molecule. It can be observed three types of target particles: 1) receptor 2) macromolecules expressing cell edges, similar to proteins, carry iota and nucleic acids 3) lipid layer

### **Meaning of metallic complexes as mri agents**

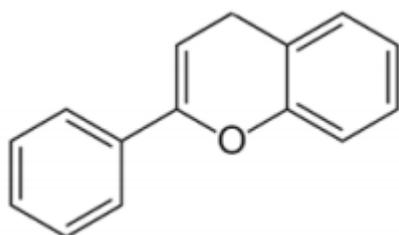
Metal buildings are of considerable importance as an X-ray medium when used as picture frames. They are also used in various diseases such as brain problems and coronary diseases, etc. It is not only the different types of disease can, such as hypoxic tissue select, but they also perceive nuclear wonder as a multi-drug block. Since the metal centers are clearly charged, they are associated with negative foci of biomolecules (proteins and nucleic acids) and thus explicit normal cycles are possible, including thrombus initiation and spot imaging. With structural filtering systems, i.e. gamma-PET and X-rays, tissues and organs with radioactive compounds can be considered and this representation ensures the recognizable detection of irregularities. Radionuclide buildings are used for purposes, as a connecting vector and as therapy.

### **Metallic complexes as antimicrobial agents**

Numerous reports have shown that levels of microorganisms that act against multiple drugs are constantly spreading and becoming mandatory for disease from one side of the planet to the other, such as methicillin-free *Staphylococcus aureus*, vancomycin-free enterococci, and other drugs that are safe for disease. men organisms in Europe and the Common States.<sup>46</sup> These tiny creatures continue to influence humanity and therefore persuasive treatment is applied to adapt to them, eventually leading to the discovery of new antimicrobial agents. Metal-based drugs can replace several other common drugs that have generally been used for treatment due to the way the synergistic effect is imparted between the ligand and the metal particles during complexation. Various metal buildings in the microbial enemy have been shown to contain a quinoline packet, for example, ciprofloxacin, prescription anti-infectives, and norfloxacin are more effective than contamination alone, for example, the antimicrobial effects of norfloxacin alone have been found they do not improve at this time. Complex stage with (bismuth-norfloxacin complex) improved antimicrobial development.

### **Latest development of metallic complexes as therapeutic active ingredients**

S. Several et al. explained the progress of the complication of drugs based on “falconoid metal particles. They articulated flavones stronger than flavones and flavanones. Flavanols are stably combined with metallic particles and form antagonistic structures against microbial active principles, against danger, against tumors, sedatives, against diabetics and threatening against oxidizing agents. Flavonoids can be cheated with metal particles and these complexes can reasonably be discussed with DNA. Due to their amphipathic nature, they can associate with the DNA and are more sensitive to the body that the agents therapeutic. The falconoid pattern is shown in the picture.”



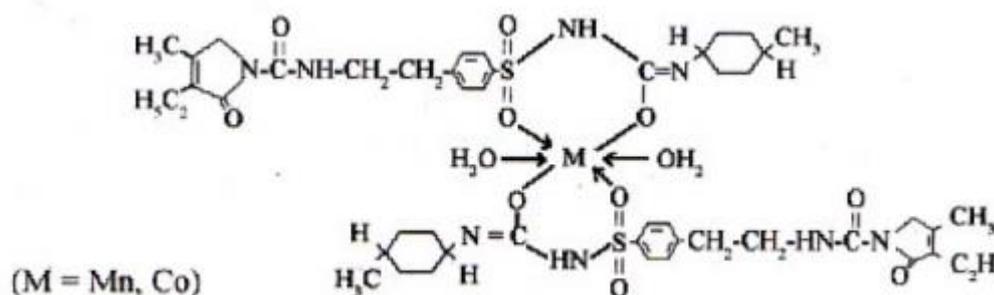
**Fig 1.1: Structure of the falconoid.**

As can be seen in the figure, flavonoids contain almost 3 benzene rings<sup>55</sup> and polyphenol packing is a central functional social event that acts in this development, in which, contrary to the oxygen circumstance, there are opportunities for another encounter (or other oxygen). or benzene ring) to attach it to this ring. The Flavan lattice has a hydrophobic individual while the hydroxyl social event of the phenolic region has hydrophilic lead. Due to this amphiphilic character, flavonoids can occupy a fundamental place in the body.

## REVIEW OF LITERATURE

The metallic structures of sulfadoxine were further evaluated and the suborders “Fe (II), Fe (III) and Cr (III) were fused. Ogunniran and. Al. Construction of Cu and Fe Consolidated with Sulfadoxine and PyrimethamineChlorpropamide is a drug used to reduce glucose and its extraordinarily complex nature has not been demonstrated in the literature. Zhu Yiqing, Wu Jigui, and Deng Ruwen discovered fifteen notable terrestrial structures with chlorpropamide”

Manganese (II) and Co (II) metal structures have been linked to an expert in dynamic hypoglycemia (glimepiride), an oral antidiabetic drug. Fundamental research on metallic structures and binders shows that buildings have a 2:1 stoichiometry of the type  $(C_{24}H_{34}N_4O_5S)_2M \cdot H_2O$ . The disgusting infrared evaluations confirm the mutual arrangement of the sulfonyl oxygen on the one hand and the enol oxygen associated with the metal molecule on the other. Given the terrifying electronic properties, it is suggested that the buildings have octahedral mathematics. Molar conductivity also shows that buildings are non-ionic in nature.



**Fig. 1.2: Structure of glimepiride metal complex**

The course of action of the “structures can extend the bioavailability of the metal molecule or the binding agent or both. To study the effect of metal particles on the antibacterial activity of norfloxacin with Co + 2, Fe 3+ and Zn 2+ metal particles from A. Kumar and P. Pandey were mixed.”

Zheng SL, Tong ML discovered sulfadiazine structures. “The structures Fe (III), Ru (III), Rh (III) and Cr (III) of sulfadiazine have been consolidated and represented by normal evaluations, and by their electron and IR spectra they have an octahedral coordination in which the particles Metals coordinate with sulfadiaziniote”. Which are probably in the form of bidentate ligands and some water particles or chloride molecules?

*Shingala-Ketan, Dr. Chetan Singh Chauhan (2016)*, ruthenium is among the last in abstract, as evidenced by its abundance, but by its deterrent effect on decomposition, its disposition in oxidation states, its antimetastatic property and his impressive determination. ; ensures a large number of thoughts throughout the planet. It is also used as a specialist in cancer therapy.

*DC Hooper, E. Rubinstein, Inorg. Chem (2011)*, flavonoids contain a total of three benzene rings and the polyphenol bundle is the key to a valuable reunion in this inclusion where, after the circumstances of the return of oxygen, there are opportunities for another social problem (or another oxygen or benzene ring) to connect to this ring. The Flavan lattice has a hydrophobic individual, while the occasionally hydroxylated phenolic region has direct hydrophilicity. Due to this amphiphilic character, it can be assumed that flavonoids are an essential part of the body. The metal particles combine with the flavonoids when they immerse the hydrogen in the hydroxyl package. So far it has been shown that genistein and quercetin are classified as deprotonan and with metallic particles. As the metallic particles progress along with the flavonoids, their properties change, but eventually stable structures are formed. Metal structures formed by 1: 1 and 1: 2 development processes, such as M : L.56 reflux , are used for the production of entangled metal particles.

*Asif Husain, Md. SabirAzim, MologyMitra, (2018)* similarly, however, a moderate antimicrobial activity of bismuth compounds is known. Another disadvantage of bismuth is the limiting component due to its susceptibility to solubility in water. Bismuth buildings have been shown to exhibit antimicrobial growth towards gram-negative organisms and are dependent on iron absorption. However, iron is crucial for the later

development of *H. pylori*. In the treatment of tumors, syphilis, reduction of the renal toxicity of cisplatin, radioisotopic drugs, etc. The bismuth compounds are often used as drugs.

**MG Kanatzidis, NC Baenziger (2016)** It is true that exceptional richness is directly related to the presence of certain metal particles in the body, but, on the other hand, compounds containing only metals are also shown to be normal. and pathogens in the workplace. Many different metal chelates are used as therapeutic agents such as Fe, 23 Ir, Rh 24, 25 and Co26, etc. In this sense, CH. Leung et al. the activity of the iridium and rhodium complexes.<sup>27</sup> They have demonstrated their ability to be potentially therapeutic agents, protein inhibitors<sup>28</sup>, in particular kinase inhibitors of compounds such as sys Ubiquitin potrase (UPS) and synthetic NEDD8-Activ (NAE) and protein- protein - game inhibitors. MC Heffern et al. He highlighted the work of cobalt as an expert in therapies and found that cobalt structures are based on the exchange of ligands, which is why bioactive binders are extremely sensitive. The structures of cobalt have accepted a piece of bio-reducing agent. In which they stated that Cobalt (III) structures are lethargic and that they sink into Co (II), which has the ability to rapidly replace its ligands. RC Hider et al. have continually detailed the work of iron chelates as therapeutic agents in his review. They described the chelating advantages and disadvantages of iron. Thirty years earlier, it was believed that iron chelates were orally active; at least their productive disposition was made more effective orally, while their harmfulness was reduced to practically zero levels. Dr. Richardson noted the use of iron chelators as therapeutic agents in his review.<sup>40</sup> He further transformed the treatment of damaging cells with the use of chelated iron.

**Vijaykumar Nekkanti1, (2004)** metals such as silver is used for a long time against microbial pathogens. Silver has low toxicity when distinguished from other alternative metals. At this stage, babies are given silver nitrate to prevent the progression of neonatal ophthalmia. The spectroscopic evaluation confirmed an octahedral calculation for these buildings. Various manganese structures were tested against various pathogenic parasites and minute life forms to assess their torsion and potential.

## OBJECTIVE OF THE STUDY

1. To mix the structures of the metals of progress with drugs and their representation.
2. The determination of the constant potential gains of piroxicam chelates with particles of Fe (II), Fe (III), Co (II), Ni (II), Cu (II) and Zn (II).

## RESEARCH METHODOLOGY

### Material and method

#### Chemicals:

All artificial substances used in the scouting work were of AR quality. The safety of the substances produced has been confirmed by routine tests such as softening point, bubble formation, thin layer chromatography, etc.

#### Solvent:

The solvents used in the work were AR grade. The ethyl liquor was obtained in its pure state by refining on calcium oxide. All the remaining solvents used during the exploration were AR grade.

#### **Devices:**

The test work was carried out with a borosilicate glass mechanical structure. They were aligned using standard logic 1-2 methods prior to use. The plastics used were loaded with a logical oven displacement with an influence of 0.01 mg.

#### **Synthesis of transition metal active substance complexes**

##### *a) Synthesis of the Ag (I) -Candesartan complex:*

“The complex was completed by dissolving neat candesartan (10 mM, 4.4 g) in ethanol and adding a silver nitrate ethanol assembly solution (10 mM, 1.69 g). The pH was changed from 6 to 7 by adding NaOH to the water. The reaction combination was refluxed for 4 hours. The combination of responses was initially stored at room temperature. A fine powder item was purchased. The arrangement was put to the test. The whole was dried on the grill.”

##### *b) Synthesis of the ciprofloxacin Ag (I) complex:*

“The complex was prepared by dissolving (10 mmol, 3.3 g) ciprofloxacin in ethanol and adding this reaction to the silver nitrate ethanolic program (10 mmol, 1.69 g). The pH was changed from 6 to 7 by adding NaOH to the water. The reaction mixture was refluxed for 4 hours. The reaction mixture was initially stored at room temperature. A finely powdered thing was obtained. The action plan was isolated. The complex was oven dried.”

##### *c) Synthesis of chlorpropamide complexes:*

The compounds used in this mixture were all Rapid (RA) and, most importantly, Temperance grade, opened and used without further purification. A controlled amount of chlorpropamide (2 mM, 1.38 g) was separated in refined ethanol. Chlorides of Mn (II)(0.72 g, 2 mM), Ni (II) (0.49 g, 2 mM) and Cu (II) (0.34 g, 2 mM) were prepared in 50 ml of ethanol. The game plane of the ligand was added gradually with constant mixing during exposure to the metal salt at room temperature, maintaining the pH between 7 and 8 with the addition of a weakened KOH layer. After 6 hours at reflux, the structures were detached, isolated, washed well with ethanol, and finally dried under vacuum and weighed.

#### **X-ray diffraction scanning and indexing of powder data**

The powder diffractogram of the X-pillar of the metallic structures of the active ingredient was projected on the Philips PW-3710 diffractometer, connected to a modernized PC, in the vicinity of a graphic social matter, in which the Cu-K $\alpha$  radiation source with the Cu - Ni 40Kv / 40 mom. The connected camera was recurrent 1,543 Ao radiation was used in view of the speed of 20 min-1. Inthe Department of Physical Sciences at the College of

Pune. Each test of a cross-sectional size of 200-300 with a total of at least 10 mg was spread as a film and the spectra were separated in the range of  $2\theta = 20$  to  $80^\circ$ . Each reflection position and reflection height was recorded similarly to relative performance. The position below the zenith is compared to the strength of the reflex.

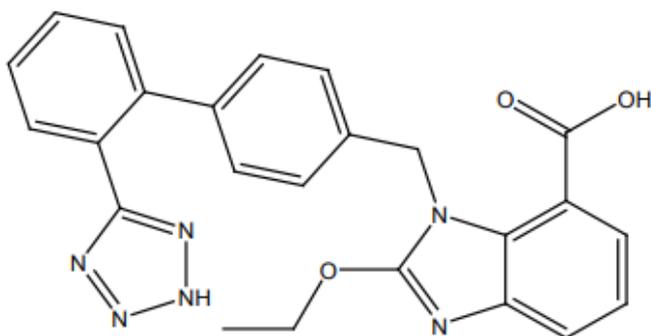
The data obtained were determined with a PC program (PDP-Consume). Preliminary data as  $2\theta$  and the magnitude of force were processed in the PC and were given the contrast properties h, k, l in each vertex. The program learns the limits of the network a, b, c (A0) and, (degrees) each close to the standard deviation. The volume of the yolk is also determined by the cell data.

## DATA ANALYSIS

### Characterization of the ag

- **complex with the candesartan drug**

Candesartan cilexetil (candesartan) is a medicine used to treat high blood pressure. It belongs to a class of prescriptions called angiotensin receptor blockers (ARBs). Angiotensin, which is produced in the blood by the action of the variation of angiotensin in the protein (Expert), is an extraordinary product that interacts with angiotensin receptors in many tissues, but mainly in smooth muscle cells, including the veins. The association of angiotensin with the receptors causes the contraction of the muscle cells and the narrowing of the veins (vasoconstriction), increasing their speed. Candesartan cilexetil blocks the angiotensin receptor and also stops angiotensin from moving. This causes the veins to grow and the heartbeat to slow.



**Fig. 1.3: Structure of candesartan**

“2-ethoxy-1- ({4- [2- (2- (2H- 1, 2, 3, 4-tetrazol -5-yl) phenyl] phenyl} methyl) -1H-1, 3-benzodiazole -7 - Carboxylic acids.”

**Table 1.1: Analytical data of the ligand / complex:**

Sr.no.	Composition of complex	colour	Yield %	M.P( <sup>o</sup> C)	Magnetic moment (B.M)	Molar conductance $\Omega^{-1}\text{cm}^2\text{mol}^{-1}$
1	$\text{C}_{24}\text{H}_{20}\text{N}_6\text{O}_3(\text{CAN})$	Off white	-	183	-	-
2	$\text{Ag}[(\text{C}_{24}\text{H}_{20}\text{N}_6\text{O}_3)\text{H}_2\text{O}]\text{NO}_3$	white	65	195	diamagnetic	8.64

Table 1.2: Elemental analysis of the complexes

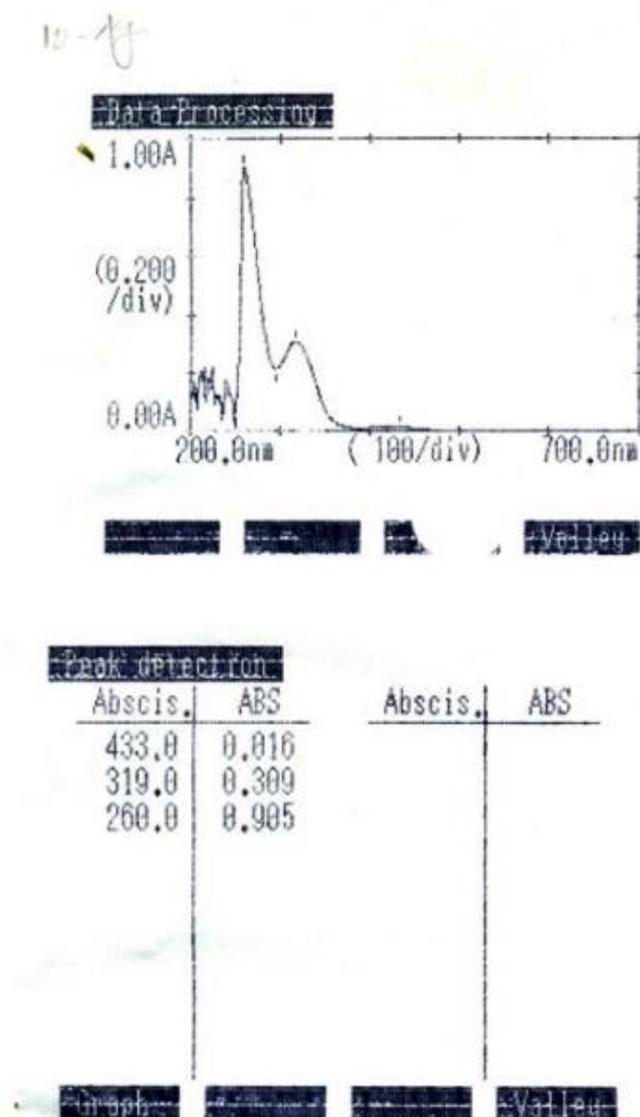
Complex	%C found(cal)	%H found(cal)	N% found(cal)
<i>CAN</i>	46.80(46.90)	2.85(2.93)	13.56(13.68)
<i>Ag [(CAN) H<sub>2</sub>O] NO<sub>3</sub></i>	42.99(43.05)	2.55(2.69)	12.45(12.55)

## UV spectra analysis:

“The electron spectra of candesartan show absorption bands at 254 nm and 271 nm, which are assigned to the  $n \rightarrow \pi^*$  and  $\pi \rightarrow \pi^*$  transition. The electron spectra of the complex show a change in frequency at 433, 319 and 260 nm, which has been attributed to the effects of the crystalline field on the interelectron repulsion between the 4d electrons of Ag (I)”.

Table: 1.3. UV spectra assignments:

Sr.No.	Compound	Wavelength in nm	Wavelength in $\text{cm}^{-1}$
1.	candesartan	254 271	39370 36900
2.	<i>Ag [(CAN) H<sub>2</sub>O] NO<sub>3</sub></i>	433 319 260	23094 31347 38461



**Fig. 1.4:** UV-Vis spectra of Ag [(CAN) H<sub>2</sub>O] NO<sub>3</sub>

## CONCLUSION

A metal-based drug structure was shown, which showed promising results or was used as part of the treatment of various diseases, etc. There are obviously open doors for metal-based drug testing in the discovery and commercialization of new chemotherapy drugs. The late results of preclinical and clinical studies with metallic compounds provide the basis for further evaluation to improve metallic drugs for better therapeutic organizations. In addition, pressure is part of the activity that the target cell and the metallic structures around it have formed, which develop the selectivity and identity of new metallic structures. Basically, metal structures offer new properties that ordinary specialists cannot find. Mandatory use of therapeutic substances for metal buildings is a neglected area of evaluation at this stage and more work is being done here. Due to a wide mixture of coordination circles, oxidation states, redox potential, and ligand level, organ metallic and coordination compounds can alter the thermodynamic and motor properties of metal-pharmaceutical structures versus

receptors. Regular In general, they offer the opportunity to develop new active ingredients for the treatment of a large number of different diseases. These are used to study a group of diseases and conditions related to cures that impair development, soil control, diabetes control, neurological, cardiovascular diseases, relief, and ulcer control and have promising therapeutic properties. Lithium carbonate is used to treat overpressure problems and germanium structures are likely to be antagonists of tumor agents.

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## **Estimation of Motorcycle Equivalent Unit Using Multiple Linear Regression and Impact of Motorcycle on Saturation Flow Rates**

**(A case study of intersections of Kathmandu valley)**

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Om Sterling Global University, Hisar-Haryana

### **ABSTRACT**

Kathmandu valley's traffic is dominated by two-wheeler. The equivalence unit as suggested by Nepal Road Standards, 2070 is same for urban as well as rural roads. Unstable queue formation during peak hours is a common phenomenon of intersections in the valley. Since, Passenger Car Equivalence has been in used in countries where traffic is dominated by cars, the need for Motorcycle Equivalence Unit is obvious for the traffic stream hugely populated with motorized two- wheelers. Relevant information regarding headway and saturation flow can only be obtained from using dominating mode of transportation as a standard vehicle.

The study of eight different intersections of Kathmandu valley was conducted with the help of recorded videos of vehicular movement in through and right turning direction. Multiple linear regression technique was used to calibrate motorcycle equivalent units using "R" database software. This study deduces that Nepal Road Standards, 2070's Passenger Car Unit values of various groups of vehicles is not applicable for urban intersections of Kathmandu valley. The average headway for through traffic is 0.47 second and for right turning traffic is 0.56 second. The saturation flow rate for through vehicles is 7,625 motorcycles per hour per lane and right turning vehicles is 6,492 motorcycles per hour per lane. This study also shows that the increase in proportion of two-wheelers in traffic stream decreases headway where by increasing saturation flow rate.

### **INTRODUCTION**

Passenger Car Equivalent (PCE) was first introduced by Highway Capacity Manual in 1965 A.D. to account for the impact of heavy vehicles in traffic stream of America. However, dominance of two-wheeler in the traffic stream is major characteristics of urban centers of under developed countries. The major challenges of traffic in some Asian countries is significantly higher proportion of two-wheeler traffic (Le & Nurhidayati, 2016). According to vehicle registration data published by Department of Transport Management (DoTM), Nepal, 78.5 % of total vehicle (32,21,042) registered in Nepal till end of fiscal year 2074/2075 B.S. is two-wheeler. In Kathmandu like city, Bangalore demonstrated 70% of transportation modes dominated by two wheelers (Anusha, Verma, & Kautha, 2012). The travel mode share study, (MoPIT;JICA, 2012) showed increase of motorcycle as a mode of transportation from 9.3% in 1991 A.D. to 26% in 2011 A.D. Leaving walking as a mode of transportation, two wheelers share nearly 44% of travel modes. The trend is increasing as the registered motorcycle is increasing in Kathmandu valley. Being auto oriented country, car equivalence might have been the standard of choice for America, whereas for the traffic composition dominated by two-wheelers of Kathmandu valley, Motorcycle Equivalent Unit is the obvious standard of choice.

Development of unstable queue of vehicles in major intersections during peak hour is a day to day phenomenon of traffic in Kathmandu valley. Affordability, mobility and accessibility are the major three criteria for dominance of motorcycle in the street. Motorcycle traffic significantly alters operational characteristics of other

modes forcing to reduce speed and alter congestion. Both side overtaking maneuver is a common attribute of motorcycle in Kathmandu valley because of which motorcycle may use every space of roadway. The study of effect of proportion of two-wheelers in saturation flow is essential.

## METHODOLOGY

### Research Process

This research study aims to find out motorcycle equivalent unit of classified group of vehicles and hence headway and saturation flow. The following flow chart is shown to depict process followed to achieve objective of this study.

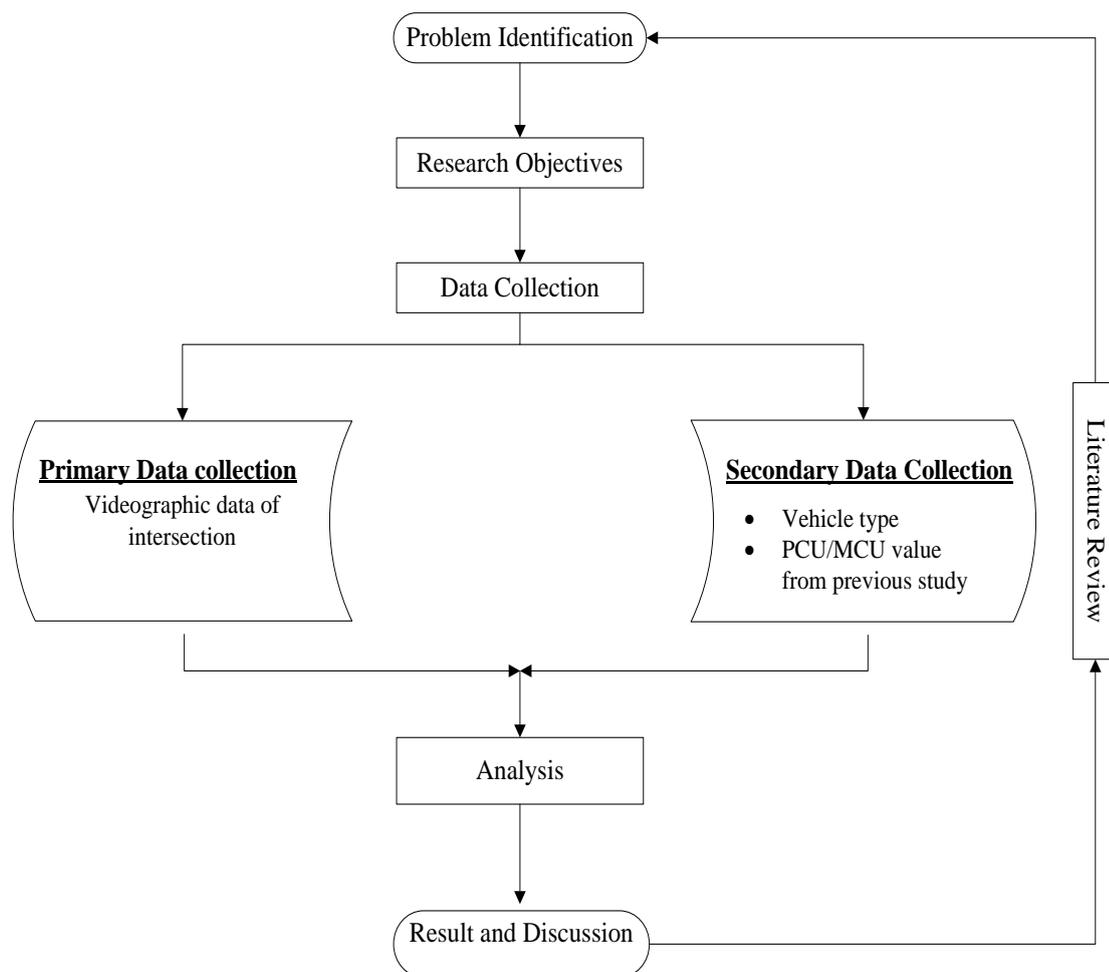


Figure 0-1: Flowchart of study methodology

Primarily, the problem is identified as the study of impact in saturation flow at an intersection. To calibrate the model for regression equation for determination of motorcycle equivalence unit video-graphic data was collected. Classified vehicle count of different intersections were performed. Similar study done beforehand in Nepal as well as elsewhere on the world were collected and compared. The flow chart of study methodology is as shown in Figure 0-1: Flowchart of study methodology.

## Site Selection

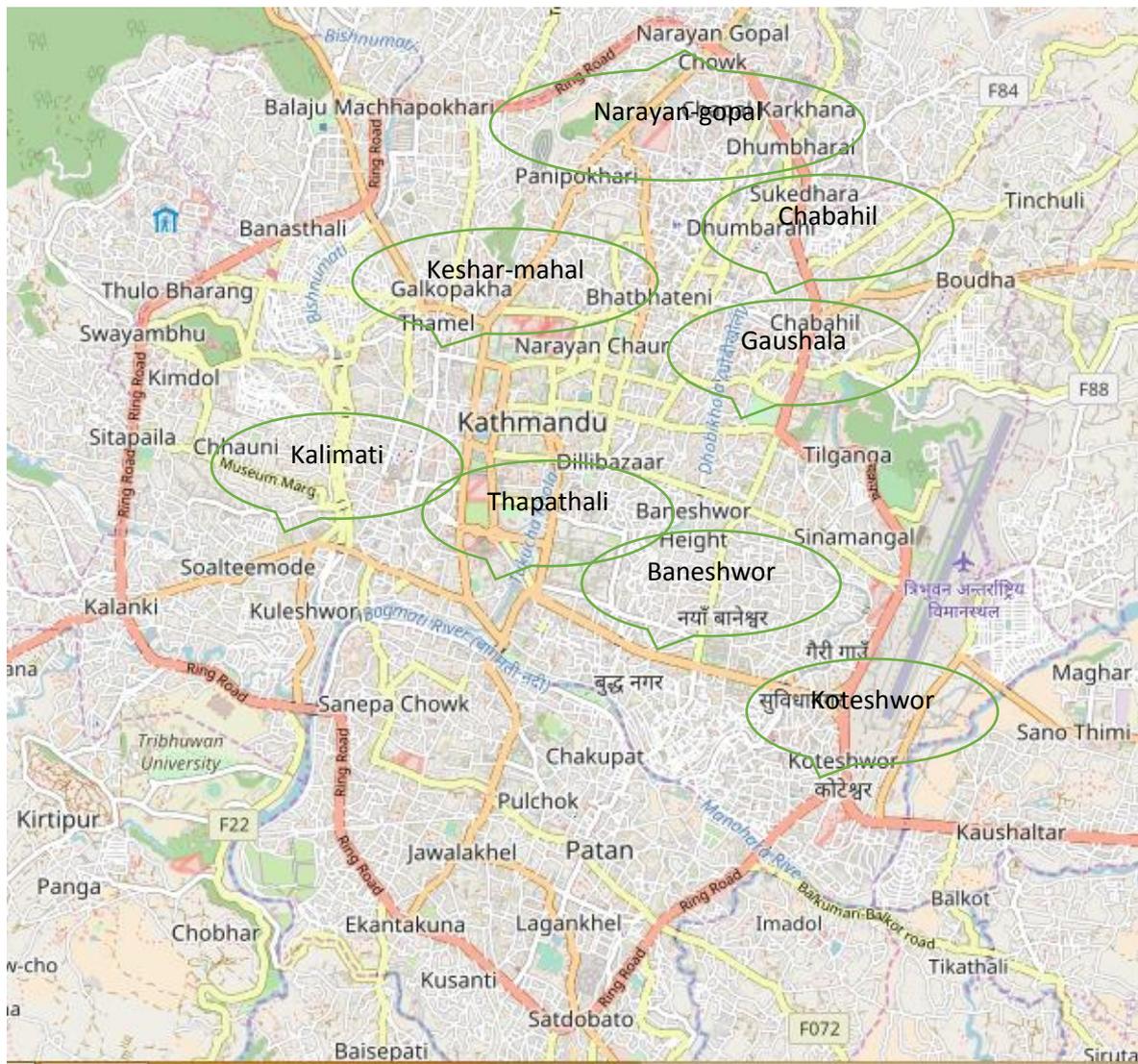


Figure 0-2: Overview of Kathmandu valley with study intersection

The objective of this study requires for the study of saturation flow and capacity of urban roads and intersections and hence some of the busiest intersection of Kathmandu valley (as evident from unstable queue formed during peak hours) was taken for the study purposes. After careful observations of queue formations and significant flow of vehicles, above 8 intersection as shown in Figure 0-2: Overview of Kathmandu valley with study intersection were selected which are listed as:

- Thapathali intersection:** Thapathali intersection is one of the busiest intersections in Kathmandu valley. Geometrically this intersection is 4-legged intersection but functionally it is similar to 3-legged intersection with *Norvic* approach having the least of traffic flow. Traffic from *Kupondole* approach is considered for through traffic whereas traffic from *Tripureshwor* and *Maitighar* approach is considered for right turning traffic.

- **Baneshwor intersection:** This is a 4-legged intersection with major volumes from *Tinkune* and *Maitighar* approach. All four right turning movement has been considered for calibration of equivalent unit.
- **Kesharmahal intersection:** Kesharmahal intersection is also a busy intersection with unstable queue formation during peak hours of morning and evening. The queue has been notably observed in through movement of vehicles from *Lainchour* and *Jamal* approach. Right turning maneuver has been however considered for all four approaches.
- **Kalimati intersection:** Kalimati intersection is basically a 3-legged intersection. The through movement of this approach has been considered for traffic movements from *Kalanki* approach and right turning volume of traffic from *Balkhu* Approach.
- **Narayan Gopal intersection:** This is a 4-legged intersection situated at ring road of Kathmandu valley. Each approach has been considered for through as well as right turning traffic.
- **Koteshwor intersection:** This intersection is located at eastern part of Kathmandu ring road. The traffic from and to Bhaktapur as well as ring road is significant yielding in unstable queue formation at this location. The through movement of vehicles from *Jadibuti* has been considered for the calibration whereas both the movement from *Tinkune* and *Balkumari* approach has been considered for turning movement.
- **Chabahil intersection:** Chabahil intersection functions as a 3-legged intersection at the ring road of Kathmandu valley. The vehicular movement from *Narayan Gopal* approach has been considered for through movement whereas turning movements from *Jorpati* and *Gaushala* approach has been utilized for calibration procedure.
- **Gaushala intersection:** Gaushala is a 4-legged intersection in Kathmandu valley ring road. The traffic movement from each leg has been considered for through as well as right turning movement.

### Data Collection Methodology

The major data collected for this study purpose was through video-graphic films. The geometric features of intersection were observed through direct site measurements and google maps. Various numbers of lanes was found in various direction of traffic flow. Majority of video-graphic films were obtained through surveillance camera of Nepal Police Division, Rani Pokhari. The cameras are rotatable and situated at enough height to monitor traffic in above mentioned intersection areas. The video-graphic films consisted of seven days peak hour traffic flow during morning and evening.

### Data Extraction Methodology

The data obtained was simultaneously input on spreadsheet for further processing. Time of the commencement of traffic counting and ending was both included in spreadsheet. The different category of vehicles that would enter in the intersection was cut-off through an imaginary line on video-graphic film perpendicular to the direction of flow.

Since, the volume of bicycles was significantly low and they tended to intercept at the front of traffic, bicycle was categorized under two-wheeler. Non-motorized transportation was observed less frequent inside ring road of Kathmandu valley and hence was included in motorcycle.

### Sampling size

The rule of thumb has been to use 10 to 20 cases for each independent variable. (Green, 1991) proposed two variation for consideration of dependent variable in multiple linear regression. He proposed minimum sample size to be greater or equal to 50+8 times number of independent variables. The sampling has been done based upon these two criteria i.e. more than 20 times number of independent variables. Since, 4 different independent variables were taken, sampling size for each intersection is taken above 80 samples.

### Analysis Procedure

The classified volume data of different category of vehicles obtained through video-graphic film processing was used for analysis. 'R' is an open source programming language and software environment for statistical computing and graphics that is supported by R foundation for Statistical Computing (Wikipedia, 2017). This software R was used for analysis of data through multiple linear regression technique using a very small in-build function for calculation of coefficients of linear regression. The classified volume data was fed to R and the resulting coefficients were obtained.

The total saturated green time is regressed with number of different types of vehicles. Following equation shall be utilized to calculate coefficients of various classes of vehicles.

$$T = C + \sum A_i * N_i \dots \dots \dots \text{Eq. 1}$$

Where,

$T$  = length of time when flow is saturated

$C$  = Constant

$A_i$  = Coefficient of  $i^{\text{th}}$  vehicle group

$N_i$  = Number of vehicles passing of  $i^{\text{th}}$  vehicle group

Motorcycle equivalent unit of each vehicle group then shall be,

$$MCU_i = \frac{A_i}{A_m} \dots \dots \dots \text{Eq. 2}$$

Where,

$MCU_i$  = Motorcycle equivalent unit of  $i^{\text{th}}$  vehicle group

$A_m$  = Regression coefficient of motorcycle

The saturation flow shall be calculated as reciprocal of time headway,

$$S = \frac{3600}{H} \text{pcu/hr}$$

Where,

$S$  = Saturation flow rate of vehicles.

$H$  = Time headway of traffic stream and is given by,

$$H = \frac{T}{\sum MCU_i * N_i}$$

Where,

$T$  = total saturation time of flow of traffic

## DATA ANALYSIS AND RESULTS

### **Vehicle Composition**

Classified vehicle data on the basis of flow during saturation period is primary data of this research study. The time for this survey was taken to be morning (9:30 a.m.-11:00 a.m.) and evening (4:30 p.m.-6:30 p.m.) peak hours. The composition of vehicles is calculated on the basis of longer length of queue formation. The total volume of traffic for the total observed time for various legs are as shown on Table 0-1.

*Table 0-1: Aggregated through vehicle composition*

Intersections	Total Observed Time(sec)	Total Count of Vehicles							
		bike	taxi	car	Jeep	Micro	bus	truck	tempo
<b>Baneshwor</b>	2,589	2,860	139	414	130	33	18	13	11
<b>Thapathali</b>	2,357	2,355	130	368	78	86	73	12	39
<b>Narayangopal</b>	3,349	2,494	141	156	96	92	103	121	61
<b>Kesharmahal</b>	2,698	2,596	168	264	122	177	116	24	34
<b>Koteshwor</b>	2,573	1,845	90	162	72	70	96	75	45
<b>Kalimati</b>	3,046	3,240	149	192	115	152	90	68	18
<b>Chabahil</b>	2,229	1,848	75	150	60	77	75	39	39
<b>Gaushala</b>	1,993	1,656	85	134	50	69	61	39	28
<b>Percentage Composition</b>		<b>77.2 %</b>	<b>4%</b>	<b>7.5%</b>	<b>3%</b>	<b>3.09%</b>	<b>2.6%</b>	<b>1.6%</b>	<b>1.12%</b>

This aggregated volume of various class of vehicles shows clearly the dominance of two wheelers in traffic stream. The volume of taxi, car, jeep, micro and tempo is each individually less than 10% and since these have

nearly similar characteristics like space and speed, were grouped into single category for the ease in calculations.

Right turning traffic volume is also integral part of this study. The total number of various group of vehicles for respective saturation flow period has been aggregated and presented in Table 0-2. To simplify the calculation of regression coefficient, the volume of car, jeep, taxi, micro and tempo are again compiled as car following similar size and speed. The volume of motorized two-wheelers placed in the group “bike” is again very high (79%) as compared to other vehicle groups.

Table 0-2: Aggregated right turning vehicle composition

Intersections	Total Observed Time (s)	Total Count of Vehicles							
		bike	Taxi	car	jeep	micro	bus	Truck	Tempo
Baneshwor	1,453	1,355	107	144	26	2	26	4	25
Thapathali	2,462	2,149	150	238	32	28	63	10	19
Narayangopal	2,461	1,634	87	99	72	85	85	49	25
Kesharmahal	2,483	2,179	149	238	33	28	63	10	2
Koteshwor	1,788	1,304	56	83	53	70	64	31	10
Kalimati	2,312	1,810	76	100	64	76	68	48	0
Chabahil	2,144	1,541	71	88	51	71	65	46	0
Gaushala	1,842	1,204	60	71	46	65	69	35	0
<b>Percentage Composition</b>		<b>79.32</b>	<b>4.6</b>	<b>6.39</b>	<b>2.3</b>	<b>2.56</b>	<b>3</b>	<b>1.4</b>	<b>0.488</b>

### Effect of motorcycle proportion in saturation flow

The main objective of this study was to study the effect of motorcycle on saturation flow in an intersection. The effect of motorcycle proportion on saturation flow study was also based on simple linear regression model with bike proportion in traffic as independent variable. The result of two-wheeler proportion on saturation flow is shown in

Table 0-3.

Table 0-3: Calibration of saturation flow for through traffic

	Estimate	Std. Error	t-value	Pr(> t )
(Intercept)	-1390.1	242.1	-5.742	1.26E-08
Prop	7517	316.1	23.778	<2e-16

- Residual standard error: 786.3 on 937 degrees of freedom
- Multiple R-squared: 0.3763, Adjusted R-squared: 0.3757
- F-statistic: 565.4 on 1 and 937 DF, p-value: < 2.2e-16

Statistically, proportion of two-wheeler is directly proportional to the saturation flow of vehicles, but estimation of saturation flow is not significantly predicted only using proportion of two-wheeler as independent variable.

Similarly, the effect of motorcycle proportion on saturation flow was observed from data taken for calculation of relation between average headway and bike proportion in right turning traffic. The result of regression is presented in

Table 0-4

Table 0-4: Calibration of saturation flow for right turning traffic

	Estimate	Std. Error	t-value	Pr (> t )
(Intercept)	-2269	179.2	-12.66	<2e-16
Prop	7598	228.4	33.28	<2e-16

- Residual standard error: 642.3 on 936 degrees of freedom
- Multiple R-squared: 0.5419, Adjusted R-squared: 0.5414
- F-statistic: 1107 on 1 and 936 DF, p-value: < 2.2e-16

This statistical calculation again shows the result that there is significant direct relationship between proportion of motorcycle in right turning traffic and saturation flow as F-value is significantly greater than 1 and p-value less than 0.01. However, proportion of bike can only account for 54% of variation in saturation flow.

### Comparison with previous study

Various studies have already been made for the calculation of PCU and MCU values. For the sake of simplicity for comparison, the PCU values of the respective research have been converted into motorcycle equivalent unit by simply dividing each value with the value provided for two-wheelers. The comparison for through traffic is tabulated in Table 0-5

For through traffic, the value of equivalence unit of car is greater than provided by NRS 2070 and *Subedi (2016)*, but less than proposed by *Shrestha (2016)* and *Shrestha (2014)*. The value for bus is however lower than provided by *Shrestha (2013)* but greater than other researchers and NRS 2070. The equivalent unit for truck is however found to be higher than any other researches and NRS 2070.

Table 0-5: Comparative study of equivalent units

Researches	MCU value			
	Two-wheeler	Car	Bus	Truck
This study (through)	1	3.13	9.60	13.67
This study (right turn)	1	3.47	10.76	11.84
Shrestha (2016)	1	5.14	12.81	-
Shrestha (2014)	1	4	8.76	10.6
Subedi (2016)	1	2.27	6.66	6.61
NRS 2070	1	2	6	6

*Shrestha (2016)* recommended saturation flow ( $Q=10380W-23310$ ) of a lane as 13,020 motorcycle units per hour per lane. *Shrestha (2014)* proposed similar model with width as variable for saturation flow calculation ( $S=1107+398.22*W$ ) amounts to 2500 veh/hr/lane which is passenger car unit which when converted to motorcycle unit by the value of two-wheeler in her research amounts to 10,000 motorcycles per hour per lane. This research study however proposes the saturation flow rate for through traffic at an intersection to be 7625 motorcycles per hour per lane. The saturation flow of right turning traffic is found to be 6,492 motorcycles per hour per lane. *Shrestha (2016)* has utilized area velocity method for the estimation of motorcycle equivalent units and utilized motorcycle following motorcycle to account for the headway time and taken only width as criteria for estimating saturation flow, which could probably have led to difference with his numbers. Having extrapolated saturation flow for intersections, *Shrestha (2013)*, has also linked saturation flow to width of lane only, which could have led in the discrepancy with this study. However, since this study shows that the higher the percentage of two wheelers in the traffic stream results in higher saturation flow, saturation flow value is similar to *Shrestha (2016)*.

### Conclusions

Eight intersections were selected for study the effect of two-wheeler on saturation flow and headway in traffic stream. The study found volumetric proportion of two-wheeler in every intersection and movement to consist of more than 50%. Video-graphic data was employed to perform temporal count of various classes of vehicles.

Firstly, the PCU values provided by NRS 2070 are not suitable for calculation of saturation flow of urban intersections. There is minor difference (0.4 in car, 1.5 in bus and 1.5 in truck) in equivalent unit values in through and right turning direction. This can be due to proportional decrease in the saturation flow of every group of vehicles. The values obtained are tabulated in Table 0-6.

**Table 0-6: Motorcycle Equivalent Units of various class of vehicles**

Vehicle group	Equivalent units	
	Through	Right-turn
Bike	1	1
Car	3.03	3.44
Bus	9.21	10.77
Truck	13.42	11.92

Secondly, average headway for through traffic is 0.47 second and for right turning traffic is 0.56 second. The saturation flow rate for through vehicles is 7,625 motorcycles per hour per lane and right turning vehicles is 6,492. The relation between average headway and the proportion of two-wheelers is inverse whereas saturation flow increases with increase of motorcycle proportion in traffic stream.

Finally, this study found that the increase in proportion of two-wheeler in traffic stream of intersection decreases time headway and subsequently increases saturation flow of traffic.

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## WINE PRODUCTION FROM VEGETABLES: A REVIEW

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### Abstract

In general the components of wine include ethyl alcohol, sugar, acids, higher alcohols, tannins, aldehydes, esters, amino acids, minerals, vitamins, anthocyanins, minor constituents like flavouring compounds etc. Vegetable wine is an organic product made from anaerobic fermentation of vegetables. Various tropical as well as subtropical vegetables can be used for organic wine production as they possess good flavors, cheap availability, appropriate sugar concentration and satisfactory chemical composition. *Saccharomyces cerevisiae* is frequently used for fermentation under oxygen deprived conditions. Better control of fermentation conditions can reduce the stress conditions for yeast cells and contamination by bacteria and wild yeasts. During the fermentation period, the wines are analysed for viscosity, pH, acidity, specific gravity, alcohol and total sugar content on an every day basis. Recently, manufacturing of wines has been enhanced progressively. With rise in demand of wines there is immense potential for development of new vegetable fermented products. This frequently compensates for post-harvest losses that a crop suffers all through its peak season. These organic vegetable wines are abundant in healthy components for example, minerals, vitamins and antioxidants that are valuable for human health.

**Keywords:** vegetable, wine, healthy, fermentation, alcohol and *Saccharomyces cerevisiae*

### Introduction

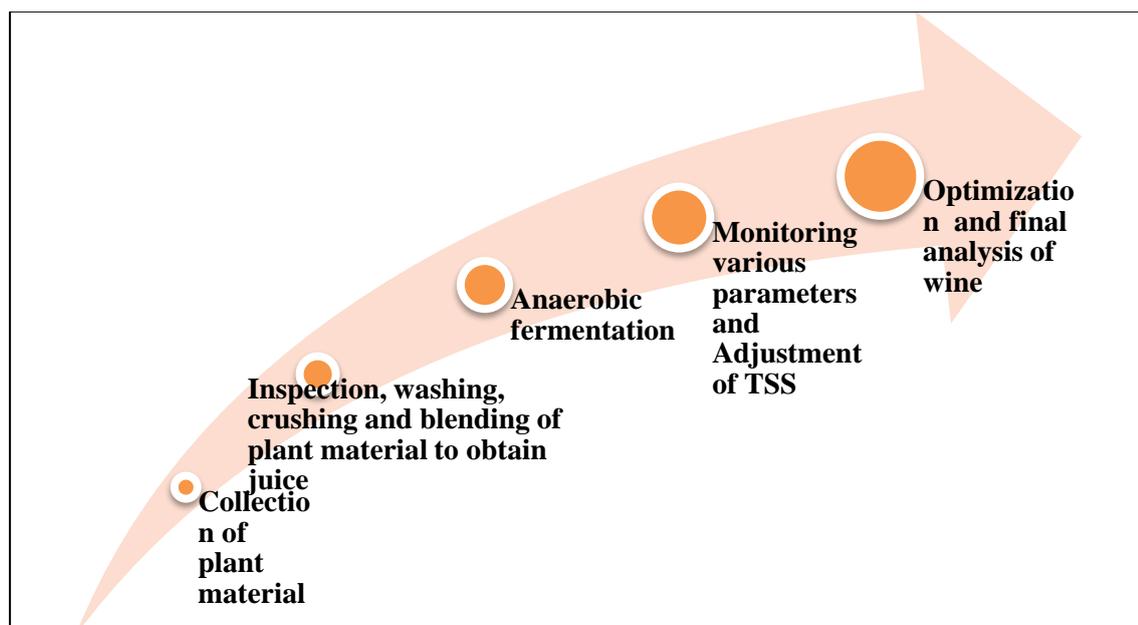
Wine production is one of the most ancient fermentation technologies and is now one of the most frequently used commercially successful biotechnological product. Wine is an ethanol drink produced from fermented vegetables, fruits, flowers and herbs juice (Legras *et al.*, 2007). It is a multi step microbial reaction. *Saccharomyces cerevisiae* is chiefly used for the alcoholic fermentation, while numerous wines are produced by action of lactic acid bacteria through fermentation process (Borneman *et al.*, 2008). *S. cerevisiae* is involved in the production of many fermented beverages, such as wine, beer and cider; distilled beverages, such as rum, vodka, whisky, brandy, and sake and also other alcoholic beverages worldwide. Precisely, fermentation is a feasible method for development of new products possessing customized physicochemical as well as sensory characters. These processed foods have all new flavors and are rich in nutritional components. Variations in wine are seen due to variation in vinification process, chemical composition of raw material, alcohol content, sugar content and ageing of wine. The most renowned wines are red wines, white wines, rose wines and sparkling wines. Generally, the raw materials for wine production contain quantities of sugar that can be used by yeast during the fermentation process. Therefore, the term "wine" also refers to starch-fermented or fortified beverages having higher alcohol content (Ray *et al.*, 2012). These are portable and one can stock up them easily. Wines truly act as health aids. They help in preventing cardiovascular diseases (CVD), increasing the high-density lipoprotein cholesterol plasma levels, decreasing platelet aggregation, antioxidant effects, anti-ageing property, reduction in ulcer-causing bacteria (*H. pylori*) and restoration of endothelial function. The components of a typical wine include ethyl alcohol, sugar, acids, higher alcohols, tannins, aldehydes, esters, amino acids,

minerals, vitamins, anthocyanins, minor constituents like flavouring compounds etc. (Swami *et al.*, 2014). Different types of wine provide different vitamins and minerals. They contain nutrients equivalent to original vegetables, fruits or herbs as they are undistilled (Skuraset *et al.*, 2002). Moreover, their nutritive value is further augmented by yeast (*Sacchomyces sp.*) during fermentation. It liberates amino acids and a mixture of nutrients.

In recent times, there has been an increase in demand for alcoholic beverages. Likewise, there has also been an increase in the demand for the use of homegrown vegetables as raw materials in the manufacturing sector. This has led to the use of several locally grown vegetables for this purpose. Thus, vegetable wine is good source of generating wealth also. The inherent characteristics such as pH values, sugar content and nitrogen contents of vegetables must be taken into account during vegetable wine production (Kannahiet *et al.*, 2019).

### General procedure for vegetable wine production

The raw material is collected from the local sources available. They are then carefully inspected for any adulterant, disease etc. After this they are properly washed and finally crushed. Their juice is obtained by blending. Then after adding yeast they are packed in air tight container for anaerobic fermentation. Various parameters like pH, titratable acidity, specific gravity, alcohol content, sugar concentration and biomass concentration are then determined on daily basis. The Total Soluble Solid (TSS) is calculated in Degree Brix and is adjusted by adding cane sugar in powder form. Finally, the fermentation processes is optimized and analysed for tannins, phenol content, total SO<sub>2</sub> content, pH, titratable acidity, specific gravity, alcohol content, sugar concentration and biomass concentration. Sensory evaluation of wine is done on basis of like taste, colour, aroma, appearance and flavor. Microbiological analysis of the vegetable wine is also carried out to analyze the microbial population. The pH, specific gravity and alcohol content of homemade wine or wines produced from small scale industries is lower than commercial wines. There is no usage of either any preservative or any additives in homemade wines, therefore they are acceptable for daily usage (Ifieet *et al.*, 2012).



### Fermentation process for vegetables

### **Vegetables that have already been employed for production of wine**

*Zingiber officinale*- The ginger wine contains small amounts of alcohol, it is not harmful, but health-giving, digestible, and stimulates the release of the hormone gastrin, which in turns stimulates the release of enzymes in the stomach. Thus, wine stimulates the release of digestive enzymes, which digest not only the alcohol but the many other nutrients found in wine. The ginger showed a pH range of 3.89 -3.94, specific gravity ranges from 1.116 -1.162 and alcohol content was 6.81 % (Agrahari *et al.*, 2015).

*Solanum lycopersicum*- Tomato is wide spread in production and has special nutritive values. It is a rich source of vitamin A and C, it also contains minerals like iron, phosphorus and pigments. Tomato is commonly used in preserved products like ketch-up, sauce, soup, etc. and apart from these food products, tomato is also used to prepare wine due to its easy availability and nutritional property. The pH value of the tomato wine was 3.2 (Jang *et al.*, 2010). The major contributors to the overall aroma of tomato wine are ethyl octanoate, ethyl hexanoate and isoamyl acetate, which are characterized by fruity notes.

*Beta vulgaris*- Beetroot is a valuable vegetable, which is biennial. It is grown year-round for its sweet, tender, succulent root. Beetroot contains more sugar than any other vegetable, and its different colors, sizes and shapes have been grown, ranging from red, yellow, round, long cylindrical (Mo *et al.*, 2020). Wine was produced from the must prepared from beetroot with brewer's yeast (*Saccharomyces cerevisiae*) as the fermenting organism. The pH value of the beetroot wine was 3.2. The beetroot wine contained 13.6% (v/v) alcohol. The K and Fe composition of the wines ranged from 568.73 – 677.38 mg/l and 14.25 – 16.85 mg/l respectively (Otegbayo *et al.*, 2020).

*Daucus carota* - Carrot is one of the popular root vegetables grown throughout the world and its high anthocyanin content makes it a suitable diet supplement as antioxidant. The high antioxidant properties of carrots are due to their high vitamin C, anthocyanin and  $\beta$ -carotene contents. These are also rich in nutraceuticals and biologically active compounds such as vitamins, dietary fibres and minerals (Lowe *et al.*, 1960). The pH value of the carrot wine was 3.8-3.2. The carrot wine had titratable acidity of 0.28 to 0.76%. The vitamin C content of the carrot wine was 257.00 to 44.00  $\mu$ g/ml. The carrot wine contained 0.05-1.10 % alcohol (Balogun *et al.*, 2021).

*Hibiscus sabdariffa*-It is a locally available vegetable in Nigeria, known as Roselle (*Hibiscus sabdariffa*) and popularly called 'Zobo' in the Northern part of Nigeria. The plant belongs to the family, Malvaceae. *H. sabdariffa* calyx extract has a characteristic red to red-brown colour. The pigment of the extract, anthocyanins possesses medicinal values. Anthocyanins have anti-oxidant, anti-inflammatory, antihepatotoxic, antibacterial, antiviral antithrombic and antiallergenic properties. In view of the medicinal values of anthocyanins, production of wine from *H. sabdariffa* perhaps serves dual purpose to man. The wine produced from *H. sabdariffa* was found to be acceptable, as well as meeting all the standards required by a good wine in terms of color, flavor, taste, aroma and overall acceptability. (Ifie *et al.*, 2012) The high acidity gives it an edge in terms of storability and its resistance to microbial spoilage. *H. sabdariffa* is readily available and it is cheap, thus, it can be a good substrate for wine industry (Alobo *et al.*, 2009).

### **Conclusion**

Vegetables are an indispensable component of our diet and provide essential ingredients such as vitamins, minerals, and carbohydrates. Vegetable wines are alcoholic drinks produced using vegetables by fermentation and being undistilled products they contain most of the nutrients present in the original vegetable juice. The procedure of winemaking is the outcome of biochemical changes brought about by the several enzymes taken from various microorganisms, including yeasts, especially *Saccharomyces cerevisiae*, resulting in alcoholic fermentation producing ethanol as the main component of alcoholic beverages like wines. Fermentation increases the nutritive value of wines due to release of amino acids and other nutrients. In general, vegetable wines are a good dietary source of minerals, such as K, Ca, and P; antioxidants and phytonutrients, such as terpenoids such as carotenoids and phenolic compounds. This review provides the insight into vegetable wine manufacturing and its nutritional benefits.

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## APPLICATIONS OF GLYCEROL

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### Abstract

Glycerol also known by name of glycerine or glycerin is a simple polyol (triol) compound exhibit a properties of colorless, odorless, high viscous liquid that is sweet in taste and non-toxic in nature, but conscious consumption is not recommended unless used as apremeditated suppository medicine. It is a by-product of the biodiesel. The backbone of lipids is formed by glycerol known as glycerides. Because of having antimicrobial and antiviral activities it is broadly used in FDA approved wound and heat burn cures. It can also be used as an efficient marker to diagnose liver disease. It is also commonly used as a sweetener in the food processing industry and as humectants in pharmaceutical formulations. Because of having three hydroxyl groups, glycerol is highly miscible with water (polar solvent) and is hygroscopic in nature.

**Keywords;** Glycerol, triol, glyceryl trinitrate, humectants,

### In food and beverages

Glycerol used as humectants due to its hygroscopic nature. It is also used as solvent for flavors and food colors. It is used as sweetener in foods marketed to diabetics and low-carb dieters. It is used as preservative for fruit and eatable because it makes them sweet. may help preserve foods. It is also used as filler in commercially prepared low-fat foods (e.g., cookies), and as a thickening agent in liqueurs (Segure *et al.*, 1951). Glycerol and water are used to preserve certain types of plant leaves because of their hygroscopic nature. As a sugar substitute, it has just about 27 kilocalories energy per teaspoon (sugar has 20) and sweetening power is 60% to sucrose (Roberg *et al.*, 1998). It does not nourish the bacteria that form plaques and cause dental cavities. As a food additive, glycerol is labeled as E number E422. It is supplementary to icing (frosting) to avoid it from setting too hard. As consumed in foods, glycerol is classified by the U.S. Academy of Nutrition and Dietetics as a carbohydrate. The U.S. Food and Drug Administration (FDA) carbohydrate designation includes all caloric macronutrients excluding protein and fat (Pagliaro *et al.*, 2007). Glycerol has a caloric power similar to table sugar, but a lesser glycemic index and diverse metabolic pathway within the body, so some dietary advocates recognize glycerol as a sweetener well-matched with low-carbohydrate diets (Christoph *et al.*, 2000).

### Medical, pharmaceutical and personal care applications

Glycerol is classified as a caloric macronutrient by the U.S. FDA. Glycerin possesses mild antimicrobial as well as antiviral activity. The Red Cross reports that an 85% solution of glycerin shows bactericidal and antiviral effects. Wounds treated with glycerin show reduced inflammation after around 2 hours. Therefore, it is widely employed in wound care products, including hydrogel sheets for burns and other wound care (Roussel *et al.*, 2012). It is also approved for packaging donor skin used in skin grafts. Glycerol is used in various preparations for improving smoothness, providing lubrication, and as humectants (Suchome *et al.*, 2017). Previous findings suggested that Ichthyosis and xerosis have been relieved by the topical use of glycerin. It is frequently found in

allergen immunotherapies, cough syrups, elixirs and expectorants (Witcher *et al.*, 1996). Various toothpastes, mouthwashes, shaving cream, hair care products and water-based personal lubricants also make use of glycerin. Glycerol is a component of glycerin soap that is used by people with sensitive, easily irritated skin because it prevents skin dryness with its moisturizing properties. It draws moisture up through skin layers and slows or prevents excessive drying and evaporation. In solid dosage formulations like tablets, glycerol is used as a binding agent. Glycerol is also used as a preservative in blood banking to store red blood cells prior to freezing. Glycerol functions as a very good laxative by irritating the anal mucosa and inducing a hyper osmotic effect, expanding the colon by drawing water into it to induce peristalsis resulting in evacuation (Klaschik *et al.*, 2003). It could be administered as a suppository or as a small-volume (2–10 ml) enema. Alternatively, it may be administered in 5% solution or a dilute solution, e.g., as a high volume enema. For the initial emergency treatment of severely elevated eye pressure glycerol can be taken orally. This causes a rapid and temporary decrease in the internal pressure of the eye. Nitroglycerin (glyceryl trinitrate -GTN) is commonly used to relieve angina pectoris, taken in the form of sub-lingual tablets, or as an aerosol spray (Aagaard *et al.*, 1973).

### **Manufacturing of Botanical extracts**

Glycerol (10%) is utilized in "tincture" method extractions and thus prevents tannins from precipitating in ethanol extracts of plants (tinctures). In preparing herbal extractions glycerol is used as an "alcohol-free" alternative to ethanol (Adrian *et al.*, 2016). Such products are not "alcohol-free" in a scientific or FDA regulatory sense, as glycerol contains three hydroxyl groups. To make glycerides herbs are extracted in hot water before adding glycerol. Glycerol has been shown to possess a high degree of extractive versatility for botanicals including removal of numerous constituents and complex compounds. It possesses high extractive power and is utilized with dynamic (i.e. critical) methodologies. Glycerol possesses the intrinsic property of not denaturing a botanical's constituents and also acts as a bacteriostatic agent (Michailidis *et al.*, 2021). Therefore, it is a stable preserving agent for botanical extracts. It does not allow inverting REDOX of a finished extract's constituents, even over several years.

### **Antifreeze agents**

Glycerol is a non-ionic kosmotrope that forms strong hydrogen bonds with water molecules, competing with water-water hydrogen bonds. This interaction disrupts the formation of ice. The minimum freezing point temperature is about  $-36\text{ }^{\circ}\text{F}$  ( $-38\text{ }^{\circ}\text{C}$ ) corresponding to 70% glycerol in water. While the minimum freezing point of a glycerol-water mixture is higher than an ethylene glycol-water mixture, glycerol is not toxic and is being re-examined for use in automotive applications. In the laboratory, glycerol is a common component of solvents for enzymatic reagents stored at temperatures below  $0\text{ }^{\circ}\text{C}$  due to the depression of the freezing temperature. It is also used as a cryoprotectant where the glycerol is dissolved in water to reduce damage by ice crystals to laboratory organisms that are stored in frozen solutions, such as fungi, bacteria, nematodes, and mammalian embryos (Pan *et al.*, 2018).

### **Chemical intermediate**

Glycerol is used to produce nitroglycerin, which is an essential ingredient of various explosives such as dynamite, gelignite, and propellants like cordite. An oxidation of glycerol affords me oxalic acid. [34] Dehydrating glycerol affords hydroxyacetone (Pagliaro *et al.*, 2008).

### **Internal combustion fuel**

Glycerol is also used to power diesel generators supplying electricity for the FIA Formula E series of electric race cars (Trifoiet *et al.*, 2016).

### **Vibration damping**

External vibrations, from compressors, engines, pumps, etc., produce harmonic vibrations within Bourdon gauges that can cause the needle to move excessively, giving inaccurate readings. The excessive swinging of the needle can also damage internal gears or other components, causing premature wear. Glycerol, when poured into a gauge to replace the air space, reduces the harmonic vibrations that are transmitted to the needle, increasing the lifetime and reliability of the gauge. Thus, it is used as fill for pressure gauges to damp vibration (Majumdar, 1996).

### **Ultrasonic couplant**

Glycerol can be sometimes used as replacement for water in ultrasonic testing, as it has favorably higher acoustic impedance (2.42MRayl vs 1.483MRayl for water) while being relatively safe, non-toxic, noncorrosive and relatively low cost (Koc, 2009).

### **Miscellaneous uses**

- Glycerol, along with propylene glycol, is a common component of liquid, a solution used with electronic vaporizers (electronic cigarettes). This glycerol is heated with an atomizer (a heating coil often made of Kanthal wire), producing the aerosol that delivers nicotine to the user (Ooi *et al.*, 2019).
- Glycerol is used by the film industry when filming scenes involving water to stop areas from drying out too quickly. Glycerine is used—combined with water (around in a 1:99 proportion)—to create a smooth smoky environment. The solution is vaporized and pushed into the room with a ventilator.
- Glycerol has also been incorporated as a component of bio-ink formulations in the field of bioprinting. The glycerol content acts to add viscosity to the bio-ink without adding large protein, carbohydrate, or glycoprotein molecules (Shin *et al.*, 2018).
- Research has been conducted to produce value-added products from glycerol obtained from biodiesel production (Suchomelet *et al.*, 2017).
  - ✓ Hydrogen gas production
  - ✓ Glycerine- potential fuel additive
  - ✓ Glycerol for starch thermoplastic
  - ✓ Conversion to propylene glycol
  - ✓ Conversion to acrolein
  - ✓ Conversion to ethanol

- ✓ Conversion to epichlorohydrin
- ✓ a raw material for epoxy resins

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## **A Study of the Effect of Technology on the Society**

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### **Abstract**

In the last few decades, Technology has improved the general living standards of many people in the society. The main objective of the present study is to know the relationship between society and technology, where emphasize have been put on development process under modern science and technology and its perspectives. Technology has transformed the methods of education, communication, business, art and literature, and has resulted in the enhancement in the core spheres of life. Without modern technology, people would still be living within their geographical confines of their societies. Various technological advancements have made life easier like the Internet, phones, tablets, TV, PS, movie, and video games. Due to blessings of science and technology, we are now able to check the advancement of every department working around our society with a single click of internet. Technology helps us to differentiate about the development process of all sections of society and help us to maintain the development process. Technology has brought our society close to each other where we can take any initiative about any social issue or discuss any matter of concern regarding the society by sitting in our homes like using video or audio conferencing.

### **Introduction**

Ashish Baghla(2018) conducted "A Study of the Impact of Technology on the Society"Technology has completely revolutionized present era in every aspect of life especially dealing with society.After the completion of study, some mixed feeling were collected from the respondents. However, on one side they have expressed the positive effects of technology on the society; at the same time they have disclosed to some negative effects too.

Al Yousef (2006) conducted an investigation under a title of the "Advantages and Disadvantages of Modern technologies - Studying the negative effects on the health of the person." The examination pointed out that because of dependence on the use of the internet, this will lead to lost self-control, the neglect of personal status, poor relations and communication in the social environment.

Lailah (2000) conducted an examination aimed at clearing up the role of media in the information technology that seriously affecting the family relationships, and focused on the negative effect of the performance of the media and information technology in our society.

### **Types of Technology**

The various types of Technology are as follows:

- 1. Industrial Technology:**the technology related with use of machinery and equipment for assembling of items and services likewise includes engineering.
- 2. Information technology:** used for storage collection and dissemination of information through electronic devices and media, like computers, workstations and mobile phones etc.
- 3. Robotics:**use of manmade reasoning machines which can perform the same assignment as like a person.
- 4. Medical Technology:**use of symptomatic and related devices for performing medical operations and giving Healthcare facilities to different diseases. It includes the latest devices for the treatment of different diseases in the society.
- 5. Biotechnology:**use of scientific principles related with science and Agriculture.

**6. Communication Technology:** use of mobile phones, landlines, email, long-range informal communication websites and applications, for example, WhatsApp, Facebook, Twitter, hike etc. to communicate human beings in the society.

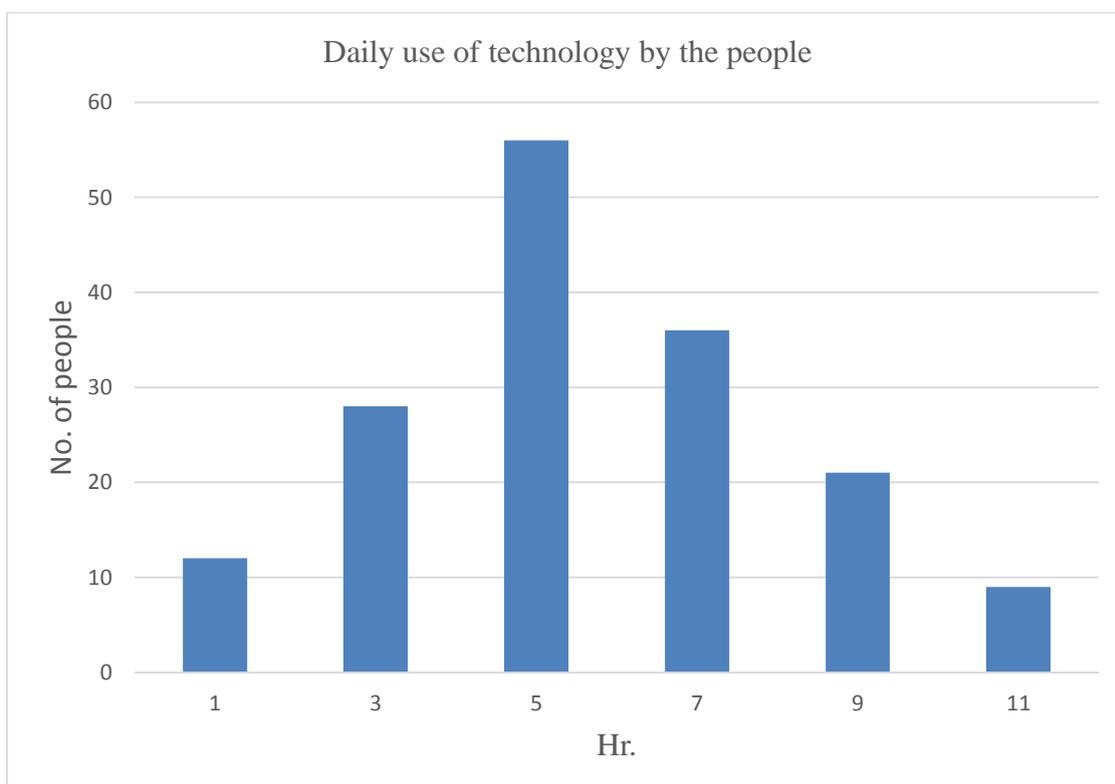
#### **Technology: Becoming an Addiction**

We can say that we are becoming addicted to the use of technology in our lives. In whole day, we use the technology a number of times. The increasing use of smartwatches, smartphones, PCs, internet, web-based social networking, utility software (applications) etc. has touched every piece of our life at every place. From school to home, from office to a transportation ticket booking, from communication to storage of information, from knowledge to awareness etc. technology assumes an imperative role in our lives. Primarily, the increasing use of technology has affected the routine of people day life. Presently the life is being changed with the change in technology; however, the direction of technology is positive or negative, it become imperative to know.

#### **Data Analysis**

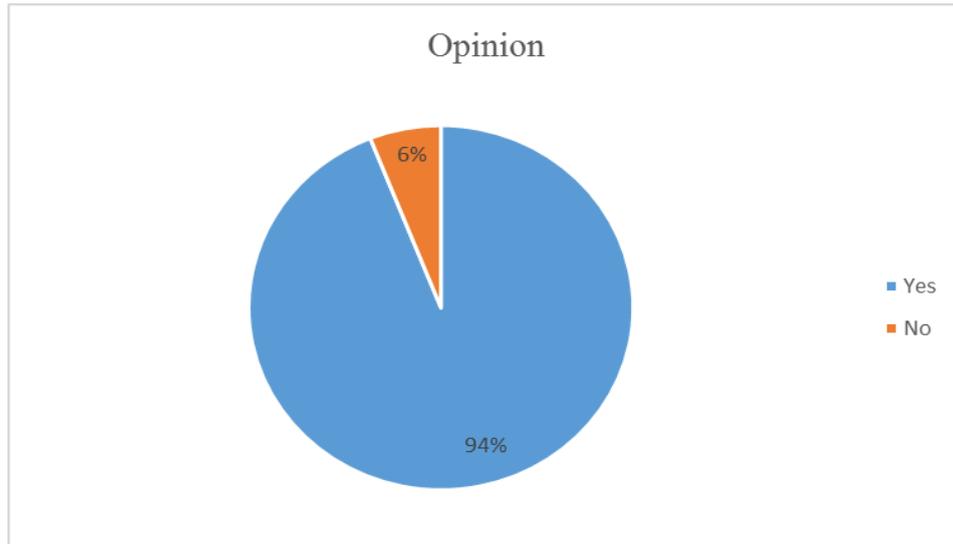
**For how much time you daily use the technology like computers, smartphones, social networking websites etc.**

Among the sample of 100 people, 12 persons were observed to be utilizing technology for around One hour daily. 28 people said that they use the technology between 1-3 hours in multi day. 56 people said that they use the technology for around 3-5 hours. 36 people said that they use the technology for more than 5 hours every day, generally due to their profession/employment.



**Do you imagine that technology has made the life of people better?**

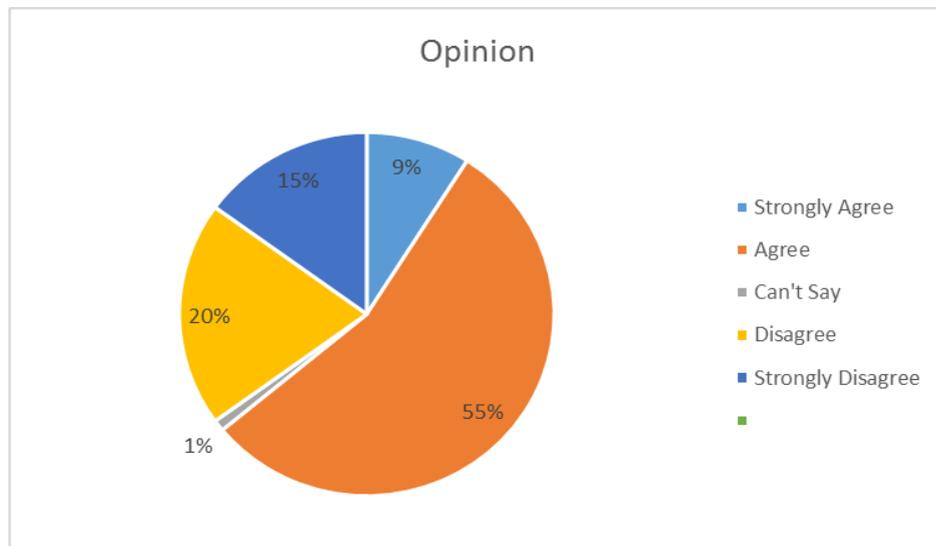
Answer: 94% said Yes, whereas 6% said No.

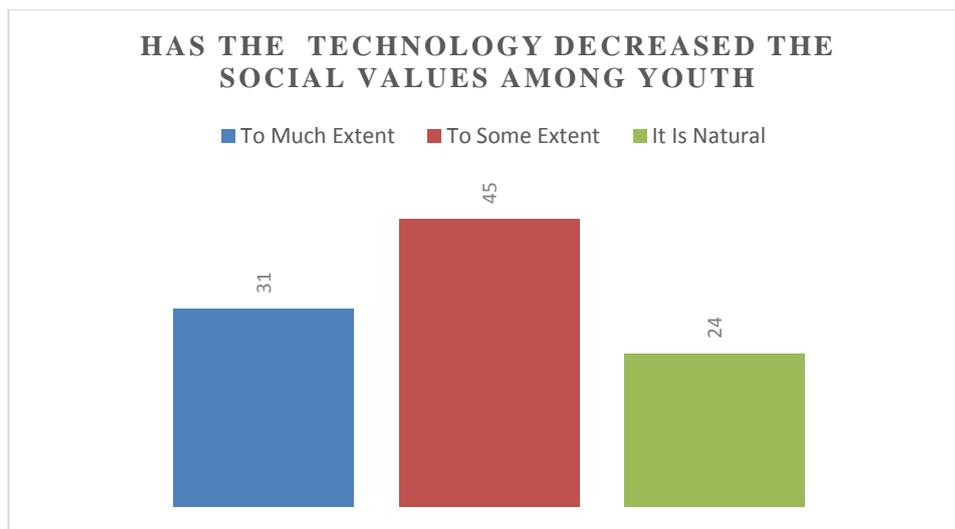


**What is your sentiment about the statement that "technology has resulted in making the people irritable"?**

**Interpretation:**

More than half people said that they agree with the view that technology has made the people irritable. 1% said they can't state something. 9% were strongly agreed. 20% said they thoroughly disagree. Ultimately, 15% people were stronglydisagree.



**Do you think that use of technology all the time has resulted in decrease in social values among youth?**

**Out come from the Study:** After the completion of study, some mixed feeling were collected from the respondents. However, on one side they have expressed the positive effects of technology on the society; at the same time they have disclosed to some negative effects too. Both types of effects are given below:

**Positive Impact of Technology on Society**

- Technology helps in better utilization of resources for the businesses and in addition for the economy.
- Technology helps in better education and learning for students like the Google, YouTube and educational applications from the internet for their knowledge purpose and in addition to keep themselves updated. Distance learning, web online journals, digital broadcasts etc. has benefitted the students to much extent.
- Technology helps in increasing quality in agricultural production. The traditional farming techniques has been changed with the changes coming in the technology for horticultural information sources, soil testing machines and conferring knowledge about the evaluating and institutionalization through Kissan call centers has improved the quality in essential sector of the economy.
- Technology has resulted in affordable products available to the consumers at cheap and affordable prices for all.
- Technology as LCD, LED, Power sparing devices, eco-friendly devices, computerized media, PCs, smartphones, forced air systems with half and half technology etc. helps in increasing the standard life.
- Use of Information technology helps in storage and retrieval of large amount of data at faster speed and with less chances of error. People can use the information for their business decision making and increasing competitive advantage.
- Technology helps in better marketing opportunities for small businesses for example, internet and e-commerce websites.
- Ease of money transfer one place to other place in only few seconds with the use of Internet Banking or by International money transfer mechanism.

**Negative Impacts of Technology on the Society**

The negative effects are as follows:

- Threat for the all- round development of children: Earlier, prime center was given by the parents on the development of their children in terms of academics, social values, sports etc. In any case, with the

presentation of internet, children have now started becoming routine of mobile phones or televisions negative effects for their overall development.

- Decreasing social values by the excessive use of technology. The respect for elders and obedience is decreasing with the dependence and increasing use of technology by youth and children.
- Threat for employment:-Discussing the employments and work structure, the excessive use of machinery and automated devices has resulted in less requirement of people at work.

### **Conclusion**

The above examination gives a mixed picture of the effect of technology on the society. In general, it may be said that the technology has affected the society to a great extent, however the manner of use and the dependency on technology ought to have some cutoff points. Modern technology affects to our society in positive as well as negative aspects.

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## **An Experimental Investigation on the use of HHO gas in Internal Combustion Engine**

VivekLohia, Neelam Rani, Anil Kumar

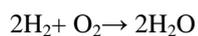
Om Sterling Global University, Hisar-Haryana

### **Abstract**

The use of fossil gas has grown over the past uncommon years. This fuel causes a high level of pollutants in the atmosphere, which can cause mega world problems such as global warming. (Abdel ghaffar et al., 2010) stated the work paper focuses on evaluating the performance enrichment of a SI engine through the improvement of H<sub>2</sub>/O<sub>2</sub> mixture get through water electrolysis. Ensure show that by exploitation H<sub>2</sub>/O<sub>2</sub> mixture the brake thermal efficiency growth and the emissions of HC, CO<sub>2</sub> and CO reduced, where as the NO<sub>x</sub> emission may growth. It is established to be a suited optional for SI engines with the drawbacks of low mechanical power output and high NO<sub>x</sub>. Catalysts are used to diminish oxygen and hydrogen bonds. Brown gas is used as a supplementary fuel in engine cylinder. Its effects on hydrocarbon, carbon monoxide exhaust gases; engine operations special and specific fuel consumption (sfc) are enquired.

### **1. INTRODUCTION**

To contract NO<sub>x</sub>, attending is focused on component that decrease peak combustion temperature and decrease the oxygen available in the flame front. Design and operational parametric that have been enforced for reduced emissions with compression ratio reduction, increased coolant temperature, change of the combustion chamber shape to minimize surface-to-volume ratio and increase turbulence, advancement of intake manifold design for improve charge distribution, use of fuel injection rather of carburetors for better mixture control, use of exhaust gas recirculation to decrease NO<sub>x</sub> by letting down combustion temperatures, positive crankcase breathing to decrease HC, and growth aromatic content in gasoline. (Karim et al., 2004).



Due to above characteristics, the HHO can be used as an optional fuel in engines and in the growth of fuel cell powered vehicles and hybrid electric vehicles (HEVs). In a diesel engine, however, HHO can't be directly because it has high ignition temperature, but it can be used in the double fuel mode. HHO is only one of many potential optional fuels that can be taken from natural resources, such as coal, oil and uranium or from renewable resources based on solar energy. H<sub>2</sub> can be industrial produced from electrolysis of water it can also be produced by different methods like the thermo chemical decomposition of water and solar photo-electrolysis, although these are now in the laboratory stage. (Charoplew et al., 2011) stated Notably in, standard H<sub>2</sub> gain was measured to increment the energy flow to the engine, as it gets to higher VF while retained a invariable global compare. Hence, a higher B.mep accomplished with HHO compared to H<sub>2</sub>. (Leelakrishna et al., 2013)

While direct injection resolve the trouble of pre-ignition in the intake manifold, it does not needs to prevent pre-ignition within the combustion chamber. In addition, due to decreased variety time of the air and fuel in a direct injection engine, the air/fuel mixture can be heterogeneous, (Sharma et al., 2018). Hydrogen is the lightest component in the periodic table and its atomic mass is 1.008 a.m.u. H<sub>2</sub>O gas is a dilution of hydrogen and

oxygen gas, typically in a 2:1 atomic ratio the symmetry as water. Hydrogen has symmetry flammability boundary of 4-75 % by volume in air compared to diesel of 0.7-5% by volume .While direct injection resolve the trouble of pre-ignition in the intake manifold, it doesn't needs keep pre-ignition within the combustion chamber. In addition, due to decreased mixing time of the air and fuel in a direct injection engine, the air/fuel mixture can be heterogenous. (Sharma et al., 2018).

**Table 1.1 Comparison of hydrogen and gasoline properties.**

Properties	Unleaded Gasoline	Hydrogen
Auto-ignition Temperature (K)	533-733	858
Minimum Ignition Energy (mJ)	0.24	0.02
Flammability Limits (vol % in air)	1.4-7.6	4-75
Stoichiometric Air-Fuel Ratio on Mass Basis	14.6	34.3
Limits of Flammability (equivalence ratio)	0.7-3.8	0.1-7.1
Density at 160C and 1.01 bar (kg/m <sup>3</sup> )	721-785	0.0838
Net Heating Value (MJ/kg)	43.9	119.9
Flame Velocity (cm/s)	37-43	265-325
Diffusivity in air (cm <sup>2</sup> /s)	0.08	0.63
Octane Number	92-98/80-90	130
Cetane Number	13-17	-

Still, a “cultural shift” will be essential, in range to access that target: the introduction of hydrogen as an energy bearer look to be a real grant to that goal, qualification possible, in the long run, the realization of a cleaner environment

## 2. LITERATURE REVIEW

Shivaprasad et al. (2014) have exercise on a single cylinder petrol engine while injecting HHO in the intake manifold in volumetric fractions (Vf) of the intake air between 5% and 25%.

The results reputed a gradual increment in b.mep and thermal efficiency, and a decrement in exhaust gases with a gradual in H<sub>2</sub> fraction. Unfavorably, a like growth in NOx was reputed with the increase in H<sub>2</sub>%. Wang et al., lead a few exercise on a petrol 4-cylinder engine to diagnose the functioning of H<sub>2</sub>/gasoline blends. In most of the functioning, the engine was running in a city at the 1400 rpm. Results in defined the generic qualities provide by H<sub>2</sub> without any other change to the engine. Notably, the spark timing of the masterpetrol operation was not adjusted, contempt the predictable fast combustion of H<sub>2</sub>/gasoline. (Dahake et al., 2016).

The Laboratory of Transport Technology (University of Gent, Belgium) has special in optional fuels for the past few year. Natural gas, LPG, hythane and hydrogen have been the theme of elongated enquiry. In a initial stage, a Valmet 420D engine, a genuine diesel engine with direct injection has been converted to a petrol engine for the use of HHO. Dülger and Özçelik through an experiment deliberate on fuel economy advance by on board electrolytic hydrogen product kit which could be installed on other engine of various types and sizes. Trail results in city traffic ultimatum showed that the fuel consumption for the Volvo 940 dropped to 6l /100 km from 10.5l /100 km, a decreased of 43% in fuel consumption. It was 36% in Mercedes.(Modi et al., 2016)

Versatile programs & projects were announced like installation of a Hydrogen Corpus Fund of Rs 100 Crore by MOPNG. The National Hydrogen Energy Board (NHEB) accomplished in 2003 by MNRES, freshly proclaimed

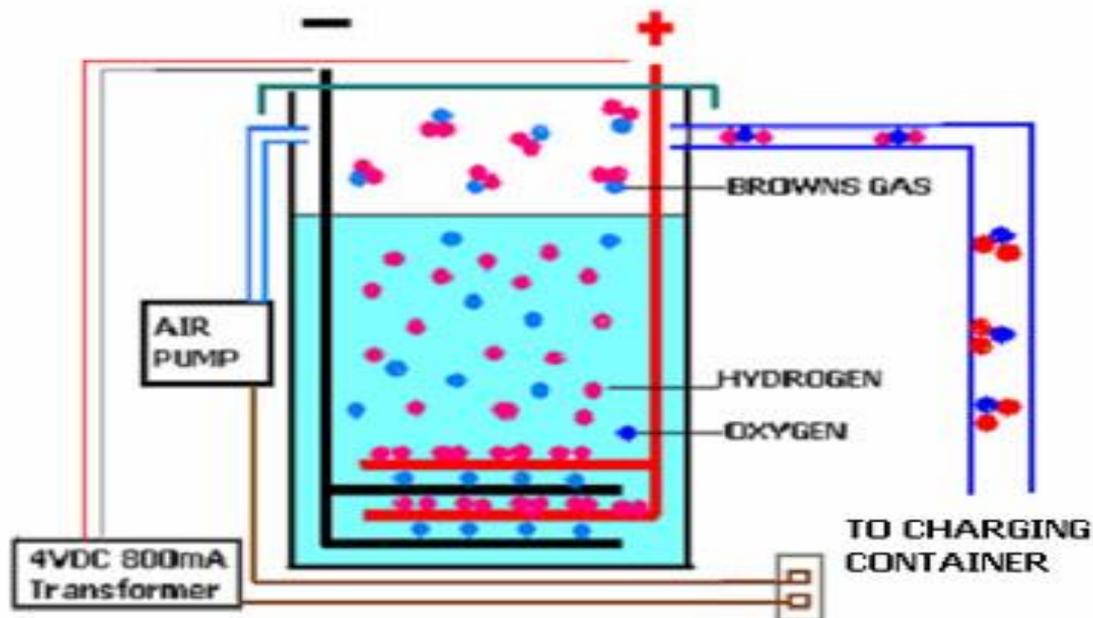
“National Hydrogen Energy Road Map HHO Vision 2020” under Green Initiative for Future Transport (GIFT) and Green Initiative for Power Generation (GIP). (Rimkus, 2014).

### 3. HYDROGEN AS A FUEL

Hydrogen has very low density. This event has two troubles when used in an IC engine. A very large volume is essential to collect enough hydrogen to give a vehicle andecent driving range then the energy density of a hydrogen-air mixture, and thus the power is reduced. Modi et al.(2016) stated the one drawback to hydrogen is that even though its lower heat value is greater than other hydrocarbon fuels it is less dense therefore a volume of hydrogen contains less energy. (Madriya and Harding et al., 2014)Hydrogen was the first element ever discovered and put on the periodic table (the periodic symbol H).The hydrogen atom has only one electron circling the nucleus. Hydrogen is the simplest compound because it has only one nucleus, one shell and one electron. 90% of all of the universe’s atoms are hydrogen. HHO is the fuel that makes lead burn. Water makes up three quarters of the earth’s surface. 1/3 of our bodies are made of water. Fossil gasare made of hydrocarbons, a combination of hydrogen and carbon. Other hydrogen compounds are proteins, cellulose, sugars and amino acids. Seshaiahet al. (2010) researched in 2010 examined hydrogen enhanced gasoline in lean combustion. John Houseman and D.J Cerini of the Jet Propulsion Laboratory publish a report for the Society of Automotive Engineers titled "On-strip Hydrogen Generator for a Partial Hydrogen Injection Internal Combustion Engine", and F.W. Hoehn and M.W. Dowy, also of the Jet Propulsion Lab, prepared a paper for the 9th Intersociety Energy Conversion Engineering Conference, named "Feasibility Demonstration of a Road Vehicle Fueled with Hydrogen Enriched Gasoline. Madriya and Harding (2014) didmore research in 2002 to reachcountexhibit "a reduction of NOx and CO<sub>2</sub> emissions", by mould an on-board hydrogen reformist and "variable the efficiency". The paper was viz a "numerical audit" done to "counter performances, exhaust emissions, and fuel consumption of a small, multi valve, spark ignition engine fueled by hydrogen enriched gasoline".(Khaliqet al., 2014)To date, Hydrogen fuel increase products have not been viz addressed by the EPA. No paper devices or industrial products have reports usable as per the "Motor Vehicle Aftermarket Retrofit Device Evaluation Program. In generic there are no references available for the US Government addressing the conception of hydrogen fuel enhancement. (Sawantet al., 2011)More importantly, however, is the reported results of using Brown's gas in internal combustion engines. Monatomic hydrogen makes a higher ranking catalyst for break down and on fire other fuels, such as petroleum based fuels. Enhanced in horsepower, mileage (mpg) and less emissions have all been reputed by people introducing Brown's gas into their vehicle's intake air stream.(Mareno et al., 2010)

The problem with H<sub>2</sub> and O<sub>2</sub> as a combustible gas, is that before they can react together to make H<sub>2</sub>O, they must first be broken apart into separate H and O atoms. The energy required to do this is a large fraction of the energy you get back when they combine to make H<sub>2</sub>O. (Tunestal et al., 2010)HHO does not have a set burning temperature. It reacts to the matter it is contact with when being burnt out. It can glow cool enough in air to run a finger done it quickly (about 230<sup>0</sup>C). Although his HHO produced cell has been procreate with success frequent times, very few have been able to run cars wholly on HHO yet; and few of Stan Meyer's best secrets died with him and are now only start to be reproduced, (Wang et al., 2009).Hydrogen will arise at the cathode (the negatively charged electrode, where electrons come in the water), and oxygen will arise at the anode

material (the positively charged electrode).ie decreased at cathode and oxidation at anode occurs according to absolute faradaic efficiency. They finally construed that gas production is increased by 30 to 40 % with the increase in these parameters. Concentrated solar absorbers are beneficial to act as hydrogen reactors.



**Fig 3.1 Generation of Brown Gas**

Commonly an electrolyte such as baking soda, potassium hydroxide or sodium hydroxide is added to distilled water in order to make it more conductive to electricity. A Brown's gas generator can be configured as a single cell or a series of cells in order to produce more oxyhydrogen, but this depends upon the size of the vehicle. (Modi, 2016).

#### 4. ANALYSIS OF EXPERIMENTAL RESULT

Morse test is a very useful test designed for multi cylinder engines. It's basic goal is to find the indicated power adult by a single cylinder. The indicated power is the addition of break horse power and the frictional power losses. With the help of Morse test, you can determine indicated power, frictional power and hence the efficiency of the engine. (Modi, 2016) The observed difference in Break power between all cylinders firing and when one cylinder cutoff the power its Indicated power of that cylinder. Summation of IP of all the cylinders would then give the total IP of the engine under test. (Shivaparsad et al., 2016)

**Table 4.1. Comparison of Brake Power at Various Load Conditions**

S.No	Net Load (Kg)	R.P.M (Gasoline)	R.P.M(Brown Gas)	B.P (KW) (Gasoline)	B.P (KW) (Brown Gas)
1	5	3850	4260	2.6640	2.922
2	10	3600	4000	4.9176	5.398

3	15	3380	3620	6.92	7.379
4	20	3250	3480	8.748	9.379

∥

**Table 4.2 Comparison of Mechanical Efficiency at Various Load Conditions**

S.No	Net Load (Kg)	R.P.M (Gasoline)	R.P.M(Brown Gas)	Mech.Eff. ( $\eta_m$ ) (Gasoline)	Mech.Eff. ( $\eta_m$ ) (Brown Gas)
1.	5	3850	4260	44.99%	43.48%
2.	10	3600	4000	47.00%	45.99%
3.	15	3380	3620	50.98%	48.00%
4.	20	3250	3480	53.53%	52.40%

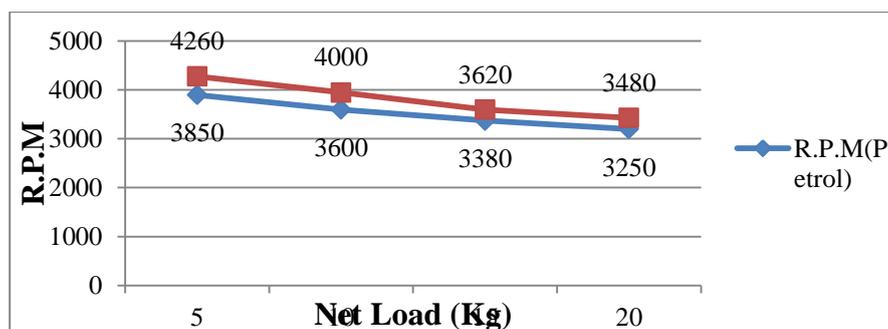
**Table 4.3. Comparison of Indicated Thermal Efficiency at Various Load Conditions**

S.No	Net Load (Kg)	R.P.M (Gasoline)	R.P.M(Brown Gas)	Indicated Thermal Eff. ( $\eta_{Ith}$ )(Gasoline)	Indicated Thermal Eff. ( $\eta_{Ith}$ ) (Brown Gas)
1.	5	3900	4280	17.77%	23.35%
2.	10	3600	3950	28.10%	37.06%
3.	15	3375	3600	30.00%	41.28%
4.	20	3200	3430	32.95%	45.22%

**Table 4.4. Comparison of Brake Thermal Efficiency at Various Load Conditions**

S.No	Net Load (Kg)	R.P.M (Gasoline)	R.P.M(Brown Gas)	Brake Thermal Efficiency ( $\eta_{Bth}$ ) (Gasoline)	Brake Thermal Efficiency ( $\eta_{Bth}$ ) (Brown Gas)
1.	5	3900	4280	7.99%	10.16%
2.	10	3600	3950	13.21%	17.05%
3.	15	3375	3600	15.28%	19.81%
4.	20	3200	3430	17.96%	23.69%

## 5. GRAPH AND THEIR INTERPRETATION

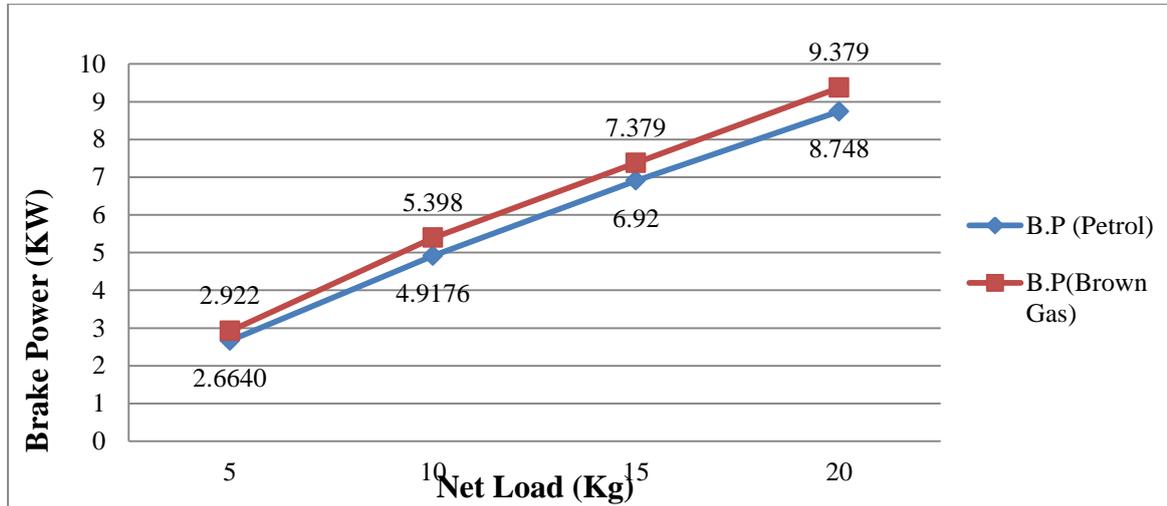


**Fig 5.1 Comparison B/W R.P.M in Gasoline & Brown Gas at Different Load Conditions**

**Graph Interpretation:**

From the above graph it is evident that there is increase in R.P.M when we use the mixture of Brown Gas and Petrol as fuel in comparison to that of petrol only. This is because of good burning of gas which may be likely due to the bearing of brown gas.

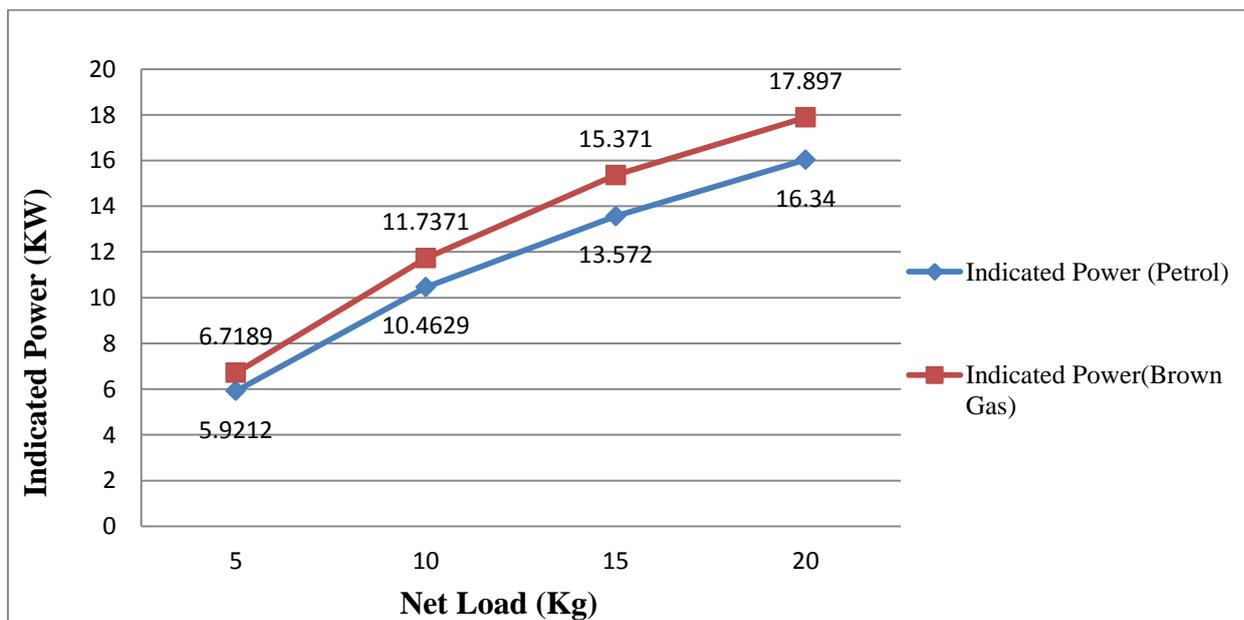
**GRAPH No.2**



**Fig 5.2 Comparison B/W Brake Power in Gasoline & Brown Gas at Different Load Conditions**

**Graph Interpretation:**

It that for the same engine running at constant revolutions per minute there is increase in brake power with the increase of load. However at the same load and revolutions per minute condition it is seen that there is rise in brake power obtained on the engine shaft when blended fuel is used in comparison with petrol as the lonely fuel only. The increment in brake power with HHO

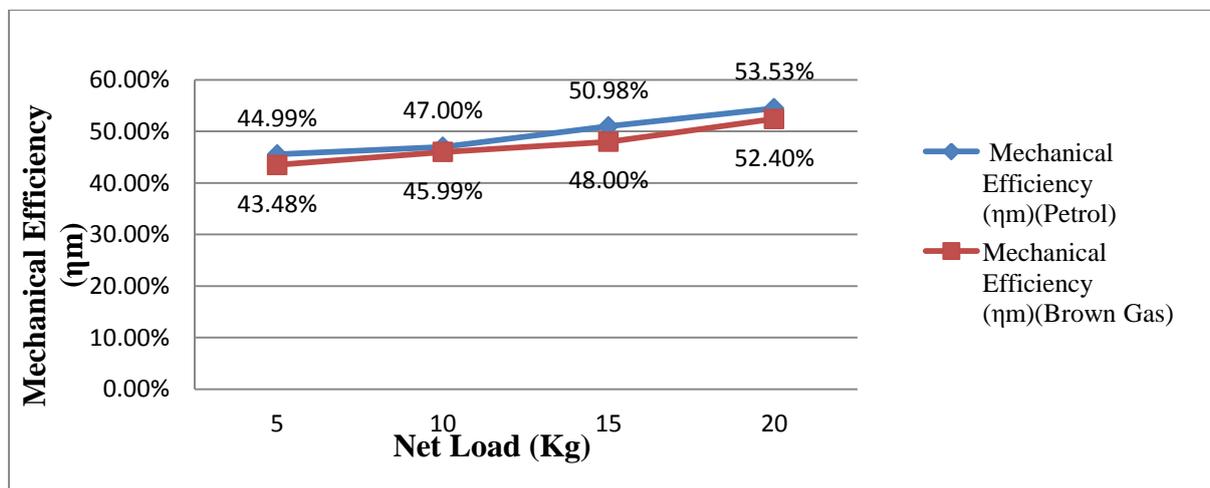


**Fig 5.3 Comparison B/W Indicated Power (I.P) In Gasoline & Brown Gas at Different Load Conditions****Graph Interpretation:**

From the above graph it is patent that there is increment in Indicated Power find from the engine when petrol with brown gas is used as fuel in comparison to that when only petrol is used as the fuel.

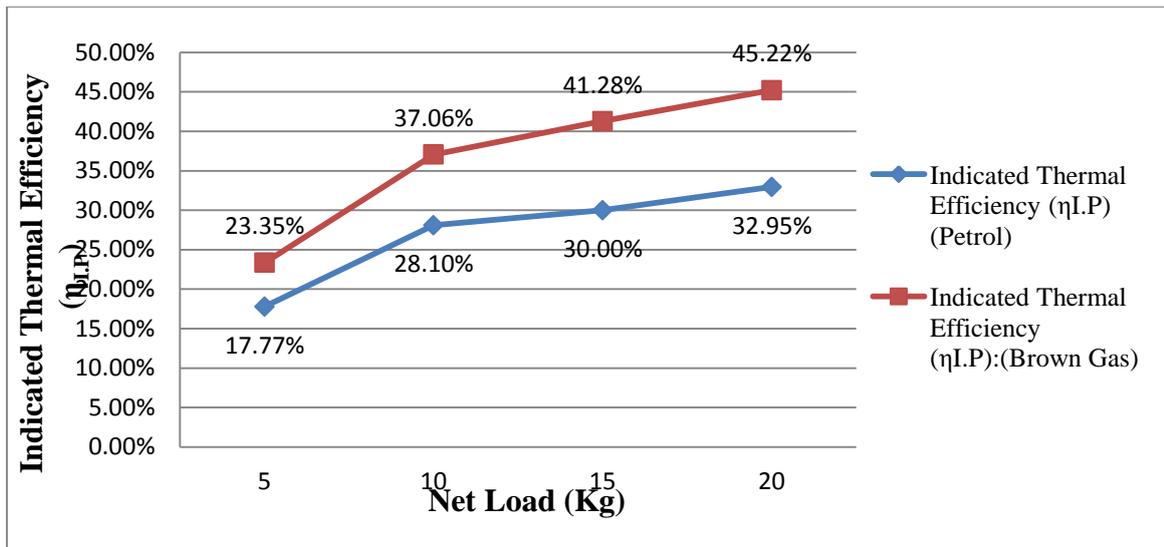
It may be because of the given reasons:

- Implosive nature of brown gas flame.
- High compression ratio formed due the high auto ignition temperature of hydrogen.
- High flame speed.
- High revolutions per minute at same load condition.

**GRAPH No.4****Fig 5.4 Comparison B/W Mechanical Efficiency (ηm) In Gasoline & Brown Gas at Different Load Conditions****Graph Interpretation:**

The above graph suggest that for the same engine running at constant speed the mechanical efficiency obtained from the blending mixture of brown gas and petro is less in comparison to that of pure petrol. This decrease in mechanical efficiency is probably because of the increase in frictional losses due to the large amount of heat produced by the combustion of mixture of brown gas and petrol.

**GRAPH No.5**

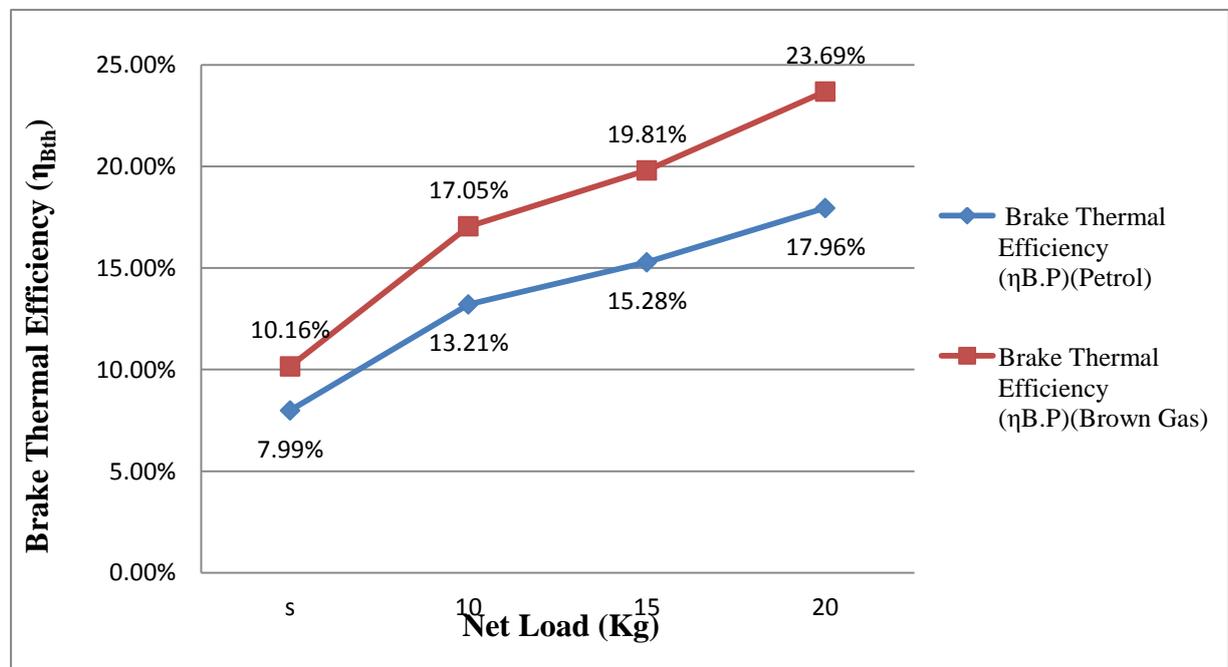


**Fig 5.5 Comparison B/W Indicated Thermal Efficiency ( $\eta_{I.P}$ ) In Gasoline & Brown Gas at Different Load Conditions**

**Graph Interpretation:**

The above graph shows the major increase in indicated efficiency when the petrol with brown gas is used as fuel in comparison to that of pure petrol. This is because of the high power potential obtained from the combustion of brown gas and better combustion condition.

**GRAPH No.6**



**Fig 5.6 Comparison B/W Brake Thermal Efficiency ( $\eta_{Bth}$ ) In Gasoline & Brown Gas at Different Load Conditions**

**Graph Interpretation:**

The trend obtained from the above graph shows that there is rise in brake thermal efficiency when the petrol with brown gas is used as fuel in comparison to that of pure petrol. This increase in brake thermal efficiency is due to better combustion and more amount of heat liberation.

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**YOGA AS A TECHNOLOGY FOR LIFE TRANSFORMATION.**

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**Abstract**

Yoga itself is a Technology of self transformation to become a joyful, wonderful and impactful human beings in this world. A transformation is a dramatic change in form or appearance, attitude and behaviour of a person and positively affect all the aspects of the health. Transformation through yoga make yoga practitioner physically, mentally, socially and spiritually strong. Along with offering direct health benefits, the various yogic tools—including the physical postures, breathing techniques, and meditation—are the part of a systematic technology for life transformation, a step-by-step method for changing bad habits. The Eight Limbs of yoga which was skillfully decorated by Maharishi Patanjali is one of the best specimen of life transformation shows that physical practice is only a small percentage of yoga as a whole. Generally we think that yoga is exercise, rituals or a religion, but infact yoga is a system of self development by controlling the mind and allow to grow and rise in consciousness. Eventually, it seeps into every aspect of life and transforming it completely. This paper discusses that the eight limbs of Ashtanga Yoga play a vital role in the life of every human being and one can transform his life for the betterment of self and society too. The main aim of this study on eight foldpath of yoga is to give us the primary picture of how yoga is beneficial in our day to day life in the long run. Through yogic lifestyle individual can be capable to open up all dimensions of the life to attain higher consciousness.

**Keywords:** Yoga, Technology, Self Transformation, Yogic Lifestyle, Consciousness.

**Introduction**

Yoga is an ancient art as well as science that originated in India around six thousand years ago, which includes different practices and techniques mentioned in the some yogic literature and scriptures. The word “yoga” comes from a Sanskrit root “yuj” which means union, or yoke, to join, and to direct and concentrate one's attention[1]. Yoga is practiced not only to get healthy body and mind but also bringing spiritual progress in the body and mind for self transformation and development by controlling the inner energy of the body. It helps to get a higher level of consciousness by gaining control over the body in all aspects (physically, mentally, socially, and intellectually). Regular practice of yoga promotes strength, endurance, flexibility and facilitates characteristics of friendliness, compassion, and greater self-control, while cultivating a sense of calmness and well-being[2]. It is believed that true state of human being is that of “sukha”, or a state of bliss. The main purpose of Yoga is to free us from all turmoil and confusion. Yoga do not only liberate us from the shackles of our innumerable desires but also prepare us from all challenges by awaken true knowledge within us and to help us to be in a state of harmony. Yoga provides a better system of living. In Yoga Sutras, Patanjali outlines an eightfold path to awareness and enlightenment called ashtanga, which literally means “eight limbs”[3,4]. Ashtanga Yoga is the foundation of all Yoga practices, which is mentioned In the second chapter of Patanjali Yog Sutra (Sadhana Pada) where Maharishi Patanjali outlines the path to Kaivalya (moksha) through -- Eight limbs of Yoga. Ashtanga Yoga is considered as a fundamental system to travel on the pathway of yoga practice.

In essence, it is a master plan for life and beyond it. Eight limbs of yoga serve as an instruction for one's morality, self-discipline, ethical conduct, value and principles which eventually leads to universal realisation.

### **Ashtanga Yoga - yogic key to life transformation.**

Ashtanga Yoga is the foundation of all Yoga practices, which is mentioned In the second chapter of Patanjali Yog Sutra (Sadhana Pada) where Maharishi Patanjali outlines the path to Kaivalya (moksha) through Ashtanga Yoga -- Eight limbs of Yoga also known as eight fold paths and Raja yoga. These eight steps helps people to live a meaningful life in the right flow by staying healthy and connected to the inner self. These steps help to stay focused and live a more purposeful life. Mainly yoga asanas focus on the body and pranayams focuses on mind and rest of limbs of yoga focus on transforming the suffering and inner struggles by disciplining the five senses. Most people who are new to the world of yoga are not familiar with 8 limbs of yoga and if they are familiar then they don't know how to make use of these life transforming steps in their day to day life. Embrace the 8 limbs of yoga into everyday life to connect with inner self and deepen the understanding of yogic life. There is detailed information given below about each of the 8 limbs of yoga.

### **Yama: (Moral vows)**

The first limb of yoga refers to discipline and moral values that are mainly concerned with our surroundings and our interaction with others. According to Pranav Pandya, yama is a method of energy conservation and niyama is purification of human tendencies[5]. The first of the 8 limbs of yoga prepares us to be honest, kind, truthful, and use soul in a worthwhile way by benefitting everything and everyone around us. Here are five Yamas:

**1) Ahimsa (non-violence):** It can be demonstrated by being kind to self, others, nature, and all other living things on the earth. It also includes eliminating unnecessary and negative thoughts from the mind and encouraging others to live life happy and peacefully.

**2) Satya (truth):** It means to live an authentic life, being honest, and building better relationships to family members and with the people around us. Truth and calmness come into one's life if he/she continue to practice satya every day.

**3) Asteya (non-stealing):** Asteya is the third Yama that educates us to live a life without stealing anything and it also covers mental theft. Wrongfully honoring your needs or stealing someone's concept falls under this Asteya.

**4) Aparigraha:** This Yama educates us to live a simple and peaceful life and obsess over nothing. In simple words, there is no need to be greedy.

**5) Brahmacharya:** This Yama tells us to have self-control without overindulging into the senses.

### **Implementing Yama into life**

(a) Be gentle, polite and friendly while speaking to someone.

(b) Always own things that you really need.

(c) Don't ever have thoughts of revenge for anything.

(d) Try to appreciate everyone rather than getting jealous.

By following these simple steps, one can be able to incorporate the first limb of yoga into his/her life.

### **Niyama: (Self-discipline)**

The second limb of yoga is all about self-discipline and spiritual observance. It guides us to live a healthy life by following a few sets of rules like cleanliness inner as well as outer, showing attitude of gratitude, be dynamic and practicing meditation daily. Below are the guidelines for Niyama:

**1) Saucha (cleanliness):** The first Niyama, Saucha means cleanliness. It tells us to keep our body as well as mind clean.

**2) Santosha:** It means contentment, happiness, and mental calmness. Santosha guides us to live a stable life and be thankful for what we have.

**3) Tapas:** Tapas means to bring change to your life. It can be overcoming a bad habit, acquiring a new one, improving health, or taking a new direction in life.

**4) Svadhyaya:** This means self-study or to read good books. It prepares us to go deeper into practice through self-examination. It's also an effort to know self through deep concentration.

**5) IshvaraPranidhana:** It is referred to as devotion or surrender to the supreme soul or higher power. Being the last Niyama, it's one of the most difficult for an individual to embrace it.

### **Implementing Niyama into life:**

(a) Choose carefully things or person that are willing to come into your life, be it food, emotion, or person.

(b) Meditate daily to calm down the mind and avoid distractions in your lives.

(c) Integrate IshvaraPranidhana in your daily life to beat unnecessary stress and depression building in your mind.

Yama and Niyama are an ethical practice that helps one to develop a yogic lifestyle.

### **Asana: Physical practice**

The third and the most popular limb of yoga is Asana which means physical practice. Asanas are the movements and postures that perform during yoga practice. According to Dhyani-bindupanishad, the asanas are as many as there are number of species[6]. Through the practice of asana, we develop the habit of discipline and concentration, both of which are necessary for meditation. "By practicing asanas the person frees himself from physical disabilities and mental distractions"[12].

### **Benefits of integrating asanas into your daily life:**

(a) Asanas essentially work to lubricate the muscles, joints, ligaments and other parts of the body.

- (b) Practising daily asanas can boost up energy and also improve immunity.
- (c) It helps in weight loss and boosts digestion and blood circulation.
- (d) It creates mental, physical, and emotional balance in the body.
- (e) Yogasana makes the body and mind feel light. It brings together the scattered mind.

### **Pranayama: Breath control**

Pranayama is the fourth limb of the eight-fold path of yoga. Pranayams comprising of techniques designed to gain mastery over the breathing process while creating a connection between body, mind and soul. According to Pt S. Sharma, meaning of pranayama is the evolution and purification of pran tattva[7]. Taking deep focused, rhythmic breaths makes the core of Pranayama techniques, the fourth limb of yoga.

### **Benefits of performing Pranayama:**

- (a) Pranayama strengthens the various muscles used in breathing, increasing lung capacity up to some extent and improving blood circulation throughout the body.
- (b) By exhaling excess carbon dioxide and inhaling oxygen can enhance the functioning of lobes and internal organs and boost the immune system.
- (c) Stimulates various body organs and systems for improved overall health.
- (d) Helps to improve sleep quality and reduce insomnia, anxiety and stress.

These four stages of Raja yoga concentrated on refining one's personality and gaining mastery over the mind and the body.

### **Pratyahara: Withdrawal**

The fifth limb of yoga is Pratyahara which means disconnection of an individual from the outer world. According to ParnavPandya, pratyahara is a method of conservation and transformation of micro energies of life. Through this the force being scattered outer world are utilised internally[8]. The practice of Pratyahara provides an opportunity to withdraw from the outer world and take a look at ourselves. Shifting focus away from the different habits that are detrimental to the health is the practice of Pratyahara, the fifth limb of yoga.

### **Benefits of integrating Pratyahara into daily life:**

- (a) Reduces negative thoughts, emotions and feelings.
- (b) Promotes inner joy, calmness and happiness.
- (c) Good for spiritual practice for yoga practitioner.

### **Dharana- Concentration**

Once you have mastered the fifth limb of yoga by blocking all the various external stimuli, now it's time to implement Dharana into practice, the sixth limb of yoga. Dharana is holding the mind to one place, object or point[9]. In the practice of concentration, one can learn meditation by slowing down the thinking process by concentrating on specific object.

### **Dhyana: Meditation**

The seventh limb of yoga, Dhyana is a kind of meditative state that comes after a long practice of Dharana. Dhyana is simplified as a state of quietness in the mind, shutting off all the various distraction from the outer world. According to Jnanadev, Meditation is not action; meditation is inaction[10]. In the meditative state of Dhyana, the mind becomes still and clear. There is not any kind of fickelnes. This is a difficult limb to master and it takes many years of practicing to access this meditative state. But that doesn't mean that anyone can't access this state. Using the strength, discipline, and concentration from the Yama, Niyama, Asana, Pranayama, and Dharana, one can achieve this state over a period of time.

### **Samadhi: Pure contemplation**

The last limb of yoga is Samadhi which refers to as an ultimate state of consciousness, bliss, deep, enlightened, and everlasting connection to a divine source that was always present. After spending a long time in a meditative state and being in a permanent state of dhyana, one will experience Samadhi. This limb of yoga connects with the universal consciousness. According to P. Pandya, one can enter into samadhi only by achieving deepness, ripeness and mastery over dhyana[11]. All the eight limbs of yoga can be implemented into daily life. All we need is the will to master them! Above were the eight limbs of yoga. Practicing all the eight limbs will help to connect with a divine soul or force and lead a life full of bliss and enlightenment.

### **Conclusion.**

Yoga improves overall well being of a person, which is a great challenge in this fast-paced life and we need to work on it regularly. The ultimate aim of yoga is to make life healthy in every aspects of the health. In the end the findings of the study also show that the eight foldpath of yoga might be effective in life transformation and to achieve a higher consciousness. The eight steps of yoga is complete package in itself which opens up all the dimensions of life. These eight steps teaches us a lesson that how we can live our life by executing these steps in our daily life and transform our life in better way. Now a days the whole world is full of misries, diseases, evils and many more, so in this time of uncertainty only divine knowledge of yog can help us and pull out the whole world from all misries, diseases, evils and make the world a better place to live in.

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# International Journal of Technical Research

Volume 1 : Oct, 2021- Dec, 2021

ISSN 2278-5787(Online)

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