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CHANGING CULTURE AND STATUS OF WOMEN IN GLOBALISED INDIA

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ABSTRACT

Women have always been recognised as objects fulfilling the desires of men. They are looked down by the society despite of their unconditional sacrifices and contribution to wards family and nation building. This has led to crimes against women since the evolution of the society. Economic necessity of women has further added to the problems of women. The concepts of feminism, women empowerment have lost their significance even after evolution of the modern society. In male chauvinistic society like India the atrocities against women are increasing. This is matter of great concern not only in India but also worldwide. The globalisation and economic liberalisation has further aggravated the problem.

Key Words: Women, Crime, Feminism, Empowerment, Globalisation, Liberalisation

1. INTRODUCTION

Globalisation is a new buzzword introduced in 1990s. Globalisation is a process of structural adjustment increasingly emerging as a kind of irreversible process that challenges the importance of the authority and welfare functions of the State. The essence of globalization in a broad sense is connecting in all aspects of human life. Cross-border integration can have several implications in cultural, social, political and economic dimensions.

Globalisation has a very profound impact on Indian culture apart from Indian economy. Westernisation in Indian culture has been the by-product of globalization and it has tremendously affected the Indian way of life. It has out-rooted the traditional Indian culture. Globalisation has affected Indian society in so much so that it has affected the morality of people, thereby increasing the rate of crime in India during post globalization era.

The culture of any country does not only portray the region and language of the region, but it starts with the mindset and mentality of the residing citizens. Indian culture is quite rich with respect to its heritage and resources, and more importantly due to the welcoming approach of its citizens. India is bouquet of flowers varying religion, dialect, edibles, tradition, custom, music, art and architecture etc, bundled into a single unit of patriotism and unity. The common factor within all these diversities is the Indian mindset of welcoming, greeting, celebrating in a united way with immense affection and togetherness. This is the rich essence of the Indian culture that has attracted many foreigners to stay back in India and mingle into its eternal fragrance.

2. THE NEGATIVE IMPACT OF GLOBALISATION AND CULTURE

- a) The joint families have become a strange surprise to the Indians especially to those residing in the metropolitan cities in the small flat culture with the nuclear families blooming up like mushrooms in the rain. We have lost the patience to get adjusted into the joint family, imbibing the values of the elders and getting the young ones brought up under the shadow of their grandparents. Children have started treating grandparents like guests or visitors, and such an upbringing is one of the main reasons of increasing old age homes, as those children consider their own parents as burden in their state of adulthood.
- b) Similarly, marriages have also lost their values. It is very much evident from the increasing number of divorce cases and the extra-marital affairs reported every now and then. Marriage used to be considered as bonding of the souls which will be linked even after the death; but today marriage is like a professional bond or a so-called commitment to share life without compromising their self-interests. The ego factor into the Indian youth is again a product of globalization.
- c) Both the genders were kept at a distance, with lot many restrictions and limitations to the approach for ages in our culture. With the emergence of globalization and western culture, youth have start mixing up well with each other. The friendly approach and the socializing feature is worth appreciable. But the total breakout of restrictions have adulterated the Indian mindset, playing up with the physical relationship. This has given birth to new relationships in India like live-in relationships. Also the increased cases of rape and sexual abuse cases are a result of the perverted mind which again the imported values very much alien to our mother culture.
- d) Indian culture has incorporated values of treating the guests as God, warm-hearted welcoming, greeting elders with due respect and a celebrating every small festival with great colour of enjoyment and togetherness. Such a wide gathering with full hue and light can hardly be seen today. People have highly

restricted themselves in social interaction. The interaction in present generation is highly diplomatic considering the financial status and wealth. We have lost our social values and cheerful blessing of togetherness. The present generation are more happy celebrating Valentine's Day rather than Holi and Diwali.

- e) Indian food, clothing and languages are varied with respect to different states. The food varies in its taste, but every food has its own nutrient value and every region is specified and rich in its medicinal preparations with the home remedies. Even the clothing varies in different states which is very much particular in maintaining the dignity of woman. The varies cuisines from all over the world though have different flavours to add, still the food ingredients that have inflicted with much popularity are the junk food items which has increased the health disorders in the country. Again the dressing like the suitings for the males are an inappropriate match for the Indian type of climate. The female dresses are again a way of distraction to the perverted minds.

Even the Indians are not very much in favour of promoting their mother tongue or our national language. Instead the youth today consider it to be a shameful condition to speak in their national language Hindi. The way the foreign languages are getting prevalent in India like the French, German and Spanish, right from the school level, is the example of how much we provide importance to Indian languages in comparison to the foreign ones.

- f) India was predominantly an agricultural based country. With the advanced globalization and cropping up of MNCs, the farming has lost its prime value in India. Agricultural science has the least focus amongst the youngsters who consider farming as a shameful profession and look down upon the same. Employment through MNCs have lucrative deals attracting the bulk of manpower who are working for the other countries as their customer care representatives. We are losing our health and our status and slowly getting to the age of economic slavery due to these MNCs. This is what the globalization has provided Indians through their emergence.

- g) Even after globalization, the existing social and economic institutions unfortunately have never been address to the crying needs of women. Many critics fear that globalization, in the sense of integration of country into world society, will exaggerate the issue of gender in equality. It may harm especially in India in several ways:

Economically, marginalization of women in unpaid or informal labour and low wages due to gender discrimination even in the organized sector. Politically, through exclusion from the domestic political process and loss of control to global pressures. Culturally, through loss of identity and autonomy to a homogenic global culture.

Globalization has had negative implications for Indian women. Their plights are similar to those of women in other developing regions such as Africa and Asia. Globalization has made many international corporations richer by the billions. However, what most people are not aware of is that women in these developing countries are suffering enormously due to this expansion of corporate empires. According to estimates from World Development Indicators, "Women work two thirds of the world's working hours, produce half of the world's food, but earn only ten per cent of the world's income, and own less than one per cent of the world's property."

3. CRIME AGAINST WOMEN IN INDIA

India has been ranked 114 in a list of 128 countries closely followed by Nepal (125) and Pakistan (126) on the Global Gender Gap report by the World Economic Forum (WEF). "The data captures the magnitude of the gap between men and women in critical areas including economic participation and opportunity, political empowerment, educational attainment, health and survival, female life expectancy and sex ratio at birth."¹ The incidence of crimes committed against women in India has seen a continuous rise over the years. Crimes against women increased. However, the reported number of cases of domestic violence may grossly underestimate the true number of women experiencing domestic violence as many incidents go unreported owing to a lack of effective documentation, the stigma of victimization in Indian society, and fear of social ostracization, all of which may inhibit distraught women from soliciting help. The etiology of violence committed against women may be traced at its roots to the characteristically patriarchal structure of the family and society at large that fosters the imbalanced power ratio between men and women. The colossal transcendence of women in the work economy of the country since independence has had little effect in eliminating violence against them. There is a case of cruelty by husbands and relatives every nine minutes, and one dowry-death case every 77 minutes.

4. INCIDENCE OF CRIME AGAINST WOMEN

Violence against women is extremely common. Kaur (2011) has commented that ‘Violence against women and girls is one of the most widespread violations of human rights. It can include physical, sexual, psychological and economic abuse, and it cuts across boundaries of age, race, culture, wealth and geography’ a statement that is amply justified by the events taking place in India every day. It takes place everywhere in the home, on the streets, in schools, the workplace, in farm fields, refugee camps, and in some places such as red light areas and prisons it is extremely common (Golden 2004). Crime against women is grossly underreported, both in India (Jain, Mathur, Kothari and Mathur 2008, Mukhopadhyay, Partha, Karmakar, Sarkar, Chatterjee and Nigam 2010, Al-Azad, Raman, Ahmad, Wahab and Ali 2011) and elsewhere (Boyer and Dalton 1997, Green 2004). The correct figures are difficult to obtain and in their absence it is difficult to know whether the actual incidence is rising or falling. There are certainly more cases being reported to the police, but whether this reflects an increase in reporting or an increase in actual crimes, we know not. Communal rapes which take place in this part of the world are totally different and their occurrence confounds the analysis of any data that is at hand (Khanna 2008).

The National Crime Bureau Data reveals the incidence of crime against women in India.

TABLE-1: CRIME AGAINST WOMEN (1990-1994)

Sl.No.	Crime Head	1990	1991	1992	1993	1994
01	Rape	9518	9793	11,112	11,242	12,351
02	Kidnapping and Abduction	11,699	12,300	12,077	11,837	12,998
03	Dowry Deaths	4,836	5157	4,962	5817	4936
04	Torture	13,450	15,949	19,750	22064	25946
05	Molestation	20,194	20,611	20,385	20,985	24,117
06	Sexual Harassment	8,620	10,283	10,751	12,009	10,496
07	Importation of Girls	----	----	----	----	167
08	Sati Prevention Act	----	----	----	----	02
09	Immoral Traffic (Prevention) Act	----	----	----	----	7547
10	Indecent Representation of Women	----	----	----	----	389
	Total	68,317	74,093	74,037	83,954	98,948

Source: National Crime Record Bureau

Table-1 above shows the rate of crime against women in India during globalisation i.e. from 1990-1994 in India. The table reveals that the incidence of crime under certain heads gradually increased and incidence under certain heads took place for the first time immediately following globalisation. For example the number of rape increased gradually from 9581 in 1990 to 12, 351 in 1994. The same result we get in case of torture and molestation. Kidnapping and abduction showed the same trend except in the year 1993. The reported case of sexual harassment increased from 8620 in 1990 to 10496 in 1994. Where as certain offences took place for the first time in the year 1994 like importation of girls, immoral traffic (Prevention) Act and indecent representation of women.

Table-2 below shows the number of crimes against women from 2010-2014. It is shocking to see that the incidence of rape increased rapidly from 22172 in 2010 to 36,735 in 2014. Similarly the incidence of kidnapping and abduction assault on women shows high increase i.e. nearly double from 2010 to 2014. Total crime incidence increased from 2,13,585 in 2010 to 3,37,992 in 2014.

TABLE-2: CRIME AGAINST WOMEN (2010-2014)

Sl.No	Crime Head	2010	2011	2012	2013	2014
01	Rape	22,172	24,206	24,923	33,707	36,735
02	Attempt to commit rape	---	---	---	---	4,234
03	Kidnapping and abduction of women	29,795	35,565	38,262	51,881	57,311
04	Dowry Deaths	8,391	8,618	8,233	8,083	8,455
05	Assult on women with intent to outrage her modesty	40,613	42,268	45,351	70,739	82,235
06	Insult to the modest of women	9,961	8,570	9,173	12,589	9,735
07	Cruelty by husband or his wives	94,041	99,135	1,06,527	1,18,866	1,22,877
08	Importation of girl from foreign country	36	80	59	31	13

09	Abetment of suicide of women	---	---	---	---	3734
10	Commission of Sati Prevention Act	0	0	0	0	0
11	Indecent representation	895	453	141	362	47
12	The Dowry Prohibition Act	5,182	6,619	9,038	10,704	10,050
13	Protection of women from Domestic Violence Act	---	---	---	---	426
14	Immoral Traffic (Prevention) Act	2,499	2,436	2,563	2,579	2,070
	Total	2,13,585	2,28,650	2,44,270	3,09,546	3,37,922

Source: National Crime Record Bureau

The analysis of above two tables clarifies the fact that the crime rate against women in India has not only increased but has also introduced new crime heads after globalisation and liberalisation.

5. APPROACH TOWARDS SAFETY OF WOMEN

a) **To increase reporting of rape and assault cases:** To increase the reporting of such cases at first we need to empower the women and children. They must be educate on their rights and encourage them to come forward to register the cases. There are many violent cases but due to stigma in the society very few are reported.

b) **Law enforcement agencies:** Law enforces should be well trained to react swiftly and with sensitivity towards the women and children cases.

c) **Exemplary punishment:** Punishment of every culprit need to be exemplary. Campaigning of “Zero-tolerance” of sex offenders. More and more fast track court should establish.

d) **Proper planning of the city:** Every city should be planned in a very specific manner. According to Ranjana Kumari, director of Delhi 's Centre for Social Research, only 37% of the city was ever planned. "The rest is . . . slums, villages, with no proper lighting or development," she said last week. "There are many pockets of crime."

e) **Indian Police system:** Neither the Centre nor States have been proactive in improving the quality of Policing. Official records shows that only 14 states have either enacted the New Police Act or amended their existing laws to incorporate SC's suggestion.

6. CONCLUSION

From the afore stated premises it can be concluded in saying that due to globalisation and economic liberalisation the Indian cultural and social values have undergone a drastic change. It has affected Indian culture in numerous ways starting from changing family structure from joint to nuclear to employment and status of women in the society. The liberalisation of economy opened up various avenues for women to fulfill their economic necessities by marginalised their employment and exposing them to various hazards. The following are the recommendations to reduce the incidence of crime against women.

7. SUGGESTIONS

- ✓ Educating women about their rights through mass media.
- ✓ Training for personal safety and self-defence may be introduced as part of curriculum staring from High school to college level.
- ✓ Women counselling centres may be introduced at district level to enable them to exercise their rights in the appropriate forum.
- ✓ Strict implementation of laws relating to women.
- ✓ Changing the mindset of people and society at large .

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IMPACT OF ORGANIZATIONAL POLITICS ON EMPLOYEE JOB PERFORMANCE

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ABSTRACT

The information technology industry is today's fastest growing industry around the globe. The information technology industry is now a days going through a lot of technological changes and increased competition at a very fast pace. Every second some new is being technology is developed and the industry needs more people to work upon it efficiently. With the increase in the development of new technology and the upcoming changes in the work culture, organizational politics is also increasing in the organizations to fight the competition.

The purpose of this research is to determine the effect of the growing organizational politics in the organizations on the job performance of the employees in terms of their productivity, efficiency, motivation to work, innovation at workplace, etc. The theoretical portion of this report has been studied with an aim to gain a better understanding about the various concepts related to the organizational politics. Even though there is a lot of literature related to the organizational politics, not much literature can be found to study the link between organizational politics and the job performance. The primary research was conducted to examine the extent of organizational politics, its impact on the job performance and the policies implemented by the companies to reduce the political environment at the work place.

The research was conducted through interviews and questionnaires which were targeted towards the employees working in various IT companies. After analyzing the data of the research results showed that organizations have now become more focus on reducing the politics in all the dimensions at the work place in order to have more innovation, increased productivity and less attrition rate at the workplace by promoting more team work and equality in the reward, pay and promotion systems.

Keywords: Organizational Politics, Employee performance, IT companies.

1. INTRODUCTION

Work environments have gone through an inevitable evolution witnessing a number of monumental transformations. Operations are now conducted in revolutionized ways that were unbeknownst before. In the current ever-dynamic marketplace, organizations are faced with continuous challenges ranging from hard (like technological challenges) to soft (like behavioral challenges) in nature. Negative behaviors will ultimately result in reduced job performance, moreover if they are linked with unhealthy elements such as organizational politics.

In the recent years, the impact of organizational politics has been studied extensively to predict its impact on the various domains in an organization and has emerged as an excellent predictor of job performance in the organization. Organizational politics is described as an activity that permits the people in organization to accomplish their goals without going through the proper channels. Whether the political activities assist or harm the organization, it depends on whether the goals of individuals working in the organization are consistent with the goals of organization. There has been no doubt that political beliefs are now a common observable fact in almost every organization. Organizational politics represented dishonest behavior of employees towards their work environment exclusively for their self-interests. These self-interests of the members may be at the cost of other employees or may be organizational goals as well.

Organizational politics is an indefinable type of power relation at the workplace. It represents a distinctive domain of interpersonal relations that are characterized by the direct or the indirect engagement of the members of organization in influencing tactics and the power struggles. These activities are usually aimed at protecting or enhancing personal interests or, alternatively, avoiding negative results within the organization (Kacmar & Ferris, 1991). Whereas, they might also be targeted at securing or maximizing the collective interests of a team, a group, organization, or social interests in cases where certain decisions are possible that can affect different interests.

It is very difficult to avoid organizational politics till the time human are working in the organizations. The organization politics no doubt has an effect on an employee's work performance due to the reason that if an employee feels that even if works very hard he will never be able to receive recognition for his hard work just because he not in the good books of his line managers. And that is the reason when he comes to workplace and still does not put in his complete efforts to ensure that the organization grows in a positive direction. This in

turn may have an effect on the organization's overall financial turnover, which in turn may lead to layoffs and increased attrition rates.

Organizational politics can have an effect on the employee's job performance since there is a lot of increased competition in today's scenario in almost every organization. This leads to an increase in jealousy and cliques among the colleagues, whereas, this is not ideal for any organization where the organizations depend on teamwork. Organizations where politics is more the employees will never be united then their efficiency and productivity will be reduced.

2. LITERATURE REVIEW

2.1 Organizational Politics

Various researchers have revealed that the politics in an organization has a pessimistic impact on a variety of outcomes related to the establishment. Steers and Porter (1979) described organizational politics is the primary variable in establishing job attitudes. It consists of participation in and recognition with the association and it is appreciably influenced by work satisfaction and on the whole environment.

It was suggested by Kacmar and Carlson (1994:3), and Kacmar and Ferris (1991:193–4) that the perceptions of organizational politics represent the degree to which respondents view their work environment as very political in nature, that promotes the self-interests of others, and thereby it is unjust and unfair from the individual's point of view. This study proposed a scale for the measurement of political perceptions called the 'Perceptions of Organizational Politics Scale' (POPS). Currently, the cognitive perspective is a very dominant approach in the study of organizational politics and it has led to an increase in the number of empirical studies on the effect of organizational politics on employees' attitudes behavior and especially the performance in the workplace. The relationship between the organizational politics and job performance is important because it has both theoretical and practical implications. It can potentially help us in better understanding the meaning of organizational power, conflict, and posit hypotheses and influence tactics regarding their meaning for micro- and macro-level of organizational outcomes. Further, it can point to practical tools for handling workplace politics and minimizing the negative effects on members, teams, and the organization as a whole.

Randall et al (1999) proposed that perceived organizational support was related to the job performance of the employees, when it was used as an individual variable. However, when a combination of both the perceived organizational support and politics was used, its influence on job performance was considered to be negligible.

Some researchers have pointed towards that political affairs had little influence on work pleasure, nonattendance, and employees' job nervousness showing considerable control over their work atmosphere (Andrews, Ferris et al., 1996; Witt & Kacmar, 2000). Hypothesis related to the organizational politics and job satisfaction tested by Valle and Witt (2001). It explained that sensitivity of managerial political affairs are directly associated with job dissatisfaction who believe low degree intensity of cooperation significance than who consider high degree of cooperation significance. This research applied the regression analyses on a sample size of 355 permanent human resources of a client service association in the eastern United States.

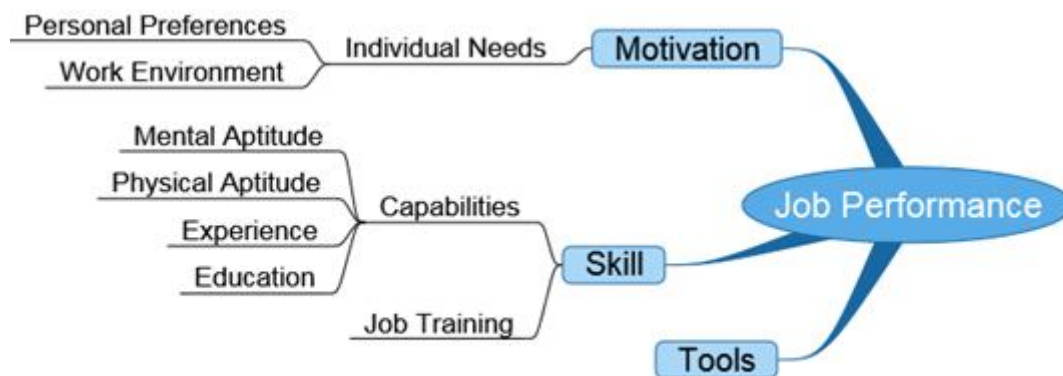
According to Dubrin, (2001) organizational politics is considered as an unofficial advancement for attaining the power in the organization. Similarly, it could be explained by achieving power through various other ways except by merit or by fortune. It can be described that politics is usually used to achieve power, either by hook or by crook. These all have done for personal benefits for example for getting promotion, obtaining huge funds or gaining other resources, or getting desired projects.

Kacmar and Andrews in 2001 explained two different scenarios that consider high level of politics. For attaining personal benefits the individuals avoid the authority chain, they use the short cuts and then go through informal channels. Sometimes various silent political activities occur in the organization for getting the desired outcomes. These activities are considered more dangerous than the active political activities. It includes only the individual personal benefits at the cost of organizations objectives or other individuals.

According to the Harris (2004) perceptions of politics also possess a negative impact on an individual's job satisfaction, in turn, effecting job performance.

Byrne (2006) concluded that both the interactional and procedural justice was positively correlated with the employee job performance. According to the author, there is no relationship between the perceptions of justice and politics with the performance of the employees in the organization.

2.2 Model of Job Performance



The model shows that an individual's performance consists of three primary elements: Motivation, Skill required and the Tools.

Every individual's **Motivation** depends on their personal needs and on the ways in which their work environment satisfies their needs.

Skills are a function of an individual's personal Capabilities and the Training that the individual is given in the organization.

Tools that used for a particular job enables an individual to multiply the effectiveness of their skills so as to increase their Job Performance.

2.3 Impact of organizational politics on the job performance

1. **Productivity:** Politics lowers the output of an individual and eventually affects the productivity of the organization. Common observation says that individuals who play politics at the workplace pay less attention to their work. They are more interested in back biting and leg pulling. They spend more time in criticizing their fellow workers. Because of the politics at the workplace, employees usually fail to achieve targets given within the allotted time frame. Most of the times the work gets delayed in such organizations.
2. **Concentration:** Individuals find it difficult to concentrate on their work. Such individuals are highly interested in spoiling the every other person's image in front of the superiors. An individual involved in politics is bound to make more mistakes as his focus is somewhere else.
3. **Ambiance of workplace:** Politics leads to a negative environment at the workplace. It spoils the relationships amongst individuals. Any individual who is involved in playing politics at the organization is disliked by all.
4. **Attitude of employees:** Politics changes the attitude of the employees. Even the serious employees lose interest in work and attend office just for the sake of it. Internal politics do not allow employees to give their hundred percent at work. No matter how much hard work an employee puts in, it will always go unnoticed in any politically driven organization.
5. **Motivation:** A non-performer can be the apple of his boss's eye simply due to politics, thus demotivating the performers. Discussions are essential at the workplace to extract the best out of employees. On evaluation of the pros and cons of an idea it always helps in the long run. Employees who are playing politics always look for an opportunity to tarnish the image of the fellow workers. Employees feel demotivated when they are not rewarded suitably or someone who has not worked hard gets the benefits due to mere politics.
6. **Stress level:** It is rightly said that problems evaporate if discussed. Individuals working in an organization always find it difficult to divulge in any of their fellow workers due to the fear of their secrets getting leaked by them. Politics increases the stress level of the employees. No Individuals is a machine who can work continuously for 8-9 hours without talking to others. It is very important to have good friends at the workplace that can help you when needed. Individuals in stress fail to trust each other.
7. **Trust among employees:** Excess of organizational politics leads to reduced trust among the members of the organization. People don't share the problems or issues with their colleagues or seniors. It leads to the loss of

organization for getting more innovative ideas since people fear to share them. This in turn affects the job performance of the employee due to the reason that they will not be able to ask or take help from others.

8. **Transfer of information:** Employees indulged in politics manipulate information and it is never passed on in its desired form. Superiors get a wrong picture of what is actually happening in the organization. A wrong person walks away with the credit in an organization where employees are indulged in politics.
9. **Attrition rate:** Politics if happens too much in the organization it has the worse effect. It leads to strikes and sometimes increases the attrition rate of the organizations since the work environment is not easy to handle. This leads to increase in the job stress of the other employees who are working. They have to do the work which is not a part of their job responsibilities, thus affecting their performance, since some might not be able to handle so much work easily.

Thus, based on the existing literature and the discussion presented above, it can be understood that organizational politics do interact with work performance of individuals. So, in light of the limited research on the possible relationship between organizational politics and employee performance, the present study attempts to fill the gap in existing literature on organizational politics by exploring the possible relationship between the two constructs in the Indian context.

3. PURPOSE, RESEARCH QUESTIONS AND SIGNIFICANCE OF THE STUDY

3.1 Need for the study: On The basis of the reviewed literature, there seems to be a lot of work done in the area of organizational politics and its antecedents. However, employee performance despite being one of the key concerns for any organization, research on employee performance and its relationship with organizational politics is lacking in Indian context. There is a scarcity of research on organizational politics in India and due to this needed focus; the present study is an attempt to fill the gap.

3.2 Objectives of the study: The main objective of the study is to examine the association between organizational politics and employee performance. Specifically, the objectives of the study are:

- ❖ To study the linkage between organizational politics and its effect on the job performance of the employee.
- ❖ To examine the implementation of policies regarding the organizational politics in the IT sector organizations.

3.3 Significance of the study: The results of the survey are considered to be significant because they are intended to assist policy makers to develop strategies for addressing the workplace aspects leading to organizational politics, so as to have a productive and satisfied workforce.

4. METHODOLOGY

4.1 Participants

A predominantly quantitative approach was adapted for this study. Organizations were selected using purposive sampling method. The sample was drawn from employees working at Wipro Infotech Ltd. and IBM. The sample consisted of 238 employees working as middle level managers and executives. Total 300 were approached (150 from each), out of which 238 responses were complete. Mean age of the respondents is 32.6 years.

4.2 Data Sources

For this study primary data as well as secondary data is used. The primary data was collected by researcher personally conducting a field survey. The secondary data available in print form and various online databases were also used.

4.3 Procedure

The survey questionnaire was divided into 2 sections. The first section consisted of questions pertaining to organizational politics and its effect on various dimensions of work and the second section was on the demographic information of the respondents.

4.4 Research Variables

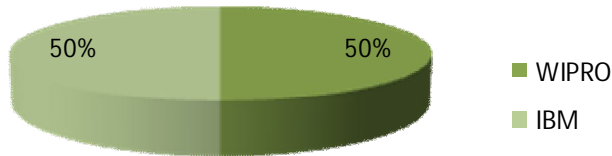
The two key variables in the study are organizational politics as the independent variable and employee performance as the dependent variable

4.5 Data Analysis

The quantitative data collected was subjected to statistical analyses. Statistical analysis was performed using excel.

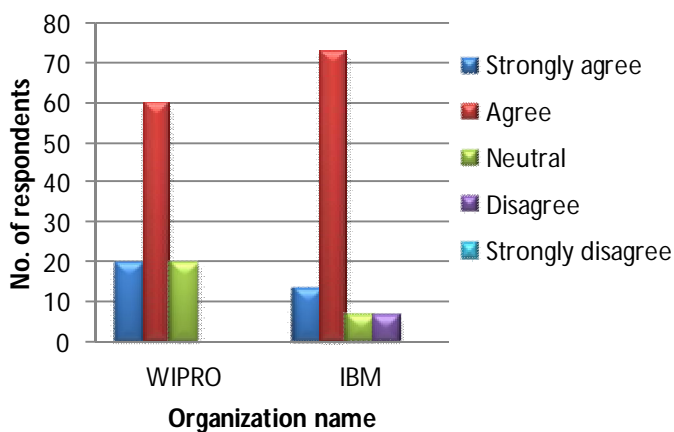
5. RESULTS

No. of employees on each organization



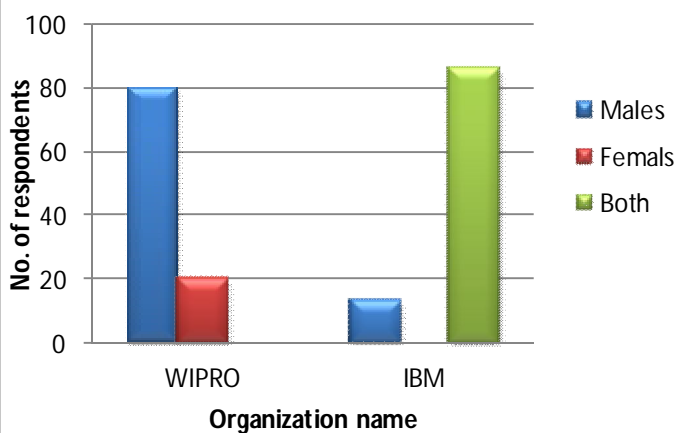
All the data has been collected from the employees of Wipro and IBM only, where, 50% employees are from Wipro and 50% from IBM.

Presense of organizational politics in the organization



Most of the employees agree to this politics exist in their organizations, where as it can only been seen in IBM that there are some employees who say that politics is not there or is less in their organization.

Politics is created more in the organization by-

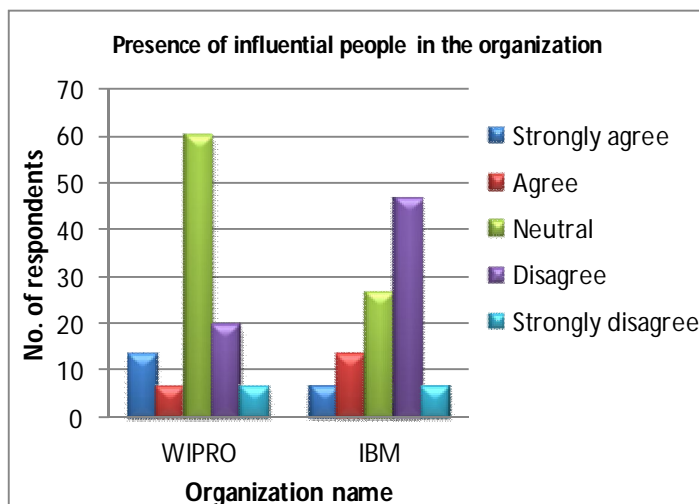
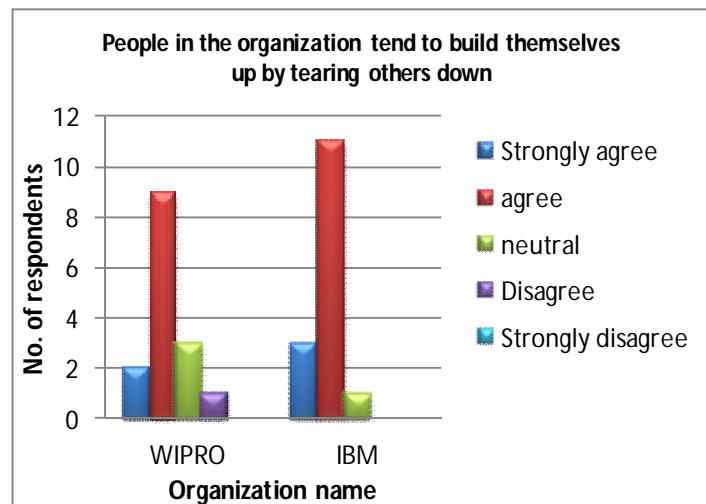


As per the responses, employees at Wipro are very particular about the gender that is involved in the politics. Majority of the employees feel that the politics is created by the males where as, a few respondents also say that only females are responsible for the politics, since it is a female dominated organization. In contrary, respondents from IBM say that in majority both the males and females are equally involved in creating politics in the organization.

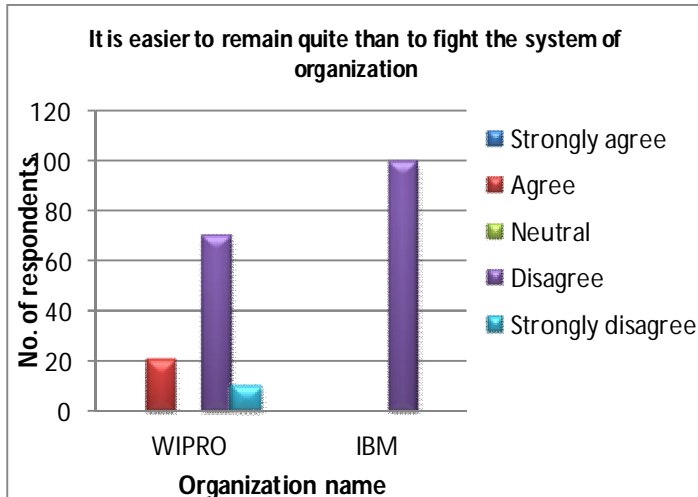
Based on the data, performance evaluation is a major cause of politics in the organizations whereas, the other component that leads to politics is the high competition among the employees and the comparison between them. Others components are almost at the similar level that are a cause of politics.



As per the responses given by the employees of both the organizations, a majority members of both the organizations agree to this fact that there are people in the organization that tend to build themselves up by tearing other employees down. On the other hand, there are a few employees at Wipro who disagree to this fact.



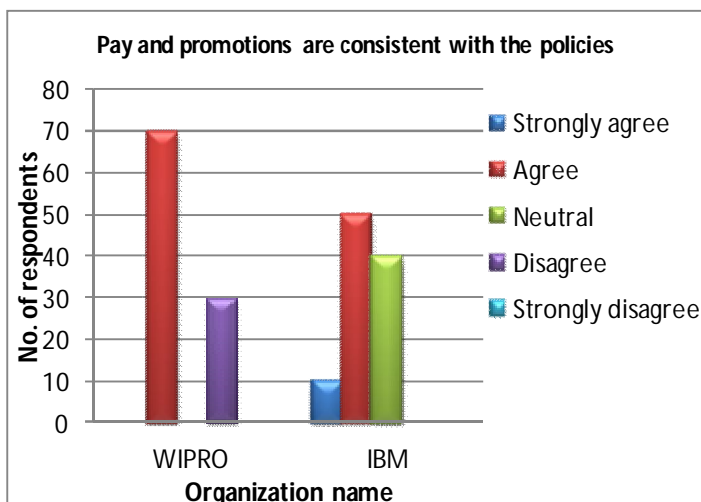
As per the graph, we get two contrary views in the opinions of the employees in the two organizations. At Wipro, the employees possess in majority a neutral opinion in the fact that there are certain people in the organization who influence others. Whereas, at IBM, there is a majority who says that there are no or very less people in the organization who influence others.



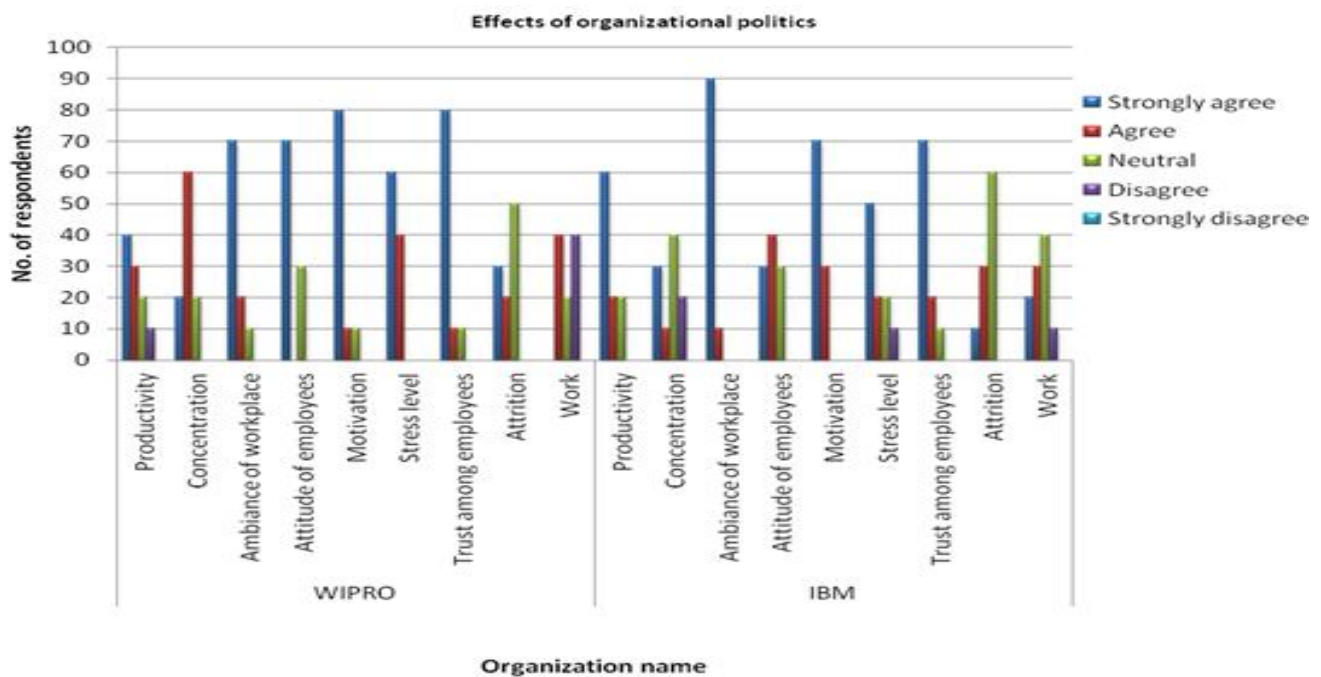
As per the data, all the employees in the organizations feel that they are given opportunity to give suggestion and present their ideas to others. Whereas, some respondents at Wipro say that they feel better to remain quite.



As per the data and the employees' sayings, it is necessary to follow the company policies in the respective organizations and it is also followed in both the organizations. The views of employees of both the companies are similar in this opinion.



Even though the policies are strongly followed in the organizations, the pay and promotions sometimes differ in both the companies from the policies. At Wipro, there is almost a 70:30 ratio in agreeing to this. 70% just agree to this whereas, 30% are against this. At IBM, the majority agrees to this but a few have a neutral opinion about this.



The graph above analyzes the effects of organizational politics on the factors that directly affect the job performance of the employees. The effects are found almost similar in the organizations. The major effect of organizational politics is on the ambiance of the workplace as well as it affects the trusts that employees have between them. The effect is then on the stress level of the employees which in turn effects the motivation level of the employees and demotivates them to give their full effort to their job. This also affects the productivity of the employees of both the companies. The attrition rate effected but not much due to the politics. But on the whole these factors directly or indirectly affect the job performance of the employees.

6. DISCUSSION

The major objective of the present research was to explore the relationship between organizational politics and employee performance. It is observed from the results of the study that there is no possible organization where there is no politics among the members of the organization. Politics happens at every level in the organization (individual, team, departmental, organizational). In addition, the results of this study reveal that organizational politics reduces the productivity, concentration, motivation of the employees to work for achieving the objectives of the organization, innovation for improving the processes, trust among the employees, and on the other hand it increases the stress level of the employees. It also reduces the ambiance of the work place, thus effecting the overall working environment. It is also found that the attrition rate increases on a high pace due to the politics in the organization. On examining the policies of both the organizations, it can be concluded that the organizations are trying to build up the policies and practices that can help in reducing the politics in all the dimensions within the organization, it has also been made compulsory by the organizations to abide by the policies else actions are taken against them.

7. IMPLICATIONS

The results of the study have some practical implications that can be useful for researchers as well as for managers and policy makers in the organizations. This study has opened up some new areas by providing some valuable information and understanding about the relationship between organizational politics and employee performance. The findings of this study give an insight to the managers to frame such policies that that can help in reducing the politics in all the dimensions within the organization and thus leading high employee performance. Also, organizations can develop policies to enhance employee performance by way of creating a positive work environment. A team should be formed that keeps a regular check on each department so as to avoid organizational politics. Regular meetings and discussions should be conducted in the organizations so as to take opinion of each employee on the politics in the organization. Feedback should be taken from each employee about the other employees in the organizations apart from the appraisal. A report of the feedbacks should be formed. A better bonding between the boss and the subordinates should be promoted and a better performance evaluation method should be practiced so as to remove any kind of biasness. The compensation and rewards should not be based on the appraisal of the employee, rather it should be competency based. Equality in rewards should be maintained and all the employees working in a particular team should all be given equal opportunity to perform same task without any favoritism. This may be helpful for an organization

to be successful and to achieve organizational objectives since employees' performance is directly related with a variety of desirable organizational outcomes. Human resources are the only resources with the privilege of giving cumulative and continuous returns to the business organization. So, it can be understood that creating a positive work culture that do not promote organizational politics will beckon competitive and productive talent base for the organizations.

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RURAL INDIAN TRIBAL COMMUNITIES: AN EMERGING GROUP FOR HIV/AIDS

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ABSTRACT

Background: Rural Indian tribes are anthropologically distinct with unique cultures, traditions and practices. Over the years, displacement and rapid acculturation of this population has led to dramatic changes in their socio-cultural and value systems. Due to a poor health infrastructure, high levels of poverty and ignorance, these communities are highly vulnerable to various health problems, especially, communicable diseases including HIV/AIDS. Our study sought to assess knowledge, attitudes and practices regarding sexuality, and the risk factors associated with the spread of HIV/AIDS and STDs among these communities.

Methods: A nested cross sectional study was undertaken as part of the on going Reproductive and Child Health Survey. A total of 5,690 participants age 18–44 were recruited for this study. Data were obtained through home interviews, and focused on socio-demographics, knowledge, attitudes and behaviors regarding sexuality, HIV/AIDS and other STDs.

Results: The study revealed that only 22% of adults had even heard of AIDS, and 18 % knew how it is transmitted. In addition, only 5% knew that STDs and AIDS were related to each other. AIDS awareness among women was lower compared to men (14% vs.30 %). Regarding sexual practices, 35% of the respondents reported having had extramarital sexual encounters, with more males than females reporting extramarital affairs.

Conclusion: Lack of awareness, permissiveness of tribal societies for premarital or extra-marital sexual relationships, and sexual mixing patterns predispose these communities to HIV/AIDS and STD infections. There is a dire need for targeted interventions in order to curtail the increasing threat of HIV and other STDs among these vulnerable populations.

INTRODUCTION

India is the second most populous nation in the world and has changing sociopolitical and demographic characteristics as well as varied morbidity and mortality patterns. These changes, in conjunction with the country's high population growth rate, have exacerbated the prevailing and emerging public health challenges the country is facing. Since 1986 when the first case of human immunodeficiency virus (HIV) was reported in India it has become imperative to include acquired immunodeficiency syndrome (AIDS) on its long list of public health issues that need to be addressed.

As a direct result of these challenges, India has begun to assess and monitor the impact of HIV/AIDS throughout the country's various states and regions with the assistance of several international health organizations. According to 2003 estimates from UNAIDS, approximately 5.1 million individuals in India are infected with the virus. Furthermore, recent studies indicate that transmission of HIV is no longer confined to high-risk urban populations, but is spreading across rural settings as well. This trend is a cause for concern as AIDS is increasingly hampering social and economic development throughout the country.

For effective control of the spread of HIV/AIDS, it is crucial to have data on knowledge, attitudes and behavioral practices for specific population as research has shown that socio-cultural influences, traditional lifestyles, societal norms, and traditions influence HIV/AIDS transmission rates [Because India's HIV/AIDS transmission pattern is predominantly heterosexual (85% of all newly reported cases) subcultures that have relaxed marital structures or are tolerant of high-risk sexual practices (e.g., sex with a commercial sex worker) are particularly vulnerable to the spread of HIV/AIDS and STDs within their communities. With more Indian men reporting premarital and extramarital sexual activity, women who marry as teenagers are vulnerable to HIV/AIDS infection and STDs. The rapid spread of HIV/AIDS in rural Indian communities has been attributed to the country's poor health infrastructure, poverty and lack of

Despite these indicators, little is known about the risk factors, transmission rates, or the impact AIDS will have in these areas in the future. Traditionally, there has been little research and only a paucity of health-related research conducted among this potentially high-risk vulnerable population.

Throughout India, approximately 8% of the population lives within rural tribal communities, which are collectively referred to as 'Tribes'. These communities are geographically distinct; with each tribe having its own unique customs, traditions, beliefs and practices. Even within a particular tribal entity, differences in

dialect, health practices, unique customs, values, and traditions are apparent. In rural Indian communities indices of reproductive health are typically very poor: maternal mortality rate is about 230 per 100,000 live births and 61.2% of the women suffer from at least one gynecologic pathology. Because tribal groups have existed on the fringe of Indian society, they may still be unaware or indifferent to the potential health threats from HIV/AIDS. Ascertaining whether or not tribal communities are potentially a high risk group warranting intervention is a necessary step in India's war on AIDS. Accordingly, we undertook this study to explore the risks for this special group of people.

METHODS

We conducted a cross-sectional study nested within an existing enumerative study referred to as the Reproductive and Child Health Survey (RCHS). The RCHS was initially designed to enumerate and ascertain basic demographic and health profiles for all tribal members. Data collection for this particular study was done in two phases. Phase one involved adding additional questions to the original RCHS study to assess risk factors (knowledge, attitudes and behavioral practices) associated with the transmission of HIV/AIDS and other communicable diseases.

STUDY POPULATION

The study population comprised of tribal communities living in the southern region of Karnataka (Figures). Members of these tribes have traditionally derived much of their livelihood from the country's vast reserve of natural forest resources. However over the years, these tribes have been forced to migrate from their ancestral land and are currently living within poor rural communities throughout the state. The initial displacement was as result of the submergence of their traditional homelands through the construction of the Kabini dam, and the second displacement was as a result of 'Project Tiger,' a wildlife conservation project that displaced them to their current location in the southern region of Karnataka, where this study was conducted.

SAMPLING

Because of the enumerative nature of the RCHS, all persons within the age group 18–44 years who participated in the RCHS study were included for phase one of this study. This age group was selected as the focus of the initial study was on reproductive health issues.

SURVEY INSTRUMENTS

A semi-structured questionnaire with both open- and close-ended questions was developed to collect information on knowledge, attitudes and behaviors regarding HIV/AIDS, as well as other relevant demographic information not included in the RCHS. The instrument was developed in English, translated to the native language, and subsequently back translated to English for content and language verification. The survey instrument was field-tested for validity purposes and modified accordingly.

DATA COLLECTION

A team of ten interviewers from the local tribal communities with a minimum of high school education were selected and trained for two weeks to ensure uniform and high-quality data collection. All adults were interviewed separately to ensure confidentiality. Each interviewer read out each of the questions and response choices (where appropriate) to the interviewees and recorded all answers directly on the questionnaire. Verbal informed consent was obtained from each respondent prior to starting the interview.

DATA ANALYSIS

Data were entered into an electronic database using Sybase Central Software (Sybase, Inc. Dublin, CA). To ensure confidentiality, all respondent identifiers were expunged to create a secondary data set that was used for the final analysis. Frequency tables were generated for selected demographics and health related categorical variables. In addition, univariate analysis was performed on relevant continuous variables. The findings are presented below.

ETHICAL CONSIDERATION

Ethical clearance was obtained from ethical boards within each of the tribal communities, and appropriate government agencies were informed about the study objectives. Permission was also obtained from the Institutional Review Board (IRB) at the University of South Florida in Tampa, Florida. Verbal informed consent was obtained from the local leaders, and the individual participants. Because of the high levels of illiteracy, it was not feasible for us to obtain written consent.

RESULTS

Demographic profile

A total of 11,379 individuals from the 5 tribal communities had been enumerated as part of the RCHS. Of these, 5,690 were within the study age range (18–44 years) and formed the basis for this analysis. the demographic profile of the study participants. The mean age of the study group was 31 years. There were more males than females; 53% vs.47%. Eighty four percent were married (91% females & 78% males). The average age at marriage was 13 years for females, and 22 years for males. Only 28% (27% female, & 30% male) of the population was literate i.e. able to read and write in any of the Indian languages. The majority of respondents (67 %) reported living in tiled roof houses with mud flooring, while only 40 % indicated easy access to potable water. Agriculture was the major source of income in these communities. The reported average daily income ranged from US \$1.50 to \$2.00. Approximately 35% of the respondents migrated on average three to four months each year to nearby areas for work.

Unique sexual practices among tribal members

The findings revealed that these tribal communities did not have a structured marital system; instead members practiced a form of serial monogamy in which they change partners and remarry every four to five years. Regarding sexual practices, 35% of the respondents reported either premarital affairs or extramarital affairs. However such practices were more common in men compared to women. Furthermore, 20% of the male participants reported having had sex with a commercial sex worker (CSW) during the period the wife had had a child.

Knowledge and beliefs about HIV/AIDS and STDs

Among these communities, there was a low level of knowledge on HIV/AIDS; only 22 % of all study participants (n = 1,252) had heard of Among those who have heard of AIDS, less than 20 % (n = 250) knew how HIV/AIDS was transmitted (16.8 % male vs. 8% females). About 98 % were not aware of the methods to prevent HIV/AIDS transmission. As many as 30 % (n = 376) of those who had heard of AIDS believed that "sinners" will get AIDS, while 10 % (n = 125) believed that AIDS and STDs could be prevented by the sterilization of women. Fifteen percent (n = 188) thought "AIDS is acquired by looking at a person who has AIDS," and 18 % (n = 225) believed that "AIDS is acquired by talking to a person who has AIDS." Only 5 % knew that a relationship exists between HIV/AIDS and STDs. Interestingly, 4 percent (n = 51) believed that there was a cure for AIDS. Most had not heard of STDs, and of those who had heard of them only 1 percent (n = 16) were aware of associated symptoms.

DISCUSSION

In today's modern world, it is difficult to imagine societies that are still socially and culturally isolated from the rest of civilization; however, they do exist. The tribal societies throughout India have remained socially and culturally alienated from mainstream Indian society until developmental and conservation activities in tribal areas forced interactions between them. Displacement of the tribal people of southern Karnataka has led to a complex process of rapid acculturation and loss of cultural identity; as they struggle to maintain their traditional social structure, they must adopt new skills, beliefs, and practices necessary for success in their new environment. During this acculturation process, they have been faced with a myriad of public health challenges complicated by poverty, ignorance, and reluctance to abandon traditional beliefs and practices that would allow them to assimilate successfully.

To date this is the first health related study among the displaced tribal communities of southern Karnataka that has attempted to assess risk threshold for the transmission and spread of HIV/AIDS and other STDs. It is not surprising that knowledge and awareness about HIV/AIDS and STDs was very low among tribal communities compared to the national figures given the degree of isolation, low literacy rates, and minimal access to information.

The high level of poverty, inadequate health resources, ignorance and high-risk beliefs and practices among the tribal communities has contributed to the vulnerability of this population. As such it has created a highly susceptible population for the rapid spread of HIV/AIDS and other STDs' as well.

Because tribal members are forced to migrate outside of their communities in search for work and increased wages, this may contribute to the spread of HIV/AIDS as many engage in extramarital affairs, seek commercial sex partners, or are under the threat of sexual harassment (females). While there has been limited scientific research exploring the cultural context of extramarital sexual behaviors, it is generally noted that in these communities, extramarital affairs are condoned and widely practiced especially during periods when women are pregnant or nursing or during period of travel for

This kind of behavior creates a fertile ground for HIV transmission and spread. Our data indicate that tribal women are particularly vulnerable for HIV/AIDS in this population since many of them commence sexual activity at an early age, and get married early as well. Also, they are in a culture that condones extramarital sex, and this exposes the women to a particularly precarious situation, increasing their risk for acquiring HIV.

CONCLUSION

It is evident from this study that the Indian tribal community is experiencing a latent phase that is potentially a precursor for an HIV/AIDS epidemic. There is a high prevalence of behavioral risk factors, coupled with ignorance, and inadequate health infrastructure thus creating a potential risk for rapid spread of HIV/AIDS, as well as other related diseases. In a country that is struggling to contain the spread of HIV, it is particularly important for concerned parties to pay attention to this population. Currently, virtually no resources are allocated toward the treatment of those infected with HIV/AIDS; the main stay of management is through education and preventive measures to control the spread of the scourge as they represent the most practical and cost effective strategies in this developing nation. It therefore becomes imperative and urgent to address the health concerns revealed in our study in order to formulate effective, culture-sensitive and appropriate intervention programs so that an imminent disaster (i.e. HIV/AIDS epidemic) in this remote and isolated communities can be averted.

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DYNAMIC STABILITY ENHANCEMENT OF SINGLE MACHINE CONNECTED TO INFINITE BUS SYSTEM WITH FUZZY DAMPING CONTROLLED SVC

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ABSTRACT

The modern power system has led to an increasing complexity in the study of power systems, and also presents new challenges to power system stability, and in particular, to the aspects of transient stability and small - signal stability (Dynamic Stability). Transient stability plays a significant role in ensuring the stable operation of power systems in the event of large disturbances and faults. Dynamic stability is concerned with ability of power systems to maintain stability under small disturbances. This paper investigates the improvement of transient stability and Dynamic stability of a Single Machine Infinite Bus System (SMIB) equipped with Fuzzy damping Controlled Static VAR compensator (SVC) is designed. The results using MATLAB Simulink demonstrate the effectiveness and robustness of the proposed SVC on transient and dynamic stability improvement of the system.

Keywords : FACTS, Mat lab / Simulink, SVC, Transient stability, SMIB ,Dynamic Stability ,PID Controllers, Phillips –Heffron Model

1. INTRODUCTION

With the increase in demand for supply of electrical energy, size and complexity of power system has increased. Most of the generating units are equipped with modern fast acting static excitation systems. As these units become a larger percentage of generating capacity, excitation system had an impact on small signal stability of power system, however these excitation systems introduce negative damping at the electro-mechanical oscillation frequencies of the machines and are usually in the range of 0.1 Hz to 2.5 Hz. Oscillations of small magnitude and low frequency often persisted for long periods and presented limitations on the power transfer capability. The problem of small signal stability is usually one of the insufficient damping of system oscillations. Power system stabilizers (PSS) were developed to aid in damping these oscillations via modulation of generator excitation. The use of power system stabilizer to control generator excitation systems is most cost effective method of enhancing the small signal stability of power systems.

2. FACTS CONTROLLERS

Recent studies reveal that FACTS controllers could be employed to enhance power system stability in addition to their main function of power flow control etc[1]. FACTS help to improve power system stability by damping rotor, power or voltage oscillations. The literature shows an increasing interest in this subject for the last two decades, where the enhancement of system stability using FACTS controllers has been extensively investigated. This paper investigates a comprehensive analysis and design of shunt connected FACTS device (SVC) to enhance the Dynamic and Transient Stability of power System. Furthermore Intelligent controller like Fuzzy logic is applied to SVC to achieve faster and better responses.

3. POWER SYSTEM STABILIZERS

The excitation system introduces a large phase lag at low system frequencies just above the natural frequency of excitation system. The fast acting voltage regulator introduces negative damping. To offset this effect and to improve the system damping in general, artificial means of producing torques in phase with the speed are introduced, these are called “Supplementary Stabilizing Signals” and the networks used to generate these signals are known as “Power System Stabilizer” networks. Stabilizing Signals are introduced at the summing junction of the AVR excitation system [2]. The stabilizing signal usually obtained from speed or a related signal such as the frequency, is produced through a suitable network to obtain the desired phase relationship. However, for practical implementation, other signals such as electrical power and accelerating power are also used[3]. Generally the choice of PSS signal can be change in rotor speed ($\Delta\omega$), or change if frequency (f), or change in accelerating power (P).

M. Karrari and O.P. Malik [4] introduced a way to identify the Heffron-Phillips model parameters for synchronous generators using online measurements. The Heffron-Phillips model of a synchronous machine has successfully used for investigating the low frequency oscillations and designing power system stabilizers. Since the synchronous generators are nonlinear, the parameters of the identified Heffron-Phillips model would Depend on the operating conditions.

In this paper the conventional power system stabilizers utilizing the speed deviation, as it is easily accessible as input signal is used for the small signal stability assessment of single machine connected to infinite bus (SMIB) system and tested for different operating conditions and disturbances[5]. Results are compared with and without conventional power system stabilizer. As the operating conditions are modified, to obtain optimal response for each case, stabilizer gain is to be modified every time .The power system stabilizer block diagram is shown in Fig.3.1

Basic Components of Power System Stabilizers

Power system stabilizers essentially consist of the following functional blocks.

- i) Phase compensation block
- ii) Signal washout block and
- iii) Gain block.

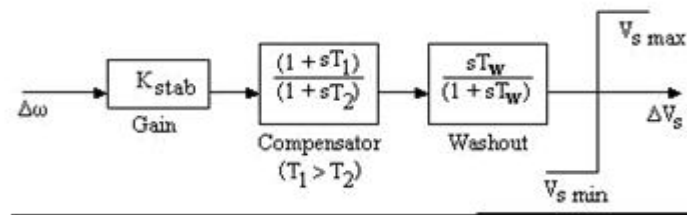


Fig. 3.1 Block Diagram of PSS

MATHEMATICAL MODELING OF SINGLE MACHINE INFINITE BUS SYSTEM (SMIB)

Delta – P – Omega Stabilizer

The rotor speed deviation can be derived from accelerating power.

$$\Delta\omega_{eq} = 1/M(P_m - P_e)dt \quad 3.1$$

Where M = inertia constant

P_m = change in mechanical power input

P_e = change in electrical power input

$\Delta\omega_{eq}$ = derived or equivalent speed deviation.

The objective is to derive the equivalent speed signal $\Delta\omega_{eq}$ so that it does not contain torsional modes. The integral of mechanical power is related to shaft speed and electrical power as follows:

$$P_m dt = M * \Delta\omega + P_e dt \quad 3.2$$

The delta-p-omega stabilizer makes use of above relationship to simulate a

Signal proportional to the integral of mechanical power change by adding signals proportional to the shaft speed change and integral of electrical power change.

The overall transfer function for deriving the equivalent rotor speed deviation

Signal from shaft speed and electrical power measurements are given by.

$$\Delta\omega_{eq}(s) = - P_e(s)/Ms + G(s)[P_e(s)/Ms + \Delta\omega(s)] \quad 3.3$$

Where G(s) is the transfer function of the torsional filter.

A linearised mathematical modeling of the single machine infinite bus system is carried out by linearising the state equations around the operating point and hence obtaining the required linearised state equations.

For single machine infinite bus system shown in Fig 3.2 the standard Phillips-Heffron model shown in Fig.3.3 is considered. The order of the system is fourth order without PSS and sixth order with PSS.

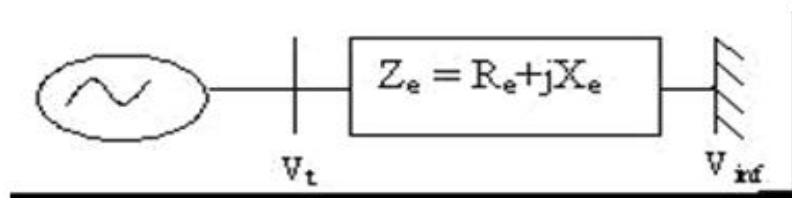


Fig.3. 2 SMIB System

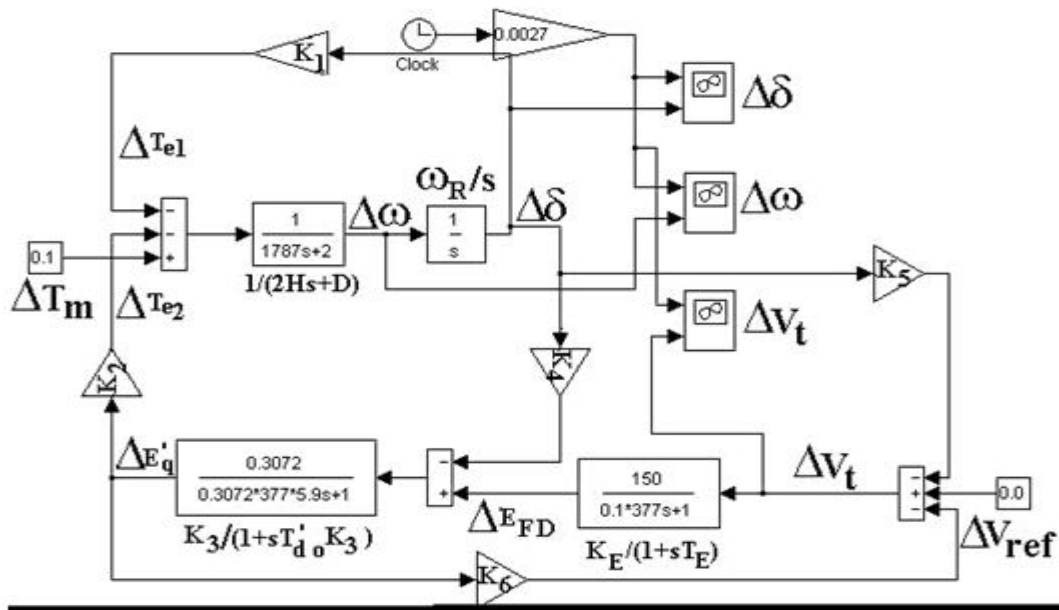


Fig. 3.3 Philips-Heffron model of SMIB system

PHILLIPS – HEFFRON MODEL OF SINGLE MACHINE CONNECTED TO INFINITE BUS (SMIB) SYSTEM

A stable power system is one in which the synchronous machines, when perturbed will either return to their original state or will acquire a new state asymptotically without losing synchronism. In order to conduct stability studies on a single machine connected to infinite Bus (SMIB) power system a proper mathematical model is essential. A simplified linearised model (Philips-Heffron model) is developed, which is popularly used in the small signal stability (or dynamic stability) studies[6].

MODELING OF SYNCHRONOUS MACHINE

A synchronous machine consists of three stator windings one is field winding and two amortisseur windings as shown in Fig. 3.2. These six windings are magnetically coupled. The magnetic coupling is a function of the rotor position. Thus the instantaneous terminal voltage ‘V’ of any winding (a, b, c phases) is of the form Eq: 3.4

$$V_i = \pm r \cdot i_i \pm \lambda_i; (i = a, b, c) \quad 3.4$$

where λ = flux linkages,

r = winding resistance

$$\begin{pmatrix} V_{abc} \\ V_{FDQ} \end{pmatrix} = - \begin{pmatrix} R_{abc} & 0 \\ 0 & R_{FDQ} \end{pmatrix} \begin{pmatrix} i_{abc} \\ i_{FDQ} \end{pmatrix} - \begin{pmatrix} sbc \\ FDO \end{pmatrix} + \begin{pmatrix} V_n \\ 0 \end{pmatrix} \quad 3.5$$

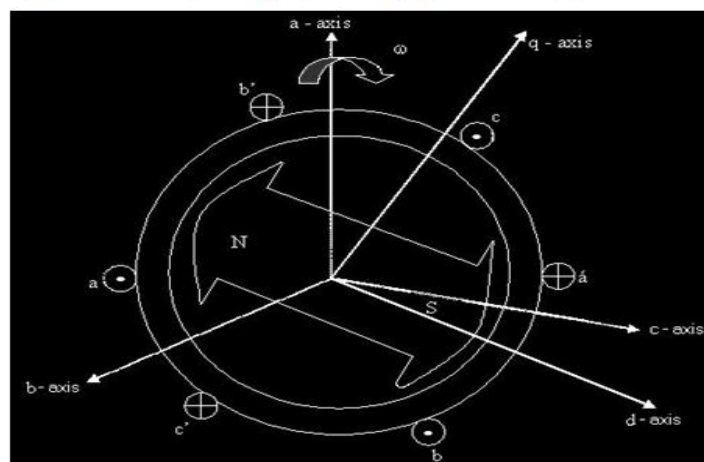


Fig. 3.2 Pictorial Representation of Synchronous Machine

In the above description of a synchronous machine, the λ_{abc} and λ_{FDQ} are the flux linkages of the machine winding which vary with respect to the rotor position or time, as inductance of the phase varies with rotor position [7]. Mathematical description of the synchronous machine is greatly simplified by considering the parameters of the machine (voltage drops, flux linkages) w.r.t. a synchronously rotating reference frame which is usually referred as “Park’s Transformation”. Park’s transformation basically converts the stator quantities from phases a, b & c (w.r.t a fixed reference) into new variables d and q-axis quantities (w.r.t. a synchronous rotating reference frame).

Let P be the Park’s Transformation matrix. Then we have $i_{dq0} = P^* i_{abc}$

$$\begin{bmatrix} i_d \\ i_q \\ i_o \end{bmatrix} = \frac{2}{3} \begin{bmatrix} \cos\theta & \cos(\theta-2\pi/3) & \cos(\theta+2\pi/3) \\ -\sin\theta & -\sin(\theta-2\pi/3) & -\sin(\theta+2\pi/3) \\ 1/2 & 1/2 & 1/2 \end{bmatrix} * \begin{bmatrix} i_a \\ i_b \\ i_c \end{bmatrix} \quad 3.6$$

Applying the Park’s Transformation to the voltage equation Eq. 3.5, we get the

model of the synchronous machine in d-q reference frame, given in Eq. 3.7.

$$\begin{bmatrix} V_o \\ V_d \\ V_F \\ V_D \\ V_q \\ V_Q \end{bmatrix} = - \begin{bmatrix} r+3r_n & 0 & 0 & 0 & 0 & 0 \\ 0 & r & 0 & 0 & \omega L_q & \omega kM_Q \\ 0 & 0 & r_F & 0 & 0 & 0 \\ 0 & 0 & 0 & r_D & 0 & 0 \\ 0 & -\omega L_d & -\omega kM_F & -\omega kM_D & r & 0 \\ 0 & 0 & 0 & 0 & 0 & r_Q \end{bmatrix} * \begin{bmatrix} i_o \\ -i_d \\ i_F \\ i_D \\ i_q \\ i_Q \end{bmatrix}$$

$$- \begin{bmatrix} L_o + 3L_n & 0 & 0 & 0 & 0 & 0 \\ 0 & L_n & kM_F & kM_D & 0 & 0 \\ 0 & kM_F & L_F & M_R & 0 & 0 \\ 0 & kM_D & M_R & L_D & 0 & 0 \\ 0 & 0 & 0 & 0 & L_q & kM_Q \\ 0 & 0 & 0 & 0 & kM_Q & L_Q \end{bmatrix} \bullet \begin{bmatrix} i_o \\ -i_d \\ i_F \\ i_D \\ i_q \\ i_Q \end{bmatrix} \quad 3.7$$

In normal practice the machine voltages will be in the kilovolt. To have numerically simplified calculation, a proper per-unit system representation is quite essential. Hence the following base quantities are chosen to reduce the system into per-unit form:

$$S_B = S_R = \text{stator rated VA/ph, VA rms,}$$

$$V_B = V_R = \text{stator rated line-to-line voltage,}$$

$$\omega_B = \omega_R = \text{Generator rated speed in electrical radian/sec,}$$

$$\text{time, } t = 1/\omega_B$$

The derived base quantities are:

$$I_B = S_B/V_B;$$

$$R_B = V_B/I_B \quad 3.8$$

PHILIPS – HEFFRON MODEL OF THE SYNCHRONOUS MACHINE

The single machine infinite bus system shown in Fig. 3.3 and SMIB single line diagram shown in Fig 3.4, where V_t is the terminal voltage of the machine, V_{inf} is the infinite bus voltage and Z_e is the line impedance. Philips-Heffron model is obtained for modeling the Single machine connected to infinite bus system for simulation studies and the block diagram is shown in Fig. 3.5. The constants K_1 to K_6 are calculated for different operating conditions [103].

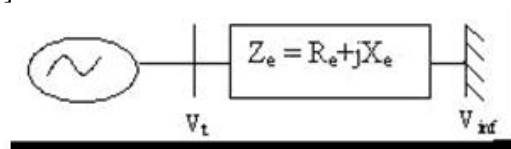


Fig. 3.3 SMIB System

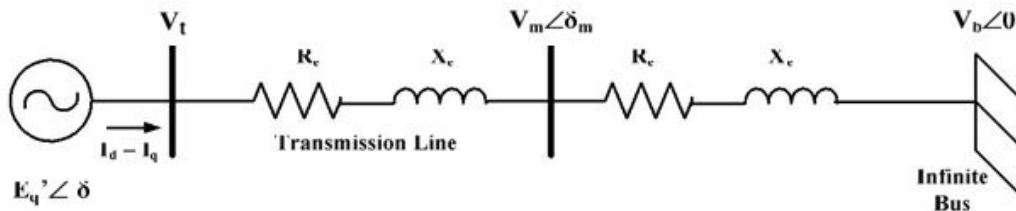


Fig. 3.4 Single line diagram of SMIB System

A simplified linear model for a synchronous machine connected to infinite bus through a transmission line having inductance Z_e , the following assumptions are made.

- 1) Amortisseur effects are neglected
- 2) Stator windings resistance is neglected
- 3) The λ_d and λ_q terms in the stator and load voltages equations are neglected compared to the speed voltage terms $\omega\lambda_d$ and $\omega\lambda_q$.
- 4) The terms $\omega\lambda$ in the stator and load voltage equations are assumed to be approximately equal to ω_r .

The derived base quantities are:

$$I_B = S_B/V_B;$$

$$R_B = V_B/I_B \quad 3.8$$

- 5) Balanced conditions are assumed and saturation effects are neglected. The equation Eq. 3.7 is then reduced to Eq. 3.9 with the assumptions stated above.

$$\begin{array}{cccccccccc} -V_d & 0 & 0 & \omega R L_d & -i_d & 0 & 0 & 0 & -i_d \\ V_F = - & 0 & i_F & 0 & * i_F & - k M_F & L_F & 0 & * i_F \\ V_q & -\omega R L_d & -\omega k M_F & 0 & i_q & 0 & 0 & 0 & i_q \end{array} \quad 3.9$$

From the above we can write the equations as follows:

$$V_d = \omega R L_d i_q \quad 3.10$$

$$V_q = -\omega R L_d i_d + \omega k M_F i_F \quad 3.11$$

$$-V_F = -i_F i_F + k M_F i_d - L_F i_F \quad 3.12$$

Rewriting the equations 3.10 to 3.12 we have the following equations 3.13 to 3.15:

$$V_d = x_q i_q \quad 3.13$$

$$V_q = E_q - x_d i_d \quad 3.14$$

$$E_{FD} = E_q + (x_d - x_d') i_d \quad 3.15$$

In addition to these equations for the synchronous machine the torque equation and terminal voltage equation are also considered,

$$\text{The torque equation, } T_e = 1/3(V_d i_d + V_q i_q) \quad 3.16$$

$$\text{The terminal voltage equation, } V_t = ((V_{td})^2 + (V_{tq})^2)^{1/2} \quad 3.17$$

Linearising these equations Eq. 3.16 and Eq. 3.17 around an operating point, results in Phillips-Heffron model of the synchronous machine.

The linearized equations of 3.16 and 3.17 are shown in the equations 3.18 and 3.19.

$$T_e = K_1 \Delta \delta + K_2 E_q \quad 3.18$$

$$V_t = K_3 \Delta \delta + K_4 E_q \quad 3.19$$

$$E_q = (K_3/(1+sT_{d0}K_3)) E_{FD} - (K_3K_4/(1+sT_{d0}K_3)) \Delta \delta \quad 3.20$$

where K_1 to K_6 are system constants determined at an operating point.

$$K_1 = E_b E_{q0} \cos \delta_o / (x_e + x_q) + E_b i_{q0} \sin \delta_o (x_q - x_d) / (x_e + x_d) \quad 3.21$$

$$K_2 = i_{q0} (x_e + x_q) / (x_e + x_d) = E_b \sin \delta_o / (x_e + x_d) \quad 3.22$$

$$K_3 = (x_e + x_d) / (x_d + x_e) \quad 3.23$$

$$K_4 = E_b \sin \delta_o (x_d - x_d') / (x_d + x_e) \quad 3.24$$

$$K_5 = -x_q V_{d0} E_b \cos \delta_o / ((x_e + x_q) V_{t0}) - x_d V_{d0} E_b \sin \delta_o / ((x_e + x_d) V_{t0}) \quad 3.25$$

$$K_6 = x_e V_{q0} / ((x_e + x_d) V_{t0}) \quad 3.26$$

The excitation system is considered to have only a lag element and hence is modeled as simply the transfer function $K_E/(1+sT_E)$. Hence combining these equations i.e. Eq. 3.18 – 3.20 with the excitation circuit model $[K_E/(1+sT_E)]$, we finally get the Phillips-Heffron modal for the SMIB system as shown in the Fig. 3.5.

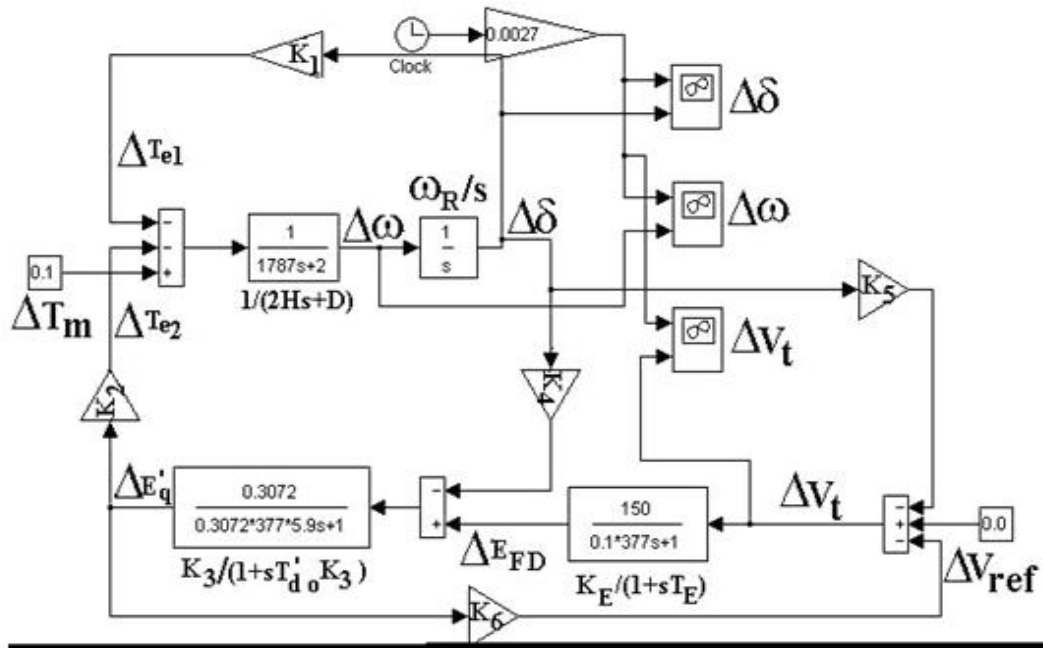


Fig. 3.5 Philips-Heffron model of SMIB system

The state equations for the Philips-Heffron model Block diagram without power system stabilizer (PSS) shown in the Fig. 3.5 is as follows:

$$\dot{\delta} = \omega \quad (3.27)$$

$$\dot{\omega} = -(K_1/2H)\Delta\delta - (D/2H)\Delta\omega - (K_2/2H)E_q + T_m/2H \quad (3.28)$$

$$\dot{E}_q = -(1/(K_3 T_{d0}')) E_q - (K_4/T_{d0}') \Delta\delta + (1/T_{d0}') E_{FD} \quad (3.29)$$

$$E_{FD} = -K_5(K_E/T_E)\Delta\delta - K_6(K_E/T_E) E_q - (1/T_E) E_{FD} + (K_E/T_E) V_{ref} \quad (3.30)$$

MODELLING OF SMIB SYSTEM WITH PSS

The state equations 3.27 to 3.29 along with the following equations 3.31 to 3.33 formulate the required state equations for SMIB system equipped with PSS. The block diagram of SMIB system equipped with PSS is shown in the Fig. 3.6.

$$\dot{E}_{FD} = -K_5(K_E/T_E)\Delta\delta - K_6(K_E/T_E) E_q - (1/T_E) E_{FD} + (K_E/T_E) V_{ref} + V_s(K_E/T_E) \quad (3.31)$$

$$\dot{V}_s = K_{stab} T_w (-K_1/2H \Delta\delta + (1/T_1 - D/2H) \Delta\omega - K_2/2H E_q + T_m/2H (T_1/T_2) - V_s/T_w + K_{stab} T_w (-Y/T_2)) \quad (3.32)$$

$$\dot{V} = (-K_1/2H \Delta\delta + (1/T_1 - D/2H) \Delta\omega - (K_2/2H) E_q + T_m/2H (T_1/T_2)) - Y/T_2 \quad (3.33)$$

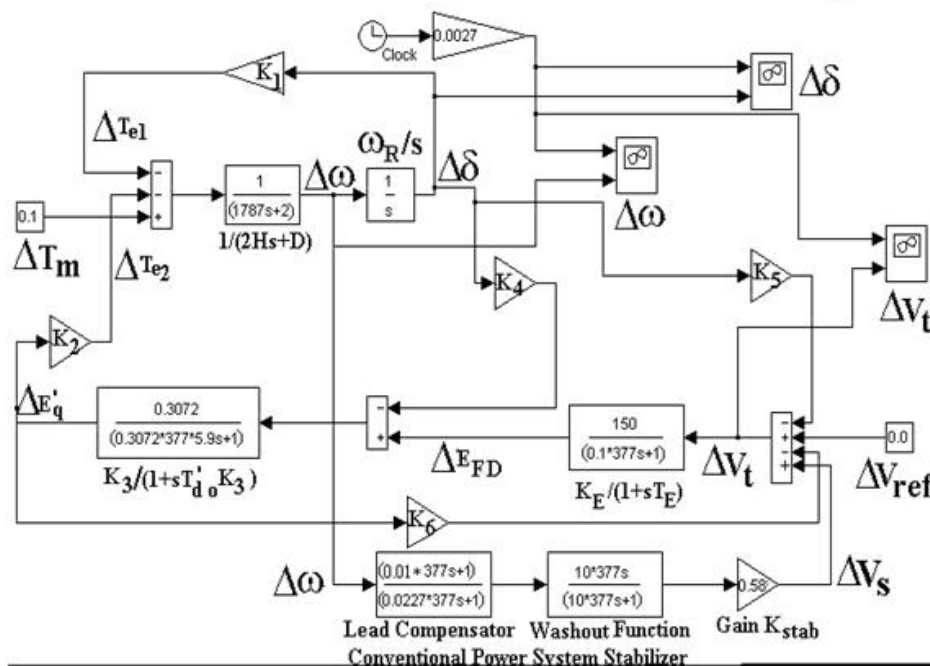


Fig. 3.6 Philips-Heffron model of SMIB system with PSS

MODELLING OF SMIB SYTEM WITH SVC

The SMIB system with SVC is shown in Fig. 3.7 and SVC Parameters are shown in Appendix B.

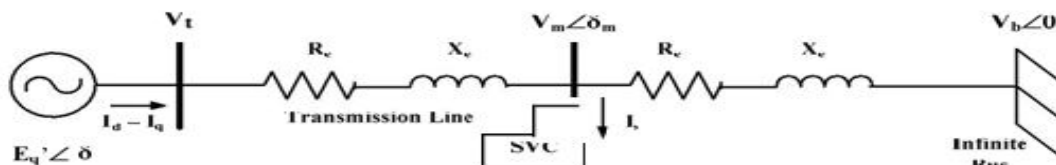


Fig 3.7 Single Machine Infinite Bus System with SVC

a) Basic stability models of SVC

The basic stability model of SVC shown in Fig. 3.8 is used for the simulations and tested for SMIB system. The basic model of SVC consists of a voltage regulator block, which estimates the susceptance value from the measurement block, which measures the current through SVC controller[8]. The Thyristor susceptance block yields the incremental change in the susceptance value when a firing angle delay is given to it. The Z_{th} is the thevenin's impedance of SVC controller, which is generally specified as a constant.

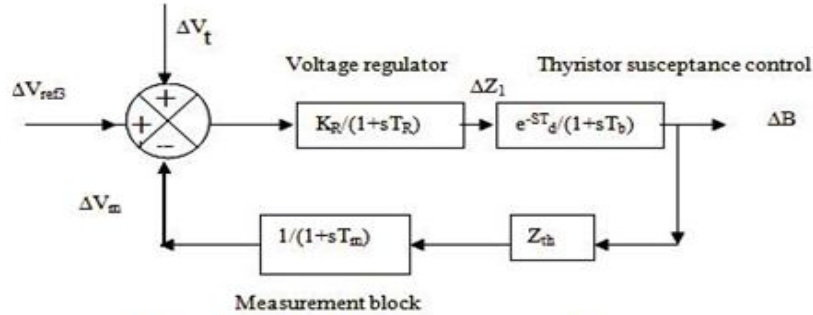


Fig. 3.8 Static VAR Compensator model

b) SVC with PID Damping Controller

SVC with additional PID damping controller shown in Fig. 3.9 is used, as this introduces an additional damping in the system and damps the rotor mechanical low frequency oscillations quickly. They are placed in the supplementary control signal of SVC. Additional PID damping controllers are used to obtain V_{ref3} signal from the generator speed deviation $\Delta\omega$.

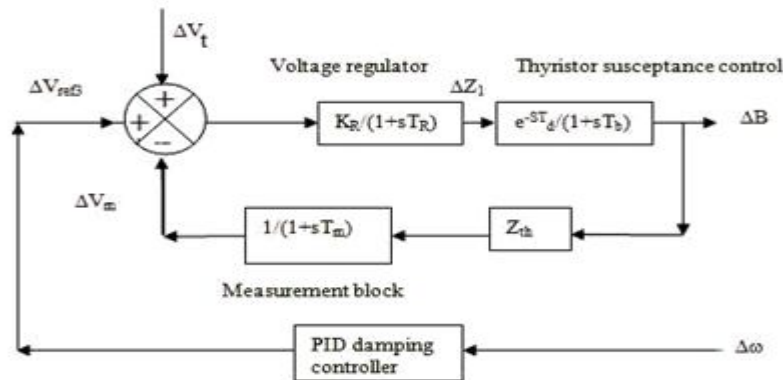


Fig. 3.9 SVC with additional PID damping controller

One of the most common controllers available commercially is the proportional integral derivative (PID) controller. Unified Philips Heffron model with PID damping controlled SVC is developed as shown in Fig. 3.10. The PID damping controlled SVC is used to improve the dynamic response as well as to reduce or eliminate the steady-state error.

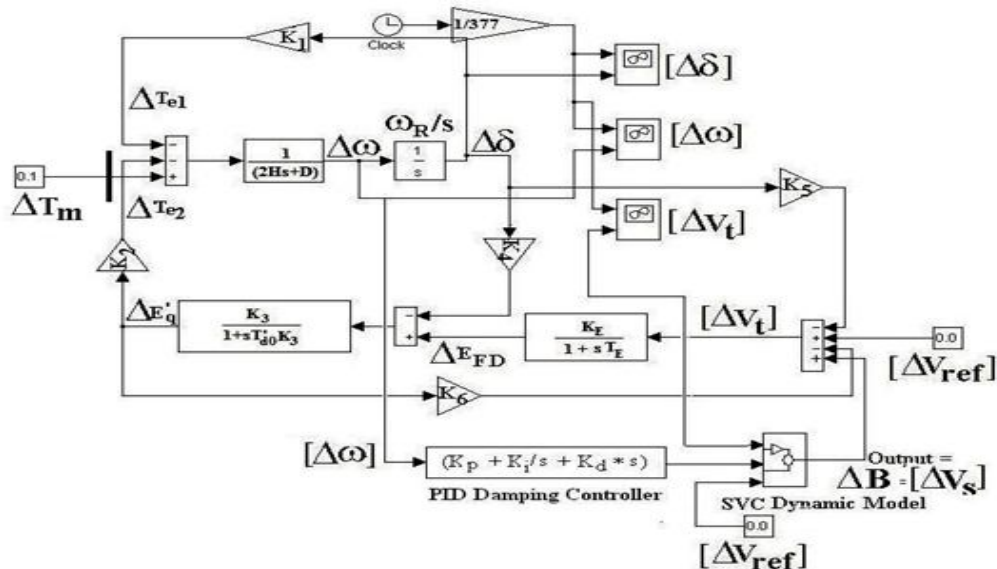


Fig. 3.10 Philips Heffron model of SMIB system with PID damping controlled SVC

c) Fuzzy damping controlled Static VAR Compensator

In Fuzzy damping controlled Static VAR Compensator the Fuzzy logic controller replaces the PID damping controller in Fig. 3.10. Fuzzy logic controller is fast, adaptive and reduces the order of the PID damping controlled SVC[9]. SVC with supplementary Fuzzy damping controller shown in Fig. 3.11 is used, as this introduces additional damping in the system and damps the rotor mechanical low frequency oscillations quickly. They are placed in the supplementary control signal of SVC. Fuzzy damping controlled Static VAR Compensator is developed and tested for SMIB system[10]

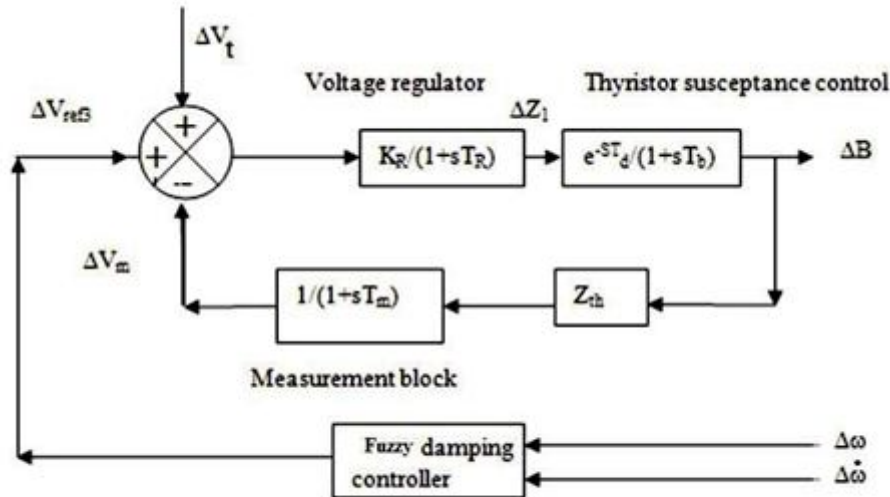


Fig. 3.11 Fuzzy damping controlled Static VAR Compensator

The input variables for fuzzification are $\Delta\omega$ and $\Delta\dot{\omega}$ respectively, $\Delta\omega$ is the change in angular velocity (or speed deviation) and is the rate of change of angular velocity of the machine on which the stabilizer is placed. The V_s is the output of Fuzzy gain (K_{stab}) controlled PSS. The range of the input and the output variables are calculated based on the responses of the system with and without conventional PSS. For the fuzzification of the input and output variables triangular membership functions are considered and a Fuzzy set consisting of seven linguistic variables namely as Negative Big, Negative Medium, Negative Small, Zero, Positive Small, Positive Medium and Positive Big (NB, NM, NS, ZE, PS, PM and PB) are used. The Inference rules, which are shown in Table 3.1 for Fuzzy damping controlled Static VAR Compensator for SMIB system are framed by the phase-plane analysis [112]. Centroid method of defuzzification is utilized. The inference rules are tuned until the desired responses are obtained.

Table 3.1 Inference rules for Fuzzy damping controlled SVC for SMIB system

$\Delta\omega$

	NB	NM	NS	ZE	PS	PM	PB
NB	NB	NB	NB	NM	NM	NS	ZE
NM	NB	NB	NB	NM	NS	ZE	PS
NS	NB	NB	NB	NM	NB	NB	PB
ZE	NM	NB	NB	PS	PM	PB	PB
PS	NM	NS	PM	PS	PM	PB	PB
PM	NS	ZE	PS	PM	PB	PB	PB
PB	ZE	PS	PM	PM	PB	PB	PB

4. SIMULATION RESULTS

Dynamic performance of SMIB system for nominal operating condition with 10% disturbance on generator mechanical power input with different cases are shown in Table 3.2 and the rotor angle fluctuations $\Delta\delta$, speed deviation $\Delta\omega$ and terminal voltage fluctuations are shown in Fig. 3.12(a), Fig. 3.12(b) and Fig. 3.12(c) respectively. The simulations are carried out in MATLAB simulink environment and the simulation time is 25 seconds and the step size of integration is 0.001 seconds.

Table 3.2 Results of 10% disturbance on SMIB

Case Studies	$\Delta\delta$			$\Delta\omega$			V_t		
	e_{ss} (pu)	t_{ss} (sec)	Mp (pu)	e_{ss} (pu)	t_{ss} (sec)	Mp (pu)	e_{ss} (pu)	t_{ss} (sec)	Mp (pu)
No SVC	0.3354	NS	0.6142	0.00021	NS	0.0035	0.0010	NS	0.0076
SVC	0.3454	LST	0.6378	0.00024	LST	0.0036	0.0009	LST	0.0043
PID SVC	0.3247	10	0.4800	7.8e-05	10	0.0031	0.0007	10	0.0292
FuzzySVC	0.3209	3	0.4463	6.8e-07	3	0.0027	0.0007	3	0.0401

NS - Not Settling, LST - Large Settling Time, e_{ss} - Steady State Error, t_{ss} - Settling time

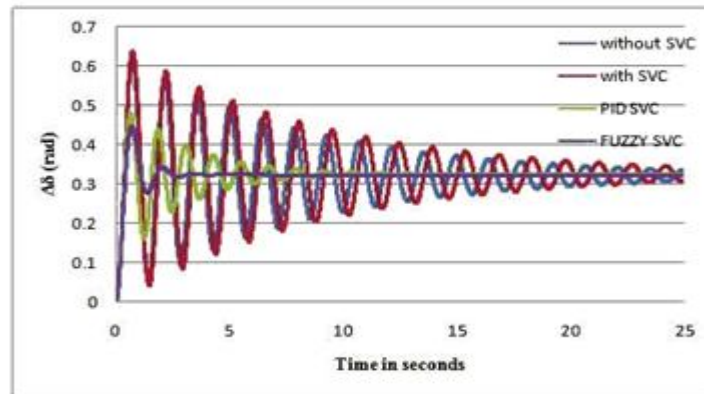


Fig 3.12 (a)

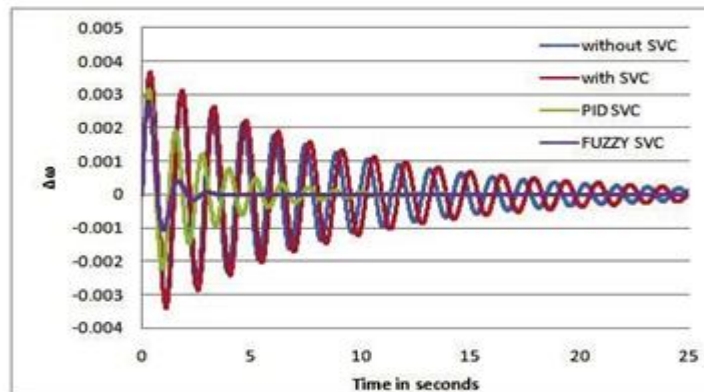


Fig 3.12 (b)

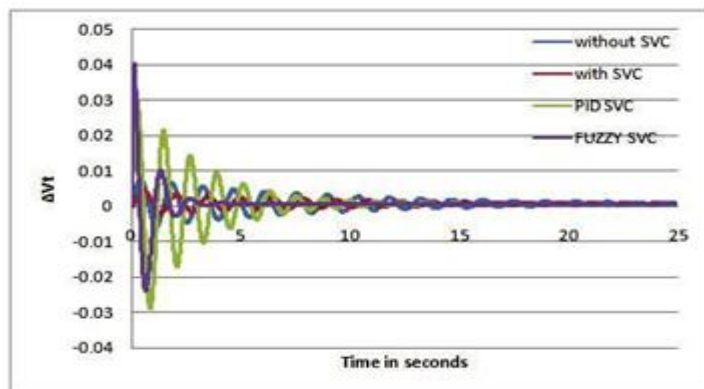


Fig 3.12 (c)

Fig 3.12 Simulation results of SMIB with 10% disturbance and different SVC case studies (a) Rotor angle deviation (b) Rotor speed deviation and (c) terminal voltage Fluctuations

5. CONCLUSIONS

In this work a novel approach has been adopted to enhance the small signal stability using SVC with PID damping controller and Fuzzy damping controller. Apart from damping of oscillations in the generator, terminal voltages has also been reported and tested on SMIB system. The conclusions are that SVC with sufficient damping controllers can improve the dynamic stability of power system. The results which are tested on SMIB system prove that SVC with PID damping Controller and Fuzzy damping controller can mitigate the problem of dynamic stability of power system i.e. they damp out the rotor mechanical low frequency oscillations, enhance the reactive power limits of the machine and also the terminal voltage fluctuations effectively. Fuzzy controlled SVC has an added advantage of adaptability for changing operating conditions and for the non-linearities in the system.

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THE NATURE OF MATHEMATICS

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Perceptions of the nature and role of mathematics held by our society have a major influence on the development of school mathematics curriculum, instruction, and research, the understanding of different conceptions of mathematics is as important to the development and successful implementation of programs in school mathematics as it is to the conduct and interpretation of research studies. The literature of the reform movement in mathematics and science education (American Association for the Advancement of Science, 1989; Mathematical Sciences Education Board, 1989, 1990; National Council of Teachers of Mathematics, 1989) portrays mathematics as a dynamic, growing field of study. Other conceptions of the subject define mathematics as a static discipline with a known set of concepts, principles and skills (Fisher, 1990).

Many educated persons, especially scientists and engineers, harbor an image of mathematics as akin to a tree of knowledge formulas, theorems, and results hang ripe fruits to be plucked by passing scientists to nourish their theories. Mathematicians, in contrast, see their field as a rapidly growing rain forest, nourished and shaped by forces outside mathematics while contributing to human civilization a rich and ever-changing variety of intellectual flora and fauna. These differences in perception are due primarily to the steep and harsh terrain of abstract language that separates that mathematical rain forest from the domain of ordinary human activity.

Research shows that these differing conceptions have an influence on the ways in which both teachers and mathematicians approach the teaching and development of mathematics (Brown, 1985; Bush, 1982; Cooney, 1985; Good, Grouws, & Ebmeier, 1983; Kesler, 1985; McGalliard, 1983; Owens, 1987; Thompson, 1984). Some see mathematics as a static discipline developed abstractly. Others see mathematics as a dynamic discipline, constantly changing as a result of new discoveries from experimentation and application (Cross white et al 1986).

HISTORICAL

It is without doubt that mathematics, the science of numbers, today owes a huge debt to the outstanding contributions made by Indian mathematicians over many hundreds of years. From zero to geometry, Indian mathematicians made some great historical achievements. Frankly speaking, without the Indian numerals, mathematics, as we know it today, would simply not exist. This article is to focus on some of these achievements and to show that mathematics was not only very much rooted in Indian soil but also that ancient Indians had great romance with mathematics.



Baudhayana (800 BC)

Indian mathematics may be said to have started with the Vedic rituals which required knowledge of geometry for accurate construction of Vedic altars. It developed further under the Jain and the Buddhist scholars who pioneered some phenomenal ground level achievements. The novel Indian numerals were subsequently adopted by the Arabs, and eventually became known to Europe as Arabic numerals. The ancient Indians provided a unique, useful, flexible and intuitive model for the world to use.

The great French Mathematician, Pascal was one who appreciated the contributions of the Indians and he put this with great clarity, when he commented, "The ingenious method of expressing every possible number using a set of ten symbols (each symbol having a place value and an absolute value) emerged in India.

India has a long tradition, both historical and mythical, of its fascination with numbers. In ancient India, mathematics was considered as one of the highest sciences. There is a statement in the Vedanga Jyotisa, which proclaims, "As are the crests of a peacock, as are the gem-stones of a snake, placed on the highest place of the body, the forehead, so is mathematics (Ganita) the head of all Vedah and shastras." The quotation suggests a reverent, almost elitist concept of mathematics in ancient India. In another mythical statement we find, "What is the use of much speaking. Whatever object exists in this moving and nonmoving world, cannot be understood

without the base of Ganita (Mathematics)". Three thousand years later, Gaileo would realise the same when he said, "It (the universe) is written in the language of mathematics, and its characters are triangles, circles, and other geometric figures, without which it is humanly impossible to understand a single word; without these, one is wandering about in a dark labyrinth."

The tradition of mathematics in India, in fact, started much earlier of which we have solid historical facts in the Indus valley which was associated with the Harappan civilization established around 2,500 B.C.

It is not known fully if the Harappan knowledge in mathematics was continued in later Vedic period. However we do know that from ancient time, Indian minds fascinated with higher numbers. While the Greeks had no terminology for denominations above a myriad (104) and the Romans above Millie (103), ancient Indians dealt freely with no less than eighteen denominations. We know from a record of an early Buddhist work in 5th century BC, how the prince Gautama Buddha correctly recited the counting beyond the koti on the centesimal scale: "Hundred kotis are called ayuta, hundred ayutas niyuta, hundred niyutas kankara, hundred kankaras vivara, hundred vivaras ksobhya, hundred ksobhyas vivaha, hundred vivahas ustanga, hundred ustangas babula, hundred babulas nagabala, hundred nagabalas tithi lambha and so on upto another twelve terms ending with tallaksana. (Thus one Tallaksna is 1053).

Examples of geometric knowledge (rekha-ganit) are to be found in the Sulva-Sutras of Baudhayana (800 BC) and Apasthamba (400 BC). Vedic Indians had knowledge of the Pythagoras theorem as early as 8th century B.C. Apasthamba's sutra provides a value for the square root of 2 that is accurate to the fifth decimal place. Apasthamba also looked at the problems of squaring a circle, dividing a segment into seven equal parts, and a solution to the general linear equation.



Aryabhata

However we do not find any proof of any of the theorems in Vedic mathematics, just the statements. This may be because, the involved mathematics was considered a sacred and secret knowledge just for the Vedic rituals reserved for the priests only. This has been one of the main problems for further development on Indian science during the Vedic Brahmanic age. As a result, none of these geometrical constructions appeared in any subsequent Indian literature, and later mathematicians did not carry these discussions to any higher level like what the Greeks did.

In ancient India, mathematics was a very lively passion. In Sanskrit, Ganita literally means the science of calculations which were generally done on a board (pati) with a piece of chalk or on sand (dhuli) spread on the ground. Thus the terms Pati-Ganita (science of calculations on the board) and Dhuli-Karma (dust work) came to be used for higher mathematics. In ancient Buddhist literature we find mention of three classes of Ganita (1) Mudra – finger arithmetic (2) Ganana – mental arithmetic (3) Samkhyana – higher mathematics in general.

The Jains were the first to discard the idea that all infinities were the same or equal. They recognized four different types of infinities: infinite in length (one dimension), infinite in area (two dimensions), infinite in volume (three dimensions), and infinite perpetually (infinite number of dimensions). Jain texts from the 6th C BC such as the Surya Pragyapti describe ellipses. Buddhist literature also demonstrates an awareness of

indeterminate and infinite numbers. Numbers were deemed to be of three types: Sankheya (countable), Asankheya (uncountable) and Anant (infinite).

The early Jainas seem to have great liking for the subject of combinations and permutations. Mahabira, the founder of Jainism, was himself a great mathematician. In the Bhagawati sutra are set forth simple problems such as finding the number of combinations that can be obtained from a given number of fundamental philosophical categories taken one at a time, two at a time, and three at a time or more at a time.

The works of the early Jain and Buddhist scholars were later summarized and expanded by Aryabhatta (476-550), the most important ancient mathematician of India. Aryabhatta headed the classical era of Indian mathematics. He helped to ignite a new era in mathematics, which in turn spurred on other sciences, such as astronomy.

In the course of developing a precise mapping of the lunar eclipse, Aryabhatta was obliged to introduce the concept of infinitesimals – i.e. *tatkalika gati* to designate the infinitesimal, or near instantaneous motion of the moon, and express it in the form of a basic differential equation. It is worth mentioning that Roots of the Modern Trigonometry lie in the book titled *Surya Siddhanta*. It mentions Zia (Sine), Kotizia (Cosine) etc. Please note that the word (Zia) changed to “Jaib” in Arab first. The translation of Jaib in Latin was done as “Sinus”. And this “Sinus” became “Sine” later on. The word Trigonometry also is derived from the Indian word *Trikonomiti*, *Trikono* meaning a Triangle, (modern day *Tribhuja*).

MODERN VIEWS

The use of a product orientation to characterize the nature of mathematics is not a settled issue among mathematicians. They tend to carry strong Platonic views about the existence of mathematical concepts outside the human mind. When pushed to make clear their conceptions of mathematics, most retreat to a formalist, or Aristotelian, position of mathematics as a game played with symbol system according to a fixed set of socially accepted rules (Davis & Hersh, 1980). In reality, however, most professional mathematicians think little about the nature of their subject as they work within it.

Mathematics deals with ideas. Not pencil marks or chalk marks, not physical triangles or physical sets, but ideas (which may be represented or suggested by physical objects). What are the main properties of mathematical activity or mathematical knowledge, as known to all of us from daily experience?

1. Mathematical objects are invented or created by humans.
2. They are created, not arbitrarily, but arise from activity with already existing mathematical objects, and from the needs of science and daily life.
3. Once created mathematical objects have properties which are well determined, which we may have great difficulty in discovering but which are possessed independently of our knowledge of them (Hersh, 1986, p.22)

The development and acceptance of a philosophy of mathematics carries with it challenges for mathematics and mathematics education. A philosophy should call for experiences that help mathematician, teacher, and student to experience the invention of mathematics. It should call for experiences that allow for the mathematization, or modeling, of ideas and events. Developing a new philosophy of mathematics requires discussion and communication of alternative views of mathematics to determine a valid and workable characterization of the discipline.

TEACHERS' CONCEPTIONS OF MATHEMATICS

The conception of mathematics held by the teacher may have a great deal to do with the way in which mathematics is characterized in classroom teaching. The subtle messages communicated to children about mathematics and its nature may, in turn, affect the way they grow to view mathematics and its role in their world.

Cooney (1987) used the work of Goffree (1985) and Perry (1970) in his analyses of the nature of mathematics portrayed in classrooms and concluded that school mathematics is bound up in a formal and external view of mathematics. Goffree presented a model for the way textbooks are developed and how teachers might employ them in the classroom to portray the nature of mathematics. The four textbook models were (a) the mechanistic, (b) the structuralist, (c) the empiricist, and (d) the realistic or applied. Each of these methods of textbook development portrays a view of the nature of mathematics. Goffree then crossed these textual characteristics with three ways in which teachers employ textbooks in the classroom-

- I. Instrumental use.

II. Subjective use.

III. Fundamental use.

Kesler (1985) and McGalliard (1983) conducted studies of secondary school algebra and geometry teachers' conceptions of mathematics by analyzing their classroom teaching. Kesler found that algebra teachers differed greatly in their orientations.

Owens's work, and that of Bush (1982), further indicated that many of the preservice teachers' dualistic or multiplistic views were strengthened by their experiences in upper-division mathematics content courses at the university level.

The reaction of students is a strong factor influencing a teacher's portrayal of the nature of mathematics in class. Brown (1985) and Cooney (1985) studied the reactions of a first-year teacher in the classroom. The teacher entered the classroom with an orientation that reflected both multiplistic and relativistic characteristics.

EXTERNAL CONCEPTIONS

The work of two groups of researchers treats mathematics as an externally existing, established body of concepts, facts, principles, and skills available in syllabi and curricular materials. The work of the first group of researchers adopting the external view focuses on assisting teachers and schools to be more successful in conveying this knowledge to children. Their work takes a relatively fixed, static view of mathematics.

Studies investigating the role of teachers in mathematics classrooms commonly focus on the actions and instructional methods of the teachers rather than on the mathematics being taught or the methods by which mathematics is being learned.

INTERNAL CONCEPTIONS

The remaining three conceptions of mathematics found in mathematics education research focus on mathematics as a personally constructed, or internal, set of knowledge. In the first of these, mathematics is viewed as a process. Knowing mathematics is equated with doing mathematics. Research in this tradition focuses on examining the features of a given context that promotes the "doing." Almost everyone involved in the teaching and learning of mathematics holds that the learning of mathematics is a personal matter in which learners develop their own personalized notions of mathematics as a result of the activities in which they participate. Ernst von Glasersfeld (1987) described this conception of learning and teaching.

A second personal, or internal, conceptualization of mathematics is based on the description of mathematical activities in terms of psychological models employing cognitive procedures and schemata. Larkin (1989) describes this approach in the following statement.

This cognitive science approach to the study of mathematics can be found in the works and recommendations of Bransford, et al. (1988); Campione, Brown, and Connell (1988); Carpenter (1988); Chaiklin (1989); Hiebert (1986); Larkin (1989); Marshall (1988); Nesher (1988); Ohlsson (1988); Peterson (1988); Resnick (1987); and Wearne and Hiebert (1988). The diversity of this research adopting the cognitive modeling approach shows the apparent acceptance of it as a model for viewing the structure of mathematics learning. Its basic tenets are the identification of representations for mathematical knowledge, of operations individuals perform on that knowledge, and of the manner in which the human mind stores, transforms, and amalgamates that knowledge.

The third internal conception of mathematics that surfaces in mathematics education research is one that views mathematics knowledge as resulting from social interactions. Here the learning of mathematics is the acquiring of relevant facts, concepts, principles, and skills as a result of social interactions that rely heavily on context. The research describing this view (Bauersfeld, 1980; Bishop, 1985, 1988; Kieren, 1988; Lave, Smith & Butler, 1988; Schoenfeld, 1988, 1989) focuses on building mathematics knowledge from learning in an apprentice model, drawing on both the content and the context.

Schoenfeld (1988) argues that the nature of mathematics perceived by students is a result of an intricate interaction of cognitive and social factors existing in the context of schooling. If students are to learn and apply mathematics, they must come to see mathematics as having worth in social settings. Such "sense making" in the learning of mathematics calls for students to participate actively in "doing mathematics" to learn the skills of the discipline.

Each of these three conceptions of the development and study of internal models for mathematics education provides important vantage points for research on the learning and teaching of mathematics. The election of one of these philosophies and its use in the design of research strongly influence the nature of the questions investigated, the manner in which relevant data are collected and analyzed, and the importance tied to the

conclusions reached. Creators and users of research in mathematics education must pay closer attention to the role such philosophies play in the conduct of that research. To ignore this feature is to misinterpret findings and misapply the outcomes of such studies.

SUMMARY

The survey of the literature shows that conceptions of mathematics fall along an externally-internally developed continuum. Hersh's (1986) comments, along with others (Tymoczko, 1986), indicate that mathematicians behave like constructionalists until challenged. Similar findings may hold for mathematics teachers.

The emergence of a process view of mathematics embedded in the NCTM standards (1989) and in the works of modern mathematical philosophers (Tymoczko, 1986) presents many new and important challenges. Teacher educators and curriculum developers must become aware of the features and ramifications of the internal and external conceptions, and their ramifications for curricular development and teacher actions. Further, all involved in applying mathematics education research must recognize the important influences of each conception of mathematics on both the findings cited and on the interpretation and application of such findings. Mathematics educators need to focus on the nature of mathematics in the development of research, curriculum, teacher training, instruction and assessment as they strive to understand its impact on the learning and teaching of mathematics.

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HARASSMENT OF WOMEN AT WORK PLACE

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ABSTRACT

Although strictly and technically speaking on paper there exist a number of Statutes, Rules, Regulations and Byelaws for the protection of rights of working women, in practice, hardly any provisions of these are actually observed to be followed in different organizations, at present. Each and every employer represented through the member of Top Management contents that women working in his organization are highly respected. However, the observed situation related to working women in almost all except a few organizations just does not confirm this contention. In this Research Paper a few ways through which the actual harassment of women was carried out at the work place have been narrated, at the start. For example, recruitment of majority of women, provision of poor working conditions, strict adherence to rules and regulations against women, to mention a few. Thereafter, some practical measures are suggested in order to reduce such harassment.

Key Words: Selective application of Rules, Unfair Advantages, Anti- Professional Working Style, Divide and Rule, Women Union.

INTRODUCTION

Although strictly and technically speaking on paper there exist a number of Statutes, Rules, Regulations and Byelaws for the protection of rights of working women, in practice, hardly any provisions of these are actually observed to be followed in different organizations, at present. As a matter of fact, only those Statutes, Rules, Regulations and Byelaws are selectively and intelligently followed by the employers which act in their own interest especially against the interest of the working women.

Over and above, the employers are always observed quite eager or highly enthusiastic to find out new ways to harass working women, that too, in a legal manner, irrespective of the fact whether they are ethical or unethical, in their character. On this background, it is the need of the hour not only to study different ways adopted to harass women at work place but also to suggest certain measures to reduce their harassment at work place.

THE RATIONALE

In almost all the Lectures, Guest Lectures, Seminars, Workshops or Conferences, whether at National or International Level, very loud comments are always passed on the topic of 'Harassment of Women at Work Place.' Each and every employer represented through the member of Top Management contents that women working in his organization are highly respected. However, the observed situation related to working women in almost all except a few organizations just does not confirm this contention.

On the contradictory background of official scenario, in the opinion of the Researcher it is, indeed imperative, thus right time, to conduct a Research on the burning topic of "Harassment of Women at Work Place."

OBJECTIVES

The Objectives of this Research Paper are as follows:

1. To Study different Ways adopted to harass Women at Work Place; and
2. To suggest certain measures to reduce Harassment of Women at Work Place.

SCOPE OF THE RESEARCH

The Practical Scope of this Research Paper firstly extends to the detail study of different ways adopted by different members of Top Managements, of different organizations, who represent their Employer. Thereafter, the Researcher has suggested certain measures in the practical form of his personal Views in order to reduce Harassment of Women at Work Place.

RESEARCH METHODOLOGY

In order to achieve the above mentioned two objectives, the following Research Methodology was adopted.

1. Field Survey of individual respondents, those were working Women in selected Organizations, possessing varying personal features was conducted in order to collect Primary Data. The Research Paper is exclusively based on **Primary Data**.
2. For conducting the field survey, an **Unstructured Non-disguised Questionnaire** was administered to the respondents those were working women, as aforesaid. The type of questions designed for the Field Survey was open ended.

3. Consolidated Research findings were arrived at on the basis of Field Survey, thus conducted and subsequently presented in the Research Paper.

SOURCES OF PRIMARY DATA

The following were the prime sources of Primary Data collected for this Research Paper.

1. The Researcher himself has a very rich and composite work experience of around thirty years, at present. Out of these thirty years, the work experience of around ten years is from five Industries and around twenty four years of Academic Experience is from six reputed Management Institutions situated in Pune. (At the beginning of the career, while the Researcher was working in Industries, for about four years, he worked simultaneously as a 'Visiting Faculty' in several reputed Management Institutions located in Pune. As a result, the total number of experience, Industry and Academics, in years is concurrent.)

Thus, the Researcher himself has **Observed** plenty situations on which the working women were harassed by their respective superior authorities during his long tenure of work in Industry and Academics. An honest attempt has been made by the Researcher in this Research Paper to highlight some such significant occasions.

2. **Personal Interviews** of **100** working women from different organizations, namely, Industries, Educational Institutions and Banks were conducted by the Researcher himself, in order to collect Primary Data for the Research Paper with the help of **Unstructured Non-Disguised Questionnaire**, especially depending upon the Personal Profile or Demography of the respondent working woman, characterized by the factors like Age, Official Position, Nature and Kind of Experience, Level of Maturity and Wisdom, An ability to express Real and 'Inner Feelings,' Level of Education, Reporting Authority, Work Experience in years, Frequency of Interaction with the Superiors, Kind of Official Relationships, whether Professional or Informal, Nature of Work Environment, whether Cooperative, Non-cooperative, Hostile, Agile, Etc.

SAMPLING PLAN FOR THE FIELD SURVEY

- (I) Population – Working women in selected Organizations in Pune
- (II) The Sample Unit – Working Woman
- (III) The Sample Size – 100 working women from selected Organizations

SAMPLING METHODOLOGY FOR THE FIELD SURVEY

The Sampling Methodology adopted for the Field Survey was **Non Probability – Stratified (Demographic) resulting into Purposive and Convenience Sampling**.

SAMPLE CATEGORY

The sample consisted of the following four different categories.

Sr. No	Category	Population	The Sample Unit	Sample Size
1	Working women in Industries	Women working at Middle-level Management in Selected Industries in Pune	Selected Working woman working at Middle level Management in an Industry in Pune	30
2	Working women in Educational Institutions	Women working in Departments like Student-Admission, Office Administration, Student-Placement, etc. in selected Educational Institutions in Pune	Selected working woman – forming part of Non-teaching Staff in an Educational Institute in Pune	25
3	Working women in Educational Institutions	Women working as Assistant Professors, Associate Professors and Professors in selected Educational Institutions in Pune	Selected working woman – forming part of Teaching Staff in an Educational Institute in Pune	25

4	Working women in Nationalized Banks	Women working at Middle –level Management in Selected Nationalized Banks in Pune	Selected working woman working at Middle –level Management in Selected Nationalized Bank in Pune	20
			Total	100

WAYS OF HARASSMENT OF WOMEN AT WORK PLACE

Some of the typical ways adopted by many superior authorities for Harassment of Women at Work Places are conveniently and broadly summarized in the following few lines.

In several reputed organizations the number of working women was observed almost nearing ninety percent. It was also learned by the Researcher from one of the official and reliable sources - Personnel Records that in last around five years or so no gents employee was recruited in such organizations on any post, either at the Middle Level Management or Lower Level Management. Furthermore, the husbands of almost all the women employees were well placed in reputed organizations. This meant that their financial position was relatively sound as their families did not depend exclusively upon their income. Thus, the nature of their income was, no doubt, secondary.

After realizing the reality, the Researcher was deeply confused. Was this a sheer Co-incidence? Or alternatively was it Deliberate Creation? Or was it a Management Policy?

When some of the dominant members of the Top Management who were primarily responsible for recruitment of the employees, whether gents or ladies, were inquired about this fact, quite curiously and out of interest of the Researcher, they gave a very decent and socially desirable reply. It can be summarized just in one sentence. "No suitable gents' candidate was actually found fit and proper for any official position in all these last few years."

This reply was not, at all, convincing because there was every possibility of happening either for one or two or at the most for three positions in any organization that a fit and proper candidate was not found, however, the same was certainly not expected to happen in respect of almost all the positions, moreover, for consecutive five years.

Thereafter, it was decided by the Researcher to investigate into this matter further in order to gather information which would lead to know either different rational and logical grounds on the basis of which Top Management's Decision was arrived at or were there hidden reasons, if any, which were under consideration of the Top Managements, when such decision was arrived at. The Researcher's suspicion proved to be true and he was quite shocked when he integrated different reasons for the recruitment only of women in different organizations.

The Top Managements were interested in recruitment only of women on almost all the positions in their organizations, those too, for a number of years because they were obtaining several advantages, undoubtedly **Unfair Advantages**, through such a decision, as follows:

(a) As the women are more family oriented as compared to men, their Prime Focus or Attention is observed naturally more on their families rather than on their Career exactly contrary to men. As a result, they are not bothered more about their present official Position, possible Promotion, Pay Scale, Annual Notional Increments, other Privileges and ultimately resultant Take- Home Payment.

This peculiar and more general feature of women helps the employers to content them with either low (in the light of Payment Norms of the organization) or at times no Annual Notional Increment and no Privileges consequently leading to relatively less take-Home Payment. Following of this kind of mal-practice on the part of the employers can surely be treated as a special kind of harassment in the practical form of Women Exploitation.

(b) Especially because of domestic problems like health hazards of senior members or children in the family, presence required for performance of religious ceremonies, to mention a few, the absence of working women in an organization is comparatively high. However, the employer is not affected, quite adversely, because of this kind of absenteeism because official work does not suffer, at all. The other lady colleagues do compensate on such occasions with a view to expect the same from her other colleagues at the time of her absence. Thus, the natural courtesy and reciprocity followed by women employees among themselves is merrily allowed by the employee as the following stands in his favor, always.

The absence of an employee from the duty undoubtedly provides an employer a ready opportunity for Salary Deduction, irrespective of the fact whether it is statutorily authorized or unauthorized,

This working style is, no doubt, anti-professional in its practical nature ultimately causing harassment to the working women.

(c) It was also observed in some organizations that out of ninety percent of the women Employees fifty percent of them were newly married. (Within last one or one and half year) Further, as an interesting fact, fifty percent out of these ninety percent women were pregnant and they were about to proceed on Maternity Leave, within the span of one or two months, one by one.

When any employee goes on the long leave like Maternity Leave, ranging minimum from one year to one and half years or sometimes evens more, naturally, an employer gets a ready opportunity to recruit a fresh employee in the vacant position resulting from such a temporary vacancy. A new employee, again of the same description, behaves very politely or modestly in the organization during the probation period because of insecurity of the job and more importantly from the employer's contemplation on relatively low salary.

(d) The employees out of which majority are women having diversified nature and coming from different families, cultures, backgrounds and most importantly having varying intensities for income can not come on a common platform in order to fight with the employer against an unfortunate incidence of injustice to the employee at the hands of the mighty employer because Employee Union simply can not be formed under the given circumstances.

An employer merrily adopts the principle of '*Divide and Rule*' and enjoys an undue advantage in the existing situation. As a result, strictly Autocratic or Dictatorial style of Leadership is found appropriate in the existing situation, thus it is followed by the employer in the organization.

It is needless to point out over here at this juncture that *history has proved, time and again that Autocracy or Bureaucracy has been universally hated by the suppressed* always. As a matter of fact, *the level and the context of the hatred is experienced different because when the rulers are different, although the rules remain the same, they are executed differently.*

(e) In one of the Organizations, there were crèches as well as baby-sitting arrangements. Whenever a new woman having a child was recruited, she was indirectly suggested to put the baby either in the crèches or use the services of baby-sitting. At the same time, the lady also finds it quite convenient and comfortable to put the child either in the crèches or use the services of baby-sitting as the child is very near to her – at place of her employment itself, just in the adjoining or neighboring campus.

In other words, when a woman having a child is recruited, a wise and practical employer simultaneously is creating a captive customer for his other business either of crèches or baby-sitting. No doubt, this can be interpreted as a tactful marketing strategy; however, in the opinion of the Researcher it is unethical and indecent in its practical nature.

Furthermore, it may necessarily not, at all, be out of place to state that it was also observed that those working women who did not put their child either in the crèches or did not avail baby-sitting service, as suggested by the employer or who put their child in the crèches initially or used the services of baby-sitting initially but subsequently changed this arrangement, because of availability of an alternative arrangement, were harassed either for one or the other very minor reason and ultimately they were compelled to leave the organization.

PRACTICAL MEASURES TO REDUCE HARASSMENT OF WOMEN AT WORK PLACE

The real task of a Researcher is certainly not over simply after putting forward different ways that is different situations or occasions of harassment of women at work place, but it is his prime duty and social responsibility to suggest some practical measures whereby such occasions can be overcome by them, quite comfortably. At the same time, it is true to state that there can really be made no generalization whatsoever as regards such situations, because although the practical consequence of any such situation finally amounts to harassment of a working woman, no two situations in two different organizations are similar in their nature.

The members belonging to Top Managements in different organizations should necessarily change their angle, attitude and approach to behave with or treat working women. They should neither take them for granted nor exploit them by taking undue or unfair advantage of their officially weak position.

Although there are a number of notable and considerable differences in the interests of the working women, as pointed out in the earlier narration, if at all, they would somehow keep their conflicting interests away and unite

in the best personal interest of their own; it would definitely turn out to be a very big challenging or threatening strength for the employers. Thereafter, the employers would no more remain in a prominent position to dictate the terms and exploit the working women as per their whims and fancies. On the other hand, working women would actually be able to have their voice especially against the employer, if it is required.

Here, there is no intention on the part of the Researcher to suggest over here that just like the employers, the working women should also exploit the organizational situation to their advantage, when they are in the majority. It is an apart fact that they would not succeed in the same attempt, if at all they do so, particularly for very long time as the employers would suitably apply different cunning practices or tactful strategies to get rid of at least the leader working women either by hook or by crook. However, the working women should insist on following of all the Statutory Rules, Regulations and Bye-laws applicable to their organization. Even if, they get success in achieving this much, the Researcher seriously thinks that no working woman would ever be exploited or harassed in any organization. In other words, *in order to reduce the harassment of working women they must unite and empower themselves on their own. There does not seem to be any other Royal Way to combat with undesirable situation.*

THE LIMITATIONS

1. As the study for this paper is purely based on Primary Data, all the limitations of Primary Data have direct and deep impact on the various views formed and inferences arrived at by the Researcher in this paper related to the Harassment of Women at Work Place and also related to a few suggestions put forward to reduce the Harassment.
2. Various views formed and opinions expressed in this Research Paper related to the Harassment of Women at Work Place are Researcher's personal views and opinions. Thus, cent percent agreement with all such views and opinions is simply not, at all possible and ideally it is neither intended nor expected by the Researcher also.
3. It was very difficult for the researcher to collect data from the working women on highly sensitive issue related to their harassment. Still the Researcher has tried his all the best all the while to collect it from them and put it forward as it stands without coloring or twisting. As a result, the possibility of dilution of the facts at the hands of working women, while responding to the Researcher's questions related to different incidences which are narrated in the Research Paper, can altogether not be denied.
4. Many more incidences, observed as well as experienced in different organizations, of harassment of women at work place can well be described in detail. However, for want of length of this Research Paper, only a few incidences which the Researcher felt significant are covered in the Research Paper.

SCOPE FOR FUTURE RESEARCH

During the course of the study of this Research Paper, the Researcher found out that there is an ample scope and adequate potential for Research in future for the following topic related to Harassment of Women at Work Place.

1. Unfair Enjoyment of Self-Position by Working Women at Work Place – An Empirical Study

Foot Notes

1. *The details regarding Industrial Experience and Academic Experience of the Researcher are not given in the Research paper not because of the fact that they are irrelevant but because their disclosure (the names of different organizations where the Researcher has worked) may invite unnecessary defamation especially in the light of the contents of the Research Paper. .*
2. *The names of all the working women who have directly contributed towards collection of Primary Data are not disclosed in the Research Paper as per their desire.*
3. *An oral assurance is given to all the working women who have directly contributed towards collection of Primary Data for this Research Paper that information, obtained from them, which finally amounts to and thus, can be interpreted as Harassment, would really and strictly be kept highly confidential and would not be utilized for any other pure purpose, either Academic or Non-Academic.*

Therefore, it is ideally advisable for the future unknown Researchers, if any, to refer to the contents of this Research Paper without disclosing the identity and the actual affiliation of the Researcher. Otherwise, it may firstly act against the interest of the Researcher personally and secondly it may invite, for the Researcher, some unnecessary problems, both official and social, which may make Researcher's position quite awkward or embarrassing. Also, it would definitely be against the Ethics of the Research. Furthermore, it may lead to some

undesirable or unwarranted impacts, either directly or indirectly on official or social life of the Researcher. (It is humbly requested by the Researcher not to hold him responsible for such probable eventualities, if any.)

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FOREIGN DIRECT INVESTMENT AND CAPITAL MARKET DEVELOPMENT IN NIGERIA

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ABSTRACT

This study examined foreign direct investment and capital market development in Nigeria for the period 1972 to 2014. The study was specifically designed to assess the relationship between foreign direct investment and market capitalization, foreign direct investment and number of listed companies, foreign direct investment and all share index, foreign direct investment and turnover ratio and foreign direct investment and value of transaction FDI in Nigeria. Secondary time series data were collected using desk survey approach and analysed using Vector Auto Regression (VAR) method. The result of the analysis revealed that there is a significant positive relationship between foreign direct investment and market capitalization; also, there is a significant positive relationship between foreign direct investment and number of listed companies; again, the study shows that foreign direct investment has a significant positive relationship with all share index; lastly it was revealed that foreign direct investment has a significant positive relationship with turnover ratio and value of transaction in Nigeria. On the basis of these findings, the study recommended that Government should put in place suitable investment conditions such as steady power supply, good road networks, etc. for the profitable operation of foreign direct investment and to boost the capital market performance in Nigeria; also, government should encourage foreign direct investors to quote their securities on the Nigerian capital market by providing special benefits such as tax holidays, to quoted FDI and finally, regulatory authorities should make policies to boost investors' confidence in the market by promoting transparency, fair trading and discouraging capital flight.

Keywords: Foreign Direct Investment, Capital market, Market Capitalization, Turnover Ratio, All Share Index, Value of Transaction, Foreign Portfolio Investment

INTRODUCTION

The lean nature of domestic savings relative to the investment needs of Nigeria, coupled with the high dependence on oil revenue, high poverty rate, poor capacity utilization and the need to attain economic growth (Udoka, Tapang & Anyingang, 2012), suggest that an enabling environment be created to enhance foreign capital inflow to Nigeria. Foreign capital could be thought of as the capital resources (either in form of cash, financial instruments or equipment) owned by a country other than the receiving country. It is the financial instruments, cash, equipment, skills and benefits granted to or invested in a country other than the originating country. When foreign capital resources are moved into a country, they are inflows; if however such movement is out of a country, it is termed an outflow. Foreign capital inflow could be in the form of foreign direct investment (FDI), foreign portfolio investment (FPI), transfers (TRF) and commercial loans (CL) (Jeffrey & Spaulding, 2005).

Foreign direct investment (FDI) has been defined as an investment in a business by an investor from another country for which the foreign investor has control (10% or more voting stock) over the company purchased (OECD, 1998). It is an investment directly into a target company by a direct investor in a country other than his own, with a view to having controlling interest in the firm. It could take the form of an investment in the equity capital of either a Greenfield or Brownfield company, reinvestment of the earnings in a firm and short term intra-company loans (Jeffrey & Spaulding, 2005).

The role of foreign direct investment in enhancing investment and attaining macroeconomic goals cannot be overemphasized. Foreign direct investment creates employment; enables knowledge and skills transfer in the area of management and technology; facilitates local firms' access to international markets and finance and enhances international trade integration. It also facilitates human capital development; provides avenues for risk and product diversification; encourages favourable competition among businesses and increases product diversity (Ngowa, 2001; Nwankwo, Ademola & Kehinde, 2013; Adaramola & Obisesan, 2015 and Ebiringa & Emeh, 2013). Other roles include broadening the dealings, value and capitalization of the capital market and by so doing enhancing its performance (Tomola, 2013 and Obandan, 1982).

A capital market is a network of individuals, institutions and instruments that facilitate the extension and acquisition of medium to long-term capital (Akpan, 2004). It is the mechanism through which medium to long term financial resources are transferred from the surplus to the deficit economic units. Since the internationalization of the Nigerian capital market, the performance of the Nigerian capital market has

increased. For instance, after the internationalization of the Nigerian capital market in 1995, market capitalization increased from ₦ 180.3 million to ₦ 2,112.5 million in 2004 and ₦ 16,875.1 million in 2014. Also, from ₦ 1,838.8 million in 1995, value of transaction increased to ₦ 225820 million in 2004 and ₦ 1334783 million in 2014. Lastly, number of listed companies from 276 in 1995, rose to 277 in 2004 but fell to 253 in 2014 (Central Bank of Nigeria [CBN], 2014). This stimulates increased inflow of foreign capital into the Nigerian economy through the capital market in the form of foreign direct investment, foreign portfolio investment, overseas development assistance (transfers) and commercial loans (Olotu & Jegbefume, 2011). For instance, FDI inflow increased from ₦ 75,940.6 million in 1995 to ₦ 248,224.6 million in 1996. By the end of 2014, FDI had reached ₦ 73,8197.19 million (CBN, 2014).

The Nigerian capital market has two components: the primary market, for new capital issue by firms and other institutional investors, including governments and the secondary market, for the exchange of existing Securities (Akinsulire, 2014). It follows from the above that the Nigerian capital market, by its functional classification, plays two major roles in investment attraction into Nigeria. Firstly, it enables deficit investors to raise long term funds from surplus investors to finance their investment activities. In fulfilling this role, it acts as primary market for new issues of equity and debt. Last, it provides a ready market for investors to sell off some shares and bonds in their portfolio or to buy additional ones to beef-up the structure of their portfolios. By so doing, it acts as a secondary market for trading on existing securities (Osinubi, 1998).

The relationship between capital market development and FDI in Nigeria has raised serious debates among scholars in recent time. Many are of the view that developments in the capital market have no relationship with FDI, since FDI involves direct investment in a target country which may not pass through the capital market. Others hold the view that capital market relates indirectly with FDI. Yet others are of the view that developments in capital market have strong relationship with FDI in any country (Ismail & Adegbelemi, 2012; Adaramola & Obisesan, 2015; Adam & Tweneboah, 2008; Wilhelms, 1998; Uwubanmwun & Ajao, 2012; Soumyananda, 2010; Oladipo, 2013; Obida & Abu, 2010; Umar, Ismail & Sulong, 2015 and Musa & Ibrahim, 2014). It is this inexhaustible arguments coupled with the recent developments in the Nigeria capital market such as, the automation of the Nigerian Stock exchange and the review of the minimum operating standards of the Bourse, as well as the reclassification of operators in The Exchange that has given credence to this study.

The operational efficiency of the Nigerian capital market has been seriously hindered by several economic challenges in Nigeria, resulting in the inability of the market to actively mobilize idle funds to finance domestic investments as well as attract foreign capital inflows into Nigeria. Many multinational companies end up at their appraisal stages without establishing in Nigeria for fear of suffering illiquidity, insolvency and bankruptcy. Already established ones are folding up day after day leading to low capital formation, reduced aggregate demand, low disposable income and high level of unemployment. Surviving ones have refused quotation on the Nigerian stock market.

Consequence of these is the low level of transactions in the Nigerian capital market, leading to the inability of firms to sufficiently mobilize long term funds to finance their expansion and/or modernization of technologies. These, coupled with the unstable and risky conditions that characterized the Nigerian investment environment have reduced the liquidity, capitalization and dealings of the Nigerian capital market. The volatility of major macroeconomic indices such as exchange rate, inflation, interest rate and money supply have further discouraged foreign direct investors from establishing in Nigeria and already established ones from accessing facilities in the capital market; to boost their operations. Given this scenario, it becomes necessary to wonder the extent to which foreign direct investment relate with capital market development in Nigeria. Hence, this study is meant to examine whether there is any relationship between foreign direct investment and capital market development in Nigeria. The specific objectives were to:

- (i) Examine the relationship between FDI and the Nigerian capital market's market capitalization;
- (ii) Ascertain the relationship between foreign direct investment and the Nigerian capital market's number of listed companies;
- (iii) Determine the relationship between foreign direct investment and the Nigerian capital market's all share index;
- (iv) Examine the relationship between foreign direct investment and the Nigerian capital market's turnover ratio;
- (v) Assess the relationship between foreign direct investment and the Nigerian capital market's value of transaction.

RESEARCH HYPOTHESES

The following hypotheses were formulated for the purpose of achieving the above stated objectives.

- H₀:** Foreign direct investment does not have any significant relationship with the Nigerian capital market's market capitalization;
- H₀:** Foreign direct investment does not have any significant relationship with the Nigerian capital market's number of listed companies;
- H₀:** Foreign direct investment does not have any significant relationship with the Nigerian capital market's all share index;
- H₀:** Foreign direct investment does not have any significant relationship with the Nigerian capital market's turnover ratio;
- H₀:** Foreign direct investment does not have any significant relationship with the Nigerian capital market's value of transaction.

The remainder of this study is divided into four sections. Section two is on review of related literature and theories. The third section is on methodology, upon which the study is built. This is closely followed by data presentation, analysis and discussion of findings. The remaining sections draw managerial implications that emerged from the findings.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Theoretical Framework

In order to give direction to the empirical investigation, this study was built on the foundation of the capital market theory of FDI, the dynamic macroeconomic theory of FDI and strength of the currency theory of FDI. However, the study was anchored on the capital market theory of FDI.

2.1.1 Capital Market Theory of FDI

The capital market theory is one of the oldest theories of FDI propounded by Boddewyn (1985). It holds that FDI is determined by the rate of interest charged by the host country's financial institutions. As a portfolio investment theory, the capital market theory identifies three factors which attract FDI to developing countries like Nigeria. First, is the undervalued exchange rate, which allows lower production costs in the host countries, less developed countries' currencies are lowly priced relative to those of the developed countries. Hence, to take advantage of low cost of production, multinational companies move their capital into these countries.

Secondly, since no organized securities exist, long term investment in less developed countries will often be FDI rather than the purchase of securities. Finally, the capital market theory assumes that foreign investors have limited knowledge about the host Countries' securities and hence prefers FDI which allows control of host country's assets (Morgan & Katsikeas, 1997).

2.1.2 Arbitrage Pricing Theory

This theory was propounded by Ross (1976) and built on the assumption that the capital markets are perfectly competitive and that investors always prefer more wealth to less wealth with certainty. Accordingly, prospective investors move their capital resources in response to changes in rates of return on investment. By this, capital is expected to flow from a capital surplus to a capital deficit economy in response to higher productivity of capital until the rate of returns is equalized. This theory also assumes that the return on an investment is linearly related to a set of risk factors. By the theory, changes in risk factors determine the return on investment which further determines the level of investment. The risk factors could be macroeconomic factors such as the growth rate of GDP, inflation, interest rate, money supply or fundamental factors like all share price index, market capitalization, turnover ratio, etc.

Foreign direct investors by this theory are wealth maximizers whose cardinal motive is to maximize the return on their investment. Accordingly, they will always appraise all necessary factors perceived to portend risk on investment in the target country with a view to divest or disinvest or both. Hence, the major factor that informs investment by foreign multinational corporations is return.

2.1.3 Dynamic Macroeconomic FDI Theory

This theory was propounded by Sanjaya (1997). According to this theory, the timing of investments is dependent on the changes in the macroeconomic environment. This theory believes that volatility in macroeconomic environment such as inflation, exchange rate, interest rate, money supply, openness and national productivity determines the flow of FDI to developing countries. FDI is therefore long term function of multinational companies' strategies. This implies that foreign direct investment is a strategy used by

multinational firms to take advantage of positive changes in developing countries macroeconomic environment. More so, unfavourable or negative changes in macroeconomic environment deter foreign direct investment inflow into developing countries.

2.1.4 Strength Of Currency Theory of FDI

This theory was propounded by Aliber (1970), who presented his theory of foreign investment on the basis of the relative strength of the various currencies. He forwarded his theory in terms of the differences in the strength of the currencies in host and source countries. He postulated that weaker currencies compared with stronger investing country currencies had a higher capacity to attract FDI in order to take advantage of differences in the market capitalization rate.

2.2 Conceptual Framework

Capital market is defined as the collection of institutions, individuals and instruments that interact to channel medium to long-term funds from the surplus economic units to the deficit economic units. It is the market where medium to long-term finance can be raised (Akingbohunge, 1996). In another view point, Ekezie (2002) posited that capital market is the market for dealings (i.e. lending and borrowing) in longer-term loanable funds. Capital market has also been conceived as a forum through which long-term funds are made available by the surplus economic unit to the deficit economic units (Mbat, 2001). It is a market where lenders (investors) provide long term funds in exchange for long term financial assets offered by borrowers. Nwankwo (1980) opined that the central task of the capital market is the mobilization of long term idle funds in the hands of myriad individuals who save and the pooling and channelling of such funds into productive uses. It is the most important institution for sufficient capital formation geared towards economic development. This market embraces both the new issues (primary) market and secondary market. Thus, it is a mechanism whereby economic unit desirous to invest their surplus funds, interact directly or through financial intermediaries with those who wish to procure funds for their businesses.

Capital market offers access to a variety of financial instruments that enable economic agents to pool, price and exchange risk. It encourages savings in financial form. This is very essential for government and other institutions in need of long term funds and for suppliers of long-term funds (Nwankwo, 1991). Based on the relevance of the market in accelerating economic growth and development, governments of most nations tend to have keen interest in the performance of its capital market. The concern is for sustained confidence in the market and for a strong investor's protection arrangement.

The principal participants in the Nigerian capital market, according to Akinsulire (2014), include the Nigerian stock exchange, the Securities and Exchange Commission, stock broking firms, issuing houses (banks and investment companies), government and quoted companies. The Securities and Exchange Commission (SEC) is the apex regulatory body of the Nigerian capital market and a government agency established by the Securities and Exchange Commission Act 71 of 1979 which was later re-named as Investment and Securities Act No. 29, 2007. The SEC pursues its objectives by registering all market operators based on capital adequacy, competence and solvency as criteria. Generally, the capital market among other things provides a platform for the greater percentage of the populace to participate in the economy. In some countries, the capital market constitutes one of the largest sources of funds for the public and private sectors to finance important projects. Similarly, the market provides a platform for mergers and acquisitions for companies desiring to do so while venture capitalists also use it as an avenue for promoting venture capital development. The capital market is a channel through which international capital flows in and out of a country.

International capital flows majorly consist of foreign direct investment (FDI), portfolio equity and debt investment, commercial lending and official flows (Razin, Sadka & Yuen, 1998). FDI may be broadly defined as the establishment of, or acquisition of substantial ownership in a commercial enterprise in a foreign country, or an increase in the amount of an already existing investment abroad to achieve substantial ownership (Wallace, 1990). It must be stated that FDI involves more than just ownership, as in the case of portfolio investment. It also includes direct involvement in the management of the enterprise (Buckley, 1997)

Dunning (1988) identifies two characteristics of FDI. First, FDI involves the movement of resources other than capital, such as technology, management, organisational and marketing skills. Secondly, the resources are transferred internally within the firm, rather than externally between two independent forces. Because of this, de jure control is still retained over their usage. Dunning suggests that this is the essential difference between portfolio and direct investment (see also Razin, Sadka & Yuen, 1998). For statistical purpose, the International Monetary Fund (IMF) defines foreign investment as direct when the investor holds 10% or more of the equity of

an enterprise. As a rule of thumb this is usually enough to give an investor a say in the management of the enterprise.

2.2.3 Measures of Capital Market Performance

Discussed below are some of the measures of capital market performance in Nigeria. They include:

(i) Stock market size

A common index often used, as a measure of stock market size is the market capitalization. Market capitalization equals the total value of all listed shares. In terms of economic significance, the assumption is that market size and the ability to mobilize capital and diversify risk are positively correlated. For the period covered by the study (1972 -2014) the highest market capitalization was #19077.4 billion in 2013 and lowest capitalization of N2.1 billion in 1972. Adeyemi (1998) identified a number of factors that account for lack of interest by Nigerian companies in being listed in the exchange to include: high cost of public quotation, reluctance to dilute ownership and control through public quotation, the interest rate structure in the past which favoured debt financing over equity financing, and stringent requirement for listing.

(ii) Liquidity

This is used to refer to the ability of investors to buy and sell securities easily. It is an important indicator of stock market development because it signifies how the market helped in improving the allocation of capital and thus enhancing the prospects of long-term economic growth. This is possible through the ability of the investors to quickly and cheaply alter their portfolio thereby reducing the riskiness of their investment and facilitating investments in projects that are more profitable though with a long gestation period.

Two main indices are often used in the performance and rating of the stock market liquidity: total value traded ratio and turnover ratio. Total value traded ratio measures the organized trading of equities as a share of the national output while turnover ratio is used as an index of comparison for market liquidity rating and level of transaction costs. This ratio equals the total value of shares traded on the stock market divided by market capitalization. It is also a measure of the value of securities transactions relative to the size of the securities market. The Nigerian capital market had an annual average turnover ratio of 0.054 in 2012, in 2013; the turnover ratio increased to 0.123 and fell in 2014 to 0.079.

(iii) Concentration

This factor measures the level of domination of the market by a few enterprises. The significance of concentration as a measure of performance of stock market is because of the adverse effect it may have on the liquidity of the market. The share of market capitalization accounted for by the 10 largest stocks often measures the degree of market concentration. In Nigeria, a few companies dominate the market as the market capitalization of the top ten equities listed on the Nigerian Stock Exchange accounted for about 40 percent of the total stock market capitalization in 2014.

(iv) Number of listed Companies

The average number of listed companies in the Nigerian capital market for 1980-2004 periods was 215.24 companies. At the end of 2014, the number of listed companies stood at 228.81. In effect, the Nigerian stock market provides greater option to investors in terms of choice of equities than most African market do (Tokunbo, & Lloyd, 2010). Over the years, the Nigerian capital market witnessed growth of equity listings, especially in the 1990s. This was attributable to economic policies put in place by the government, notable among which was privatization of public enterprises. Also, the establishment of second-tier securities market (SSM) which allowed small/medium-sized enterprises to participate in the capital market. As at the end of 1999 16 firms were listed in SSM market. The market capitalization, which opened the year at N263.3 billion, closed the year at N300 billion. This growth was attributed to new listings and recovery of equity prices.

2.2.4 Factors Influencing Investment in the Capital Market

Investment in the capital market can be undertaken by investors either for wealth maximisation; liquidity maintenance or risk minimisation purposes. For wealth maximization, investors part with their current consumption in anticipation of a rise in the net present value of their income in form of a rise in their share price (capital gain) and an additional dividend as a compensation for parting with their income (Emekaekwue, 2009). The risk minimization purpose for investing in the capital market suggests the desire of investors to spread more evenly over time, the cost of risks in order to reduce the strain (financial and otherwise), and possible insolvency, which the random occurrence of large losses may cause (Akinsulire, 2014). When more and more securities are added into a portfolio, the risk of the individual securities in the portfolio is decreased. This risk vanishes when the number of securities is very large (Pandey, 2008). Hence, the desire to spread or diversify the risk of an investment portfolio necessitates investment in the capital market. Additionally, investors desire to

remain liquid and maintain sufficient working capital for their daily dealings. This has also given impetus to investments in the capital market.

Many factors have also been identified by scholars as necessitating the investment in capital market. Al-Tamimi (2005) investigated the factors influencing individual investor behaviour on the United Arab Emirates (UAE) financial markets. The study found that the six most influencing factors in order of importance were: expected corporate earnings, get rich quick, stock marketability, past performance of the firm's stock, government holdings and the creation of the organised financial markets. Other factors identified by the study to be less influential to the investment in the capital market are expected losses in other local investments, minimising risk, expected losses in international financial markets, family member opinions and gut feeling on the economy.

In a similar study, Al-Tamimi and Kalli (2009) revealed religious factors as having dominant influence on capital market investment while rumours was said to have less influence on capital market investment. These findings have been confirmed as true by Hossain and Nasrin (2012) in their submission that all possible factors influencing investors' investment decisions are not constant over time and that they may vary widely from investor to investor for distinct demographic features.

Mojgan and Ali (2011) studied the effect of earnings per share and cash dividend per share on investor decision making in the Tehran stock market. They found that the two factors influenced investors' decision to buy stocks. Azam and Kumar (2011) examined the factors influencing Pakistan investors' behaviour on the Karachi Stock Exchange and found that the earning per share, foreign direct investment and gross domestic product growth rate have a significant impact on stock prices.

Merikas, Merikas, Vozikis and Prasad (2008) investigated factors influencing investors' decision in the Greek Stock Exchange and found that investors principally favour expected corporate earnings, condition of financial statements and firm status in the industry. This finding seems to us as depicting the factors influencing the investment in the Nigerian stock market. Masomi and Ghayekloo (2011), studying the consequences of human behaviours in economies of Tehran market and found that behavioural factors influenced investment decision making of investors.

Kaleem, Wajid and Hussain (2009), studied the factors affecting financial advisors perception in portfolio management in Pakistan. The study found that age, income, language and orientation of education have a significant role in determining the investment style of an investor. Furthermore, Shanmugsundaram and Balakrishnan (2011), found that age, gender, income and education affect investors' preference and attitudes towards investment decisions.

In another study, Shaikh and Kalkundrikar (2011) argued that the factors influencing investors' investment decisions are demographic in nature and include age, gender, marital status, level of income, level of market knowledge, educational qualification and the number of dependents.

Geetha and Ramesh (2012) studied the relevance of demographic factors in investment decisions in India. The study revealed that demographic factors have a significant influence over some of the investment decision elements, while insignificant influence was found on some other elements. Also, Jain and Mandot (2012), studying the impact of demographic factors on investment decision of investors in Rajasthan, concluded that various demographic factors like age, marital status, gender, city, income level, market knowledge, occupations and qualifications have a major impact on investment decision of investors.

Fares and Khamis (2011) investigated individual investors' stock trading behaviour at the Amman Stock Exchange, Jordan, using the multiple regression technique. They identified four behavioural factors (age, education, accessibility to the internet and interaction between the investor and his/her broker) that influenced investors' trading decisions. According to the study, investor's age, education, and his/her accessibility to the internet had a significant and positive effect on stock trading, while the interaction between the investor and his/her broker, had a significant negative effect.

Sultana and Pardhasadhi (2012) investigated factors influencing Indian individual equity investors' decision making and behaviour. Applying factor analysis, the 40 attributes were reduced to ten factors of individual eccentric, wealth maximisation, risk minimisation, brand perception, social responsibility, financial expectation, accounting information, government and media, economic expectation and advocate recommendation factors.

Nagy and Obenberger (1994) examined the factors influencing investment behaviour and found that classical wealth maximisation criteria are the most important to investors, even though investors employ diverse criteria when choosing stocks. In Sri Lanka, Cooray (2003) identified the factors affecting investment decisions as risk

factor, return on investment, liquidity of investment, tax consequences of an investment, inflation and the term of an investment. Sharma & Gupta (2011) identified factors affecting investment decisions in India to include risk, return, peer influence, recommendation of financial advisors and market trends.

Rashid and Nishat (2009) found that in Bangladesh, the most influencing factors on investors' decisions are efficiency of the company, inflation rate, easy and quick transactions, transaction cost, and access to the company. Others include industry information, quality of information and prior knowledge of securities. Also, Hossain & Nasrin (2012) in a study of Bangladesh found that the eight most important principal factors influencing retained investors are company specific attributes/reputation, net asset value, accounting information, trading opportunity, publicity, ownership structure, influence of people and personal finance needs.

In Nigeria, the study by Aregbeyen and Mbadiugha (2011) found that the ten most influencing factors on investors' decision in order of importance are: motivation by people who have attained financial security through share investment, future financial security, recommendations by reputable and trusted stock brokers, management team of the company, awareness of the prospects of investing in shares, composition of the board of directors of companies, recent financial performance of the company, ownership structure of the company, reputable predictions of future increment in share value and bonus payments.

Also, Tomola (2013) studied the main factors influencing investment decisions of investors and how these factors are related to the investors' socio-economic characteristics in the Nigerian Capital Market. The study covers individual investors using convenient sampling method to obtain information from 297 respondents through a modified questionnaire developed by Al-Tamimi (2005). Independent t- test, Analysis of variance (ANOVA) and post hoc tests were employed. The results indicated that the five most influencing factors on investment decisions of investors in Nigeria are past performance of the company's stock, expected stock split/capital increases/bonus, dividend policy, expected corporate earnings and get-rich-quick. Also, the five least influencing factors include religions, rumors, loyalty to the company's products/services, opinions of members of the family and expected losses in other investments. The study finds that the socio-economic characteristics of investors (age, gender, marital status and educational qualifications) statistically and significantly influenced the investment decisions of investors in Nigeria.

2.2.8 Factors that determine FDI inflow to Nigeria

Many factors have been recognized by scholars as being responsible for FDI flow into a country, first is the market size. There abound many empirical studies on the extent to which market size influence foreign direct investment. Most of these studies revealed a significant relationship between market size and FDI in line with the market size hypothesis which holds that a country with a large market can easily attract foreign investor and especially foreign direct investors (see Ebiringa & Emeh, 2013; Billington, 1999; Brock, 1998; De Mello, 1997; Gastanaga, Jeffery & Bistra, 1998; Wheeler & Mody, 1992). Conceptually, market size should be a more important measure for market- seeking FDI than resource seeking FDI. Often used to measure market size is the absolute GDP. However, this approach has been debated on the grounds that it is a poor measure of market potential for the products of foreign investors, since it captures the size of the population rather than their income or buying power (Chakrabarti, 2001).

Trade liberalization is another important factor in foreign direct investment attraction into a country. It is however important to state that the level of openness of a country to international trade exert different influence on FDI inflow. As suggested by the protection jump hypothesis, some market oriented FDI are influenced by high levels of trade barriers. In this case, trade openness would exert negative influence on FDI inflow. On the other hand, a higher degree of openness of an economy indicates not only more economic linkages and activities with the rest of the world, but also a more open and liberalized economic and trade regime (Ebiringa & Emeh 2013).

A country with a weak currency will not attract foreign investors. An income stream (like repatriated profits) from such a country is associated with an exchange rate risk. Such income stream is capitalized at a higher rate by the market when it is owned by a weak currency firm. Hence, high volatile exchange rate is a disincentive for FDI inflow.

The growth rate of GDP is the annual changes in productivity or output of a country measured in absolute terms. A fast growing economy is viewed as a fertile ground for investment by foreign investors (Ojong, Arikpo & Ogar, (2015). Hence the higher the growth rates of GDP, the higher the level of FDI inflow. This is so because investors believe that a country with high growth rate would earn high income per capital. This will translate into higher demands for their profits and higher return from their investments. Hence a country with higher growth rate of GDP has the capacity to attract more FDI.

Foreign investors may view the investment decisions by others in a country as a good signal of favourable conditions and invest there too, to reduce uncertainty. That is, high levels of FDI in the past may signal to potential foreign investors the soundness and potential of an economy Ebiringa & Emeh (2013). The literature attributes this to a combination of agglomeration effects, information effects and a type of herding behaviour among foreign investors. Lagged FDI flows are therefore expected to attract more FDI. Foreign investors may be attracted to countries with an existing concentration of other foreign investors. In this case, the investment decision by others is seen as a good signal of favourable conditions in the host country.

The addition to the stock of a country's capital resources necessary for future productivity in the real sector is another factor that determines the flow of FDI. Gross fixed capital formation involves the actual-value-added to the economy in real-asset-terms which will lead to further enhancement of savings, investment and generation of more wealth in the future (Uremadu, 2010). Capital formation is derived from savings accumulation. It has a positive impact on private savings accumulation in the sense that increase in capital formation will lead to more savings. When savings accumulate it will lead to an increase in gross domestic investment (GDI) and income generated as a result of the investment projects made will, in turn, lead to GDP growth (Uremadu, 2006).

Government policies towards trade and foreign investment are significant in determining foreign investment. At the broadest level, governments may pursue either an export promoting or import substituting strategies. The Nigerian Government has at one point or the other developed policies, plans and strategic efforts meant to shape or/reshape the investment horizon of Nigeria.

2.3 Review of Empirical Literature

The critical roles played by capital markets in attracting FDI to countries have given rise to preponderance of empirical studies on this subject area. Many of these studies sought to investigate the role played by capital markets on FDI, yet others examined the relationship between capital markets and economic growth; FDI and stock market and the determinants of FDI. A review of some of these studies is presented below.

Serven and Solimano (1992) studied economic adjustment and FDI performance for fifteen developing countries using pooled cross sectional time series data from 1975 to 1988. The investment equation estimated in the study used exchange rate and inflation as proxies for instability and in such case instability was measured by the coefficient of the variation of relevant variable over three years. The two measures were found to be jointly significant in producing negative effect on investment.

Osinubi (1998) examined the impact of capital market on industrial growth and development in Nigeria, the outcome of the study provided a mixed result. While government securities and all-share index displayed a non-significant impact on industrial growth, volume of transaction and values of industrial securities were found to be relatively stable. New issues were found to be a major determinant of industrial output.

Asiedu (2003), used panel data for 22 countries in sub-Saharan African over the period of 1984-2000 to examine the impact of political risks, institutional framework and government policy on the FDI flows. The dependent variable was the rate of the net FDI flows to GDP while the independent variable used include natural resource intensity, attractiveness of the host country's market, infrastructural development, macroeconomic instability, openness to FDI, host country institution and political instability. His result showed that macroeconomic stability, efficient institution, political stability and good regulatory framework have positive impact on FDI. He, therefore, held that FDI inflows to Africa is not solely driven by natural resources endowment, but also by the institutional roles play by the government in promoting FDI and maintaining stable economic policies.

Nonnemberg and De Mendonca (2004) in their study argued that the growth in capital markets in advanced countries is a powerful determinant of investment outflows from these countries to abroad, especially in recent times. Anyanwu (2006), in the same vain, investigated the economic determinants of FDI inflow in Nigeria and applied the OLS technique; the study's findings revealed that market size is a strong determinant of FDI inflow in Nigeria.

On their part, De Santis and Ehling (2007), examined whether international portfolio investors follow firms' foreign investment decisions and conclude that the movements on the stock market are the most significant determinant of FDI and portfolio transactions. In a study on the dynamic linkages between stock markets and major macroeconomic indicators, Adam and Tweneboah (2008) found a positive and significant relationship between FDI and stock market in Ghana. They explained these trends by opening up the domestic stock market to foreigners and Ghanaian non-residents and they found the inflows of high-rank institutional investors which indirectly increased the inflows of FDI to Ghana.

Studying the determinants of stock market development in South Africa, Yartey (2008) stated that FDI promotes institutional and regulatory reforms which encourage greater confidence in the domestic capital market, which further increases the variety of investors and trading volume. Opening the domestic stock market to foreign investors may reduce the risk premium in the country and thus further attract foreign investments inflows.

In the same vein, Adam and Tweneboah (2009) highlighted an indirect, but strong relationship between stock markets and FDI inflows. FDI inflows are a source of technological progress and increasing employment in most developing countries, which increases the production of goods and services and ultimately, increased GDP. Economic growth then has a positive effect on the development of stock markets and the rise of share prices. Using the cointegration method, the authors found evidence of a long-term positive relationship between FDI and stock market development in Ghana.

Olatundun (2009) studied the impact of financial integration and capital market development on investment efficiency in Nigeria. Applying event study on 856 firms operating in Nigeria, the study revealed that investment was slowed down in high net worth growing firms and ramped up in low net worth declining firms in the pre and post financial integration period.

Obida and Abu (2010) examined the determinants of FDI in Nigeria. The error correction technique was employed to analyze the relationship between market size, deregulation, political instability, exchange rate depreciation and foreign direct investment. The results reveal that the market size of the host country, deregulation, political instability, and exchange rate depreciation are the main determinants of foreign direct investment in Nigeria.

Soumyananda (2010) empirically investigated the factors that determine FDI to Nigeria. Applying the co-integration technique, it was revealed that the endowment of natural resources, trade intensity, macroeconomic risk factors like inflation and exchange rates are significant determinants of FDI flow to Nigeria. The study also showed that in the long run market size is not a significant factor for attracting FDI to Nigeria.

Adefoso and Agboola (2012) also investigated the determinants of FDI in Nigeria. Using Residual-Based Engel-Granger Dickey-Fuller Co-integration test and a unit root test to test the properties of the time series of the variables. It was revealed that there was a significant relationship between market size, openness, ICT, oil sector, tax, tourism, phone penetration and the inflow of FDI in Nigeria in the long run. The study also showed that changes in exchange rate, CPI, infrastructure and external debt respectively accounted for changes in FDI outflow from Nigeria. Also, Danish & Adiga (2012) studied FDI, Trade openness and real output, using error correction model, the authors revealed that trade openness relate significantly with FDI in Nigeria.

Lautier and Moreaub (2012) investigated domestic investment and FDI in developing countries, using a sample of 68 countries and GFCF as a proxy for domestic investment, the authors applied the OLS method to analyse the data. The study revealed a large positive relationship between domestic investment (GFCF) and FDI for all countries and therefore concluded that domestic investment is a strong determinant of FDI in less developed countries.

Ohazulike (2012) studied the effect of exchange rate fluctuations, infrastructure and inflation on FDI inflow in Nigeria. Using econometric tools of OLS multiple regression, unit root, co-integration and Granger causality tests to analyse the data, it was revealed on the one hand that exchange rate fluctuations and infrastructure had positive but insignificant relationships with FDI while on the other hand inflation had a negative and significant relationship with FDI in Nigeria. The study also revealed a unidirectional relationship between inflation and FDI.

Olukoyo (2012) examined the effects of foreign direct investment on the development of Nigerian economy, applying the ordinary least square regression technique to test the time series data from 1970 - 2007 and the Cochrane-Orcutt iterative method to correct for autocorrelation. The regression analysis result did not provide much support for the view of a robust link between FDI and economic growth in Nigeria.

Udoka, Tapang and Anyingang (2012) in their test conducted using OLS, found market exchange rate in the official market as being significant at 10% for explaining variations in FDI and the agricultural sector. The author in the same study found an insignificant relationship between exchange rate and the manufacturing sector. They, therefore, concluded that a properly managed exchange rate was essential for enhancing the inflows of FDI to Nigeria and sub-Saharan African countries.

Vladimir, Tomislav and Irena (2012) studied the long run and short run relationship between stock market and foreign direct investment in Croatia. They tested the long run relationship by using a co-integration analysis and

the short run relationship by using a VAR model. The long run analysis suggested the absence of long run relationship among observed variables. This was explained by the lack of connection between FDI and economic growth in Croatia. The result obtained from the VAR model were consistent with the theoretical assumptions as the stock market indicators did prove to be an important short term determinant of FDI in Croatia.

Adeusi, Sulaiman and Azeez (2013) investigated the impact of capital market development on economic growth and development from the period 1986 to 2010 in Nigeria. They employed Ordinary Least Square (OLS) and Johansen co-integration estimation techniques. Gross Domestic Product (GDP) was used as measure for economic growth while the capital market development was represented with Market Capitalization (MCAP), Total Value of Transaction (TVT), Total New Issues (TNI), All-Share Index (ALSI) and Total Listing on the NSE (TLT). The result of the study shows that capital market development has not impacted positively on Nigeria economic growth and development due to the relative small size of the market expected transmission effect of the liberalization policy.

Ebiringa and Emeh (2013) investigated the determinants of FDI in Nigeria. Using stationarity test, co-integration, error correction mechanism and variance decomposition analysis to examine the characteristics of the time series. The study revealed that all selected determinants individually and jointly exerted significant influence on FDI flows in Nigeria.

Applying the purely descriptive narrative methods, Nwankwo, Ademola and Kehinde (2013) studied the effect of globalization on FDI in Nigeria. The study revealed that, while FDI has been of increased benefit to Nigeria in the area of employment, technology transfer, local enterprise development, etc., there exist some impediments to the full realization of the benefits of FDI in Nigeria.

Maduka (2014), focusing on the economy of three countries observed a statistically significant relationship between capital market development and the performance of the industrial sector vis-a-vis national economic performance. He observed that financial liberalisation widens the rate of access to investible funds and by implication, has an upward shift on the production activities of the economy. Also, the higher the rate of capital market development, the better the industrial growth rate.

In studying the determinants of FDI and their impact in Nigeria, Ndem, Okoronkwo and Nwamuo (2014) sought to ascertain the relationship between exchange rate, market size, infrastructural investment, openness, political risk and the flow of FDI. Adopting the OLS and the co integration error correction method (ECM), it was revealed that market size, openness and exchange rate impacted much on FDI inflow while political risk was unfavourable to it, infrastructural investment was favourable but marginal in attracting FDI.

Sulaiman and Mohammed (2014) investigated stock market development, foreign direct investment and macroeconomic stability in Nigeria for the period 1981 to 2010. The study applied the Johansen co-integration and Error Correction Mechanism (ECM) techniques, the study revealed a positive long run relationship between macroeconomic variables and FDI and an insignificant relationship between stock market development indices and FDI in Nigeria. They also found that inflation rate had a negative and insignificant effect, while exchange rate has a significant and negative relationship with stock market development.

Adaramola and Obisesan (2015) assessed the impact of foreign direct investment on the Nigeria capital market. The study employed the ADF unit root test and the Johansen co-integration test to analyse the data, the result suggested the absence of co-integration between FDI and market capitalization. Hence, the study resorted to the OLS technique which proved a positive and significant relationship between FDI and market capitalization in Nigeria.

Umar, Ismail and Sulong (2015) studied the impact of the stock market development on foreign direct investment using autoregressive distributed lag (ARDL) in the presence of structural breaks (dummies) in Nigeria. The study utilized annual time series data from 1970 to 2013. The data were generated from World Bank and Central Bank of Nigeria (CBN). The result suggests that the foreign direct investment (FDI) has a significant positive long-run impact on the value of the total stock transaction but has a negative and significant effect on the rate of stock returns. However, the relationship between FDI and market capitalization ratio is not statistically significant.

2.4 Summary of Literature Review

Several literatures have been review in this study with no consensus on their findings and choices of variables. While most of these studies examined the relationship between market capitalizations, total new issues, all share index, number of deals and foreign direct investment. Others dwelt on the relationship between volume of

transaction, market capitalization number of deals, number of listed companies and foreign direct investment. Yet others concentrated on the relationship between market returns, market capitalization, total new issues and foreign direct investment. None of these studies however consider the liquidity aspect of the market and how it influence foreign direct investment in Nigeria. This study, to bridge this gap created therefore introduce the turnover ratio into the model to examine whether or not there is a relationship between the liquidity of the market and foreign direct investment in Nigeria.

RESEARCH METHODOLOGY

3.1 Research Design

A research design constitutes the core of formal research. This is because it does not only guide the conduct of the enquiry, but also provides the design for the testing of the formulated hypotheses. Thus, two designs: exploratory and ex-post facto were used in this study. The exploratory design was used to access the relevant theories and literatures needed to provide the empirical and theoretical basis for the study. The ex-post facto design on the other hand, was applied to collect the data on the study's variables, analyze and test them. The adoption of the ex-post facto design became appropriate as the events studied had already taken place and cannot be controlled.

3.2 Model Specification

The functional relationship between foreign direct investment and capital market development in Nigeria was expressed thus:

$$(MCAP, NLC, ASI, TNR, VOT) = F(FDI) \dots \dots \dots (1)$$

Where:

MCAP = Market Capitalization

NLC = Number of Listed Companies

ASI = All Share Index

TNR = Turnover Ratio

VOT = Value of transaction

FDI = Foreign Direct Investment

The above functional relationship was transformed into an unrestricted standard VAR model with lag order K, thus:

$$Y_t = \beta + \sum_{i=1}^k \beta_i Y_{t-i} + e_t \dots \dots \dots (2)$$

Y_t = nx1 vector of endogenous variables

β = Vector of constants

Y_{t-1} = corresponding lag term for each of the variable

e_t = vector of error terms

The above model is further presented using matrix notation thus:

$$\begin{bmatrix} LMCAP \\ LNLC \\ LASI_t \\ TNR_t \\ LVOT \\ LFDI_{t_t} \end{bmatrix} = \sum_{i=1}^k \begin{bmatrix} a_{1i} & b_{1i} & c_{1i} & d_{1i} & e_{1i} & f_{1i} \\ a_{2i} & b_{2i} & c_{2i} & d_{2i} & e_{2i} & f_{2i} \\ a_{3i} & b_{3i} & c_{3i} & d_{3i} & e_{3i} & f_{3i} \\ a_{4i} & b_{4i} & c_{4i} & d_{4i} & e_{4i} & f_{4i} \\ a_{5i} & b_{5i} & c_{5i} & d_{5i} & e_{5i} & f_{5i} \\ a_{6i} & b_{6i} & c_{6i} & d_{6i} & e_{6i} & f_{6i} \end{bmatrix} \begin{bmatrix} LMCAP_{t-i} \\ LNLC_{t-i} \\ LASI_{t-i} \\ TNR_{t-i} \\ LVOT_{t-i} \\ LFDI_{t-i} \end{bmatrix} + \begin{bmatrix} u_{1i} \\ u_{2i} \\ u_{3i} \\ u_{4i} \\ u_{5i} \\ u_{6i} \end{bmatrix} \dots \dots \dots (3)$$

Where:

a_{ij} - f_{ij} = Coefficient of the exogenous variables (e.g. LMCAP, LNLC, LASI, TNR, LVOT and LFDI)

u_{ij} = Error term

$t-1$ = lag value of each series up to the p-lag

3.3 Sources of Data

Both the study literature review and hypotheses testing were based on the secondary sources of data. They were extracted from the published works of various scholars in test books, articles, journals libraries internet and various other publications like the CBN statistical Bulletins.

3.4 Methods Of Data Collection

Annual time series data were collected for the period 1972 to 2014 on Foreign Direct Investment (FDI), Number of Listed Companies (NLC), All Share Index (ASI), Market Capitalization (MCAP) Turnover Ratio (TNR) and Value of Transaction (VOT). The desk survey method was used to extract the data on the variables from the publications bearing in mind the study objectives and hypotheses. FDI, NLC, ASI, VOT and MCAP were transformed into their natural logs to ensure that their elasticities were duly captured and to control the robustness of the time series.

3.5 Techniques of Data Analyses

In view of the uniqueness of this study, several techniques were employed, to estimate and analyse the study's model. Firstly, descriptive analytical tools such as simple tables, and percentages were used to analyze the trend performance of the variables. Secondly, the unit root test was conducted using Augmented Dickey Fuller and Philips Peron to ascertain the stationarity or otherwise of the time series.

Thirdly, the study also employed the Vector Auto Regression (VAR) technique. The VAR model places less theoretical emphasis on the structural relationship, but simply specifies a set of endogenous variables that are believed to have logical relationship and qualify for inclusion as part of the economic system. It is used for systems of interrelated time series and for analyzing the dynamic impact of random disturbance on the system variable.

Furthermore the study applied the AR root to test the stability or otherwise of the VAR result. Again, the impulse response function was applied to examine the effect of one standard deviation shock on current and future values of the endogenous variables. It establishes the path of the dependent variables in the VAR, to shocks from all the explanatory variables. More so, the variance decomposition was used to examine the proportion of forecast error variance in each variable that is attributable to its own innovation and to the innovation from endogenous variables in the model. The study finally applied the granger causality test to determine the nature of relationship that existed between the variables of the model and the direction of such relationship.

DATA PRESENTATION, ANALYSES AND DISCUSSION OF FINDINGS

4.1 Data Presentation

Presented below is the data on Market Capitalization (MCAP), All Share Index (ASI), Number of Listed Companies (NLC), Turnover Ratio (TNR), Value of Transaction (VOT) and Foreign Direct Investment (FDI).

TABLE 4.1
Data used for the study

YEAR	MCAP (N'billion)	ASI (N'billion)	NLC	TNR (%)	VOT (N'billion)	FDI (N'billion)
1972	2.1	NA	72	0.013	27.2	297.8
1973	2.6	NA	82	0.035	92.4	186.3
1974	3.4	NA	95	0.015	50.7	181.6
1975	3.3	NA	99	0.019	63.7	253
1976	4.1	NA	105	0.027	111.9	245.5
1977	4.3	NA	112	0.042	180	212.5
1978	3.4	NA	128	0.055	189.7	245.5
1979	4.6	NA	172	0.055	254.4	184.3
1980	4.9	NA	188	0.079	388.7	-404.1
1981	5	NA	194	0.061	304.8	334.7
1982	5	NA	205	0.053	215	290
1983	5.7	NA	212	0.069	397.9	264.3
1984	5.5	NA	213	0.047	256.5	360.4
1985	6.6	117.28	220	0.048	316.6	434.1
1986	6.8	149.82	240	0.073	497.9	735.8
1987	8.2	176.92	244	0.047	382.4	2452.8
1988	10	210.81	253	0.085	850.3	1718.2

1989	12.8	273.87	267	0.048	610.3	13877.4
1990	16.3	423.66	295	0.014	225.4	4686
1991	23.1	677.62	239	0.01	242.1	6916.1
1992	31.2	931.02	251	0.016	491.7	14463.1
1993	47.5	1229.03	272	0.017	804.4	29660.3
1994	66.3	1913.23	276	0.015	985.9	22229.2
1995	180.3	3815.12	276	0.01	1838.8	75940.6
1996	285.8	5955.14	276	0.024	6979.6	111290.9
1997	281.9	7638.79	264	0.037	10330.5	110452.7
1998	262.6	5961.88	264	0.052	13571.1	80749
1999	300	5264.19	268	0.047	14072	92792.5
2000	472.3	6701.18	260	0.06	28153.1	115952.2
2001	662.5	10185.08	261	0.087	57683.8	132433.7
2002	764.9	11631.87	258	0.078	59406.7	225224.8
2003	1359.3	15559.9	265	0.089	120402.6	258388.6
2004	2112.5	24738.65	277	0.107	225820	248224.6
2005	2900.1	22876.72	288	0.091	262935.8	654193.2
2006	5120.9	25343.55	294	0.092	470253.4	624520.7
2007	13181.7	48773.31	310	0.082	1076020	759380.4
2008	9563	50424.7	301	0.179	1679144	971543.8
2009	7030.8	23091.55	266	0.098	685717.3	1273816
2010	9918.2	24775.59	264	0.081	799911	905730.8
2011	10275.3	23393.65	250	0.062	638925.7	1360308
2012	14800.9	23432.69	256	0.055	808991.4	1113511
2013	19077.4	36307.08	254	0.123	2350876	875102.5
2014	16875.1	39409.82	253	0.079	1334783	738197.2

Source: CBN Statistical Bulletin, (Various publications)

4.2 DATA ANALYSIS

4.2.1 Unit root test

TABLE 4.2.1

Unit root test using the Augmented Dickey-Fuller (ADF) statistics

Variables	ADF Test Statistics		Order of integration
	Level	1 st Difference	
LMCAP	-0.717065	-4.895736	I(1)
LNLC	-4.767256		I(0)
LASI	-2.049228	-3.872303	I(1)
TNR	-2.978254		I(0)
LVOT	-0.266388	-6.708592	I(1)
LFDI	-0.404499	-8.817976	I(1)

Test critical values at level: 1% = -3.679322, 5% = -2.967767, 10% = -2.622989

Test critical values at 1st Diff: 1% = -3.689194, 5% = -2.971853, 10% = -2.625121

Source: Researcher's Computation from E-views 9, 2016.

TABLE 4.2.2

Unit root test using the Philip Peron (PP) statistics

Variables	ADF Test Statistics		Order of integration
	Level	1 st Difference	

LMCAP	-0.613249	-4.916359	I(1)
LNLC	-5.190482		I(0)
LASI	-2.046425	-3.912503	I(1)
TNR	-2.837577		I(0)
LVOT	-0.249297	-6.699541	I(1)
LFDI	-0.286047	-8.580645	I(1)

Test critical values at level: 1% = -3.596616, 5% = -2.933158, 10% = -2.604867

Test critical values at 1st Diff: 1% = -3.600987, 5% = -2.935001, 10% = -2.605836

Source: Researcher's Computation from E-views 9, 2016.

This study started by examining the time series properties of each variable employed in the model using both the Augmented Dickey Fuller (ADF) and Philips Peron (PP) tests to determine the order of integration of the series. Tables 4.2.1 and 4.2.2 above showed that the two tests are in congruence at 5 percent respectively, suggesting that LNLC and TNR are stationary at levels which means that they are all integrated at order zero (0) at 5 percent significant level while LMCAP, LASI, LVOT and LFDI are stationary at first difference, implying that they are integrated at order one (1). Since the series are not integrated at the same level, it excludes the possibility of a long run relationship among the variables, which suggests that co-integration is not necessary.

4.2.3 VAR lag order selection criteria

In order to estimate the VAR model, we started by determining the optimal lag order selection criteria. The result is as presented in table 4.2.3

TABLE 4.2.3
VAR lag order selection criteria
Endogenous variables: LMCAP, LNLC, LASI, TNR, LVOT, LFDI.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	3.200196	NA	4.96e-08	0.207393	0.495357	0.293020
1	126.0130	181.9449	8.59e-11	-6.223187	-4.207441	-5.623800
2	199.1698	75.86630	8.58e-12	-8.975542	-5.232013	-7.862395
3	305.1035	62.77550*	2.23e-13*	-14.15581*	-8.684501*	-12.52891*

Source: Researcher's Computation from E-views 9, 2016.

*indicates lag order selected by the criterion

LR: Sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan Quinn information Criterion

Table 4.2.3 above showed that the Akaike Information Criterion (AIC) and all other information criteria were significant at lag three (3) implying that the optimal lag for this study is three.

4.2.4 Vector Auto Regression (VAR) test

Having determined the optimal lag length, we proceeded to estimate the VAR model using E-views 9. The result of the VAR model is presented below in table 4.2.4

TABLE 4.2.4
Vector Auto Regression (VAR) result
Dependent variables: LMCAP, LNLCL, LASI, TNR, LVOT

Variable	Coefficient	Standard Error	t-stats
C	62.90363	18.9662	3.31662
LMCAP(-1)	6.409340	1.79997	3.56080
LMCAP(-2)	-2.191751	0.76555	-1.06506
LMCAP(-3)	-3.463594	1.05707	-3.27661
LNLCL(-1)	9.821294	4.00721	2.45090
LNLCL (-2)	-4.125728	2.18000	-1.89253
LNLCL (-3)	4.226080	2.10589	2.00680
ASI(-1)	4.608247	1.38972	3.31597
ASI(-2)	-3.049352	1.07719	-2.83084
ASI(-3)	1.315468	0.73980	1.77813
TNR(-1)	39.79935	11.8385	3.36184
TNR(-2)	2.640297	9.08038	0.29077
TNR(-3)	14.22848	7.41318	1.91935
LVOT(-1)	2.103152	0.73579	2.85835
LVOT (-2)	1.703558	0.96270	1.76956
LVOT(-3)	-1.534438	0.63380	-2.74983
LFDI(-1)	-0.909547	0.34314	0.35838
LFDI (-2)	0.929328	0.33796	2.74983
LFDI(-3)	0.873228	0.30049	2.90604
R-squared	0.990209		
Adj. R-squared	0.968180		
F-statistics	44.94970		

Sourcure: Researcher's Computation from E-views 9, 2016.

The result of the VAR model as presented in table 4.2.4 above shows a positive relationship between foreign direct investment and market capitalization in Nigeria for the first period lags and an inverse relationship between foreign direct investment and market capitalization for the second and third period lags. This result showed specifically that a one percent increase in foreign direct investment led to a 640.93 percent increases in the first lag period and a 219.18 percent and 346.35 percent decrease in market capitalization in the second and third lag periods respectively.

Further examination of the result showed that foreign direct investment has a positive and significant relationship with number of listed companies in the first and third lag periods and an inverse relationship in the second lag period. This means that a one percent increase in foreign direct investment led to a 982.13 percent and 422.61 percent increase in the number of listed companies in the Nigerian capital market in the first and third lag periods and 412.57 percent decrease in the second lag periods.

Furthermore, the result showed a positive and significant relationship between foreign direct investment and all share index in the first and third lagged periods. This implies that a one percent increase in foreign direct investment led to a 460.82 percent and 131.55 percent increase in all share index. Also, the result showed that there is an inverse relationship between foreign direct investment and all share index in the Nigerian capital market in the second lagged periods. Meaning that a one percent increase in foreign direct investment led to 304.94 percent decrease in all share index.

Again, the result shows that there is a positive relationship between foreign direct investment and capital market turnover ratio in the first, second and third lagged periods. This implies a one percent increase in foreign direct investment led to 3979.94 percent, 264.03 percent and 1422.85 percent increase in the turnover ratio of the Nigerian Capital Market.

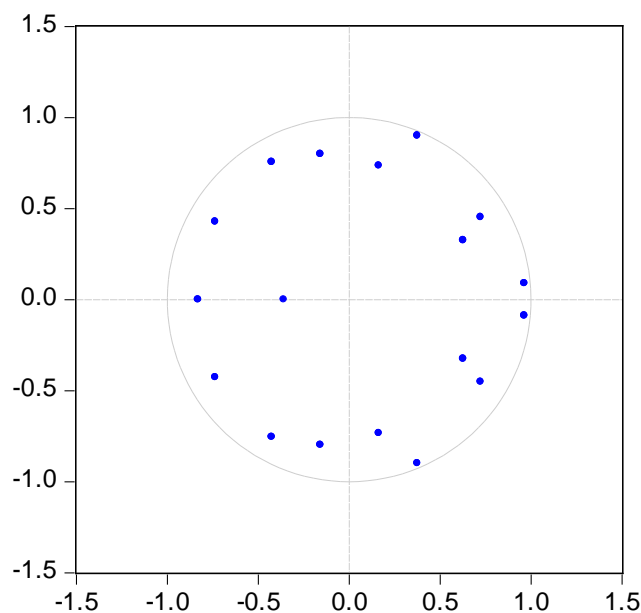
Finally, the result showed a positive relationship between foreign direct investment and value of transaction in the first and second lagged periods. This implies that a one percent increase in foreign direct investment led to 210.32 percent and 170.36 percent increases in volume of transaction. However, in the third lagged period, foreign direct investment had an inverse relationship with value of transaction. In effect, a one percent increase foreign direct investment led to a 153.44 percent decrease in value of transaction in the Nigerian capital market.

The goodness of fit of model as indicated by their R^2 and adjusted R^2 values of 0.990209 or 99.02 percent and 0.968180 or 96.82 percent indicated that the model fits the data well. Specifically, the adjusted R^2 value of 96.82 percent showed that the total variation in the observed behaviour of the selected capital market development indices in Nigeria is predicted or explained by the variations in foreign direct investment, up to 96.82 percent, the remaining 3.18 percent is accounted for by the disturbance term. The overall significance of the model was also tested using the ANOVA or F-statistics. Here the high significance of the f-statistics value of 44.95 confirmed that the high predictability of the model did not occur by chance, it actually confirmed that the data fitted the model well.

4.2.5 Stability Test

With the VAR result above, we proceeded to conducting a stability test using the using the AR root graph and table 4.2.5. The result of the stability test is presented in figure 4.2.1 and table below

FIG. 4.2.1
Inverse AR roots graph
Inverse Roots of AR Characteristic Polynomial



Source: Researcher's Computation from E-views 9, 2016.

TABLE 4.2.5
Inverse AR roots table
Root of polynomial characteristic
Endogenous variables: LMCAP, LNLIC, LASI, TNR, LVOT, LFDI

Root	Modulus
0.376896 + 0.899240i	0.975030
0.376896 - 0.899240i	0.975030
0.963921 - 0.088452i	0.967970
0.963921 + 0.088452i	0.967970
-0.424282 + 0.755114i	0.866148
-0.424282 - 0.755114i	0.866148
0.724716 - 0.452388i	0.854323
0.724716 + 0.452388i	0.854323
-0.734973 + 0.427490i	0.850255
-0.734973 - 0.427490i	0.850255
-0.829885	0.829885
-0.157729 - 0.798628i	0.814055
-0.157729 + 0.798628i	0.814055
0.164741 + 0.734528i	0.752776

0.164741 - 0.734528i	0.752776
0.627884 + 0.325962i	0.707452
0.627884 - 0.325962i	0.707452
-0.358762	0.358762

No root lies outside the unit circle.
VAR satisfies the stability condition.

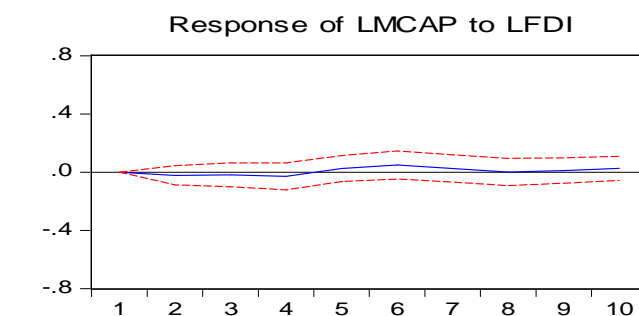
Source: Researcher's Computation from E-views 9, 2016.

Figure 4.2.1 is the stability test of the VAR result using AR root graph. The condition for the stability of the VAR result is that no root should lie outside the unit circle. Hence, since in our result all roots lie within the unit circle, the stability condition has been satisfied. Confirming this result is the AR root table presented in table 4.2.5 above. The result also showed that no root lies outside the circle. The modulus is less than one, meaning that our VAR result is stable.

4.2.6 Impulse Response Function Analysis

Having seen that the VAR result is stable we now examine the impulse response function to determine the response of FDI to choleskey one standard deviation shocks in other exogenous variables. The result of the impulse response function is presented below.

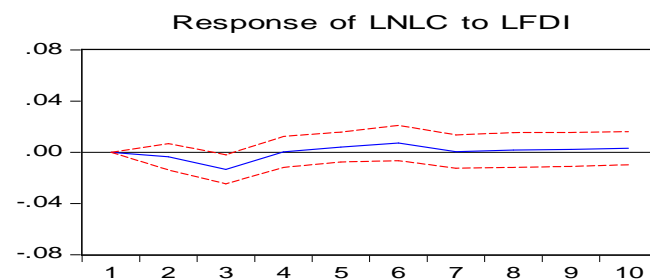
FIG. 4.2.2
Impulse response graph of LMCAP to LFDI
Response to Cholesky One S.D. Innovations ± 2 S.E.



Source: Researcher's Computation from E-views 9, 2016.

From figure 4.2.2 above, a one standard deviation innovation in Foreign Direct Investment (FDI) led to a negative impact on Market Capitalization (MCAP) up to period four. From period four to period eight, innovations in Foreign Direct Investment (FDI) led to positive impact on Market Capitalization (MCAP). From period eight to nine, the impact level out at zero origin but increased immediately in a stepped manner from period nine to ten. This implies that foreign direct investment triggered positive developments in market capitalization in the medium to long term period. An innovation in foreign direct investment resulted in a negative development in market capitalization in the first four periods. From the fifth period, innovations in foreign direct investment led to positive development in Market Capitalization.

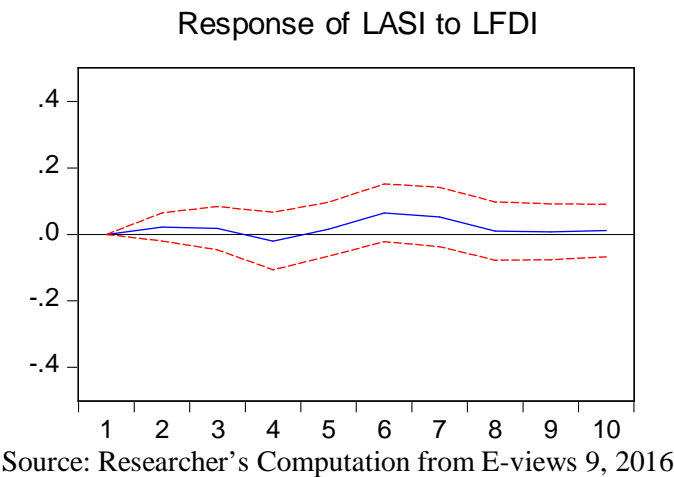
FIG. 4.2.3
Impulse response graph of LNLC to LFDI
Response to Cholesky One S.D. Innovations ± 2 S.E.



Source: Researcher's Computation from E-views 9, 2016

Figure 4.2.3 above, is the response of Number of Listed Companies (NLC) to a one standard deviation shock in Foreign Direct Investment. A one standard deviation innovation in Foreign Direct Investment (FDI) led to negative values of Number of Listed Companies up to period three. At period four, Number of Listed Companies had touched the origin but increasing continuously to the positive region and levelled back at the origin in period seven, then, increased slightly within the negative region but did not touch the origin and levelled at period eight till the end.

FIG. 4.2.4
Impulse response graph of LASI to LFDI
Response to Cholesky One S.D. Innovations ± 2 S.E.



From figure 4.2.4 above, a one standard deviation innovation in Foreign Direct Investment (FDI) led to a decrease in All Share Index (ASI) to the second quarter of period three, after which, it started rising and touched the origin at the first quarter of period four. Further innovations in Foreign Direct Investment (FDI) led to a continuous increase in All Share Index (ASI) to the last quarter of period six and then a gradual decrease to period eight, where it flattens to last period without touching the origin. This shows that market FDI has a positive relationship with ASI.

FIG. 4.2.5
Impulse response graph of TNR to FDI
Response to Cholesky One S.D. Innovations ± 2 S.E.

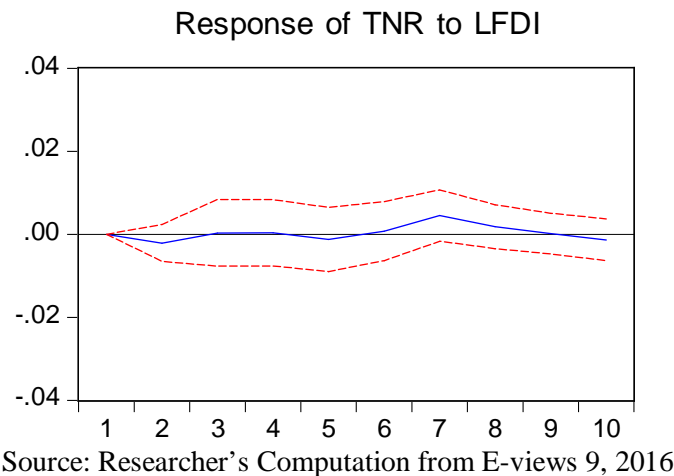


Figure 4.2.5 above, is the response of Turnover Ratio (TNR) to a one standard deviation shock in FDI. A one standard deviation shock in TNR led to negative responses of Turnover Ratio (TNR) to period three, after which it flattens at the origin to period six. At period six, Turnover Ratio (TNR) responded positively to period

seven where it peaked and then fell gradually and assumed negative values at the end. Investors in the capital market are careful always to invest in stocks that guarantee liquidity.

FIG. 4.2.6

Impulse response graph of LVOT to FDI

Response to Cholesky One S.D. Innovations ± 2 S.E.

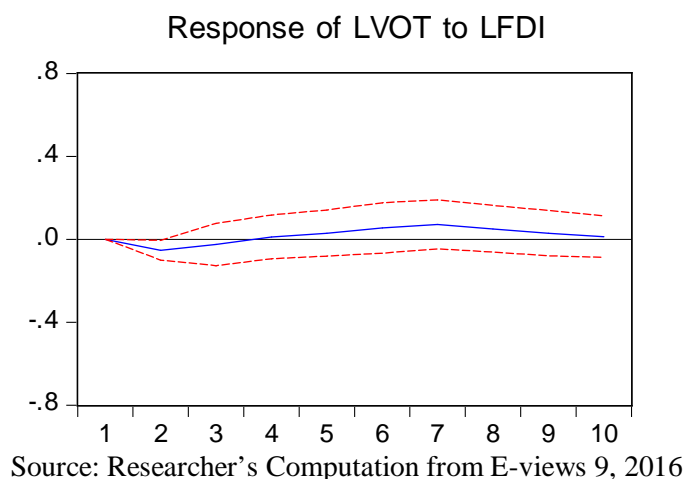


Figure 4.2.6 above, is the response of Value of Transaction (VOT) to a one standard deviation shock in FDI. A one standard deviation shock in FDI led to negative responses of VOT to the first quarter of period three, after which it increased in a stepped pattern and touched the origin at period four. Further innovation in FDI led to continuous increase in VOT to period seven where it peaked and then started falling till the end but did not touch the origin. This means that innovations in FDI triggers enhanced performance in value of transactions as theoretically expected.

4.2.7 Variance Decomposition

In order to appraise the relative importance of the random innovations and show the sources of error in forecasting capital market development in Nigeria, the variance decomposition was applied. The result of the variance decomposition is presented in tables 4.2.6 below

TABLE 4.2.6
Variance decomposition Result

Variance decomposition of LMCAP							
Period	S.E.	LMCAP	LNLC	LASI	TNR	LVOT	LFDI
1	0.302201	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
5	0.717275	50.85723	2.417525	17.30362	11.32553	17.64864	0.447461
10	0.890008	39.86610	8.344695	19.58997	15.72016	15.70478	0.774287

Variance Decomposition of LNLC							
Period	S.E.	LMCAP	LNLC	LASI	TNR	LVOT	LFDI
1	0.047109	65.59389	34.40611	0.000000	0.000000	0.000000	0.000000
5	0.084453	47.07101	18.14092	15.72472	10.75056	5.406101	2.906678
10	0.101547	46.52788	21.14825	14.77090	10.41834	4.450099	2.684526

Variance decomposition of LASI							
Period	S.E.	LMCAP	LNLC	LASI	TNR	LVOT	LFDI
1	0.193347	84.86236	0.156955	14.98069	0.000000	0.000000	0.000000
5	0.590335	43.26259	4.457674	16.22471	17.45025	18.17837	0.426400
10	0.741728	30.92355	13.12274	20.56691	20.67705	13.13066	1.579093

Variance decomposition of TNR

Period	S.E.	LMCAP	LNLC	LASI	TNR	LVOT	LFDI
1	0.020338	6.739069	5.780959	46.95593	40.52404	0.000000	0.000000
5	0.035820	33.50931	8.702547	20.07739	31.37139	5.850530	0.488844
10	0.042429	31.62625	13.68780	19.91688	26.47834	6.506316	1.784423

Variance decomposition of LVOT

Period	S.E.	LMCAP	LNLC	LASI	TNR	LVOT	LFDI
1	0.208631	39.25463	0.041164	9.815356	23.01326	27.87559	0.000000
5	0.744864	49.03692	8.018577	14.37522	13.67168	14.09668	0.800933
10	1.002038	27.85141	23.06085	16.04613	19.17215	12.28306	1.586397

Variance Decomposition of LFDI

Period	S.E.	LMCAP	LNLC	LASI	TNR	LVOT	LFDI
1	0.337947	12.17963	49.40772	0.656892	27.70736	0.003285	10.04511
5	0.798587	27.39368	12.31042	19.98421	24.14705	12.58590	3.578750
10	0.906920	25.46685	16.61257	19.62540	22.99061	12.08595	3.218615

Source: Researcher's Computation from E-views 9, 2016.

From the above table it could be noticed that the variance decomposition of LMCAP is completely explained by its own movements in the first period. In the fifth period, LMCAP contributed 50.86 percent to its own movements, leaving about 2.42, 17.30, 11.33, 17.64 and 0.44 percents to number of listed companies, all share index, turnover ratio, Volume of transaction and FDI respectively. In the tenth period, the variance decomposition of LMCAP explained only 39.87 percent of its own movement while number of listed companies, all share index, turnover ratio, Volume of transaction and FDI explain only 8.34, 19.59, 15.72, 15.70 and 0.77 percents respectively to changes in LMCAP.

Again, the variance decomposition of LNLC is explained by its own variation up to 34.41 percent, leaving 65.59 percent explanation to LMCAP and no contribution from other variables in the first year. In the fifth year, the variance decomposition of LNLC revealed that about 18 percent of its variation had been explained by its own movement while 47.07, 15.72, 10.75, 5.41 and 2.91 percent been explained by market capitalization, all share index, turnover ratio, Volume of transaction and FDI. Furthermore the variance decomposition of LNLC in period ten showed that LNLC contributed about 21.15 percent of its variations, while market capitalization, all share index, turnover ratio, Volume of transaction and FDI contributed about 46.52, 14.77, 10.42, 4.45 and 2.68 percents respectively to the variations in LNLC.

The variance decomposition of All Share Index (ASI) shows that ASI contributed about 14.98 percent to its own variations in the first year while LMCAP and LNLC contributed respectively 84.86 and 0.15 percents to the variations in ASI. In the fifth period, ASI explained about 16.22 percent of its variations while LMCAP, LNLC, TNR, LVOT and LFDI explained 43.26, 4.46, 17.45, 18.18, and 0.43 percent of the changes in ASI respectively. In the tenth period, ASI explained 20.57 percent of its variations, while LMCAP, LNLC, TNR, LVOT and LFDI explained 30.92, 13.12, 20.57, 20.68, 13.13 and 1.58 percents respectively of the changes in ASI.

The variance decomposition of TNR shows that in the first period TNR contributed 40.52 percent to its variations while LMCAP, LNLC and ASI explained respectively about 6.74, 5.78 and 46.96 percents of the changes in TNR. In the fifth period, TNR explain about 31.37 percent of its variation while LMCAP, LNLC, LASI, LVOT and LFDI explained respectively 33.51, 8.70, 20.08, 5.85 and 0.49 percents of the changes in TNR. In the tenth period, TNR explained about 26.48 percent of its variations, while LMCAP, LNLC, LASI, LVOT and LFDI explained respectively 31.63, 13.69, 19.92, 6.51 and 1.78 of the variation in TNR.

The variance decomposition of LVOT shows that in the first period LVOT contributed 27.88 percent to its variations while LMCAP, LNLC LASI and TNR explained respectively about 39.25, 0.04, 9.82 and 23.01 percents of the changes in LVOT. In the fifth period, LVOT explain about 14.10 percent of its variation while LMCAP, LNLC LASI TNR and LFDI explained respectively 49.04, 8.02, 14.37, 13.67 and 0.80 percents of the changes in LVOT. In the tenth period, LVOT explained about 12.28 percent of its variations, while LMCAP,

LNLC, LASI, TNR and LFDI explained respectively 27.85, 23.06, 16.05, 19.17, and 1.59 percent of the variation in TNR.

Finally, the variance decomposition of LFDI revealed that FDI contributed 10.05 percent in explaining changes in FDI in the first period while LMCAP, LNLC, LASI, TNR AND LVOT respectively contributed 12.18, 49.41, 0.66, 27.71 and 0.003 per cents to the variations in LFDI. In the fifth period, LFDI explained its variation up to 3.58 percent while LMCAP, LNLC, LASI, TNR AND LVOT respectively were responsible for 27.39, 12.31, 19.98, 24.15, and 12.59 percent changes in LFDI. LFDI explain 3.22 percent of it variation in the tenth period while LMCAP, LNLC, LASI, TNR AND LVOT respectively account for 25.47, 16.61, 19.63, 22.99 and 12.09 percent changes in LFDI. It could on the bases of this analysis be concluded that innovations in FDI accounted predominantly for variations in capital market development.

4.2.8 Granger Causality Test

The Pairwise Granger causality test was employed to examine the direction of relationship among the variables. The result is as presented in table 4.2.7.

TABLE 4.2.7
Granger causality test

Null Hypothesis:	Obs	F-Statistic	Prob.
LASI does not Granger Cause LMCAP	27	1.43545	0.2621
LMCAP does not Granger Cause LASI		4.47707	0.0147
TNR does not Granger Cause LMCAP	40	1.45482	0.2447
LMCAP does not Granger Cause TNR		3.45912	0.0273
LVOT does not Granger Cause LMCAP	40	1.33362	0.2802
LMCAP does not Granger Cause LVOT		6.66552	0.0012
LFDI does not Granger Cause LMCAP	36	3.17390	0.0389
LMCAP does not Granger Cause LFDI		1.51572	0.2313
LFDI does not Granger Cause LNLC	36	3.24428	0.0362
LNLC does not Granger Cause LFDI		2.84724	0.0548
TNR does not Granger Cause LASI	27	2.63782	0.0776
LASI does not Granger Cause TNR		2.65377	0.0765
LVOT does not Granger Cause TNR	40	2.95467	0.0467
TNR does not Granger Cause LVOT		7.65958	0.0005

Source: Researcher's Computation from E-views 9, 2016.

The result showed from table 4.2.8 shows a unidirectional relationship running from ASI, TNR and VOT to MCAP. This means that it is ASI, TNR and VOT that cause a change in MCAP. Also, there is a unidirectional relationship between MCAP and FDI. This implies that changes in MCAP cause changes in FDI and not the other way round. Furthermore, a bidirectional relationship was found running from between FDI and NLC. This shows that, it is chances in foreign direct investment trigger changes in number of listed companies and vice versa. Again, a bidirectional relationship was found between TNR and ASI, implying that the both variables cause changes in each other. Lastly, a bidirectional relationship was found between volume of transaction and turnover ratio, meaning that both variables trigger changes in each other.

4.3 Test of Hypotheses

Hypothesis one

H₀: Foreign direct investment does not have any significant relationship with the Nigerian capital market's market capitalization;

H₁: Foreign direct investment has a significant relationship with the Nigerian capital market's market capitalization.

Decision Rule

Accept H_0 : if calculated t-statistics value $>$ table t-statistics value.'

Reject H_0 : if calculated t-statistics value $<$ table t-statistics value.

From the regression result,

Table t-statistics value = 2.026

Calculated t-statistics value = 3.561

Since the calculated t-statistics value of 3.561 is greater than the table t-statistics value of 2.026 at 5 percent level of significance, we reject the null hypothesis and accept the alternative hypothesis. It therefore implies that foreign direct investment has a significant relationship with market capitalization in Nigeria.

Hypothesis two

H_0 : Foreign direct investment does not have any significant relationship with the Nigerian capital market's number of listed companies;

H_1 : Foreign direct investment has a significant relationship with the Nigerian capital market's number of listed companies.

Decision Rule

Accept H_0 : if calculated t-statistics value $>$ table t-statistics value.'

Reject H_0 : if calculated t-statistics value $<$ table t-statistics value.

From the regression result,

Table t-statistics value = 2.026

Calculated t-statistics value = 2.451

Since the calculated t-statistics value of 2.451 is greater than the table t-statistics value of 2.026 at 5 percent level of significance, we accept the alternative hypothesis and reject the null hypothesis. It therefore implies that foreign direct investment has a significant relationship with the Nigerian capital market's number of listed companies.

Hypothesis three

H_0 : Foreign direct investment does not have any significant relationship with the Nigerian capital market's all share index;

H_1 : Foreign direct investment has a significant relationship with the Nigerian capital market's all share index.

Decision Rule

Accept H_0 : if calculated t-statistics value $>$ table t-statistics value.'

Reject H_0 : if calculated t-statistics value $<$ table t-statistics value.

From the regression result,

Table t-statistics value = 2.026

Calculated t-statistics value = 3.316

Since the calculated t-statistics value of 3.316 is greater than the table t-statistics value of 2.026 at 5 percent level of significance, we accept the alternative hypothesis and reject the null hypothesis. It therefore implies that foreign direct investment has a significant relationship with the Nigerian capital market's all share index.

Hypothesis four

H_0 : Foreign direct investment does not have any significant relationship with the Nigerian capital market's turnover ratio;

H_1 : Foreign direct investment has a significant relationship with the Nigerian capital market's turnover ratio.

Decision Rule

Accept H_0 : if calculated t-statistics value $>$ table t-statistics value.'

Reject H_0 : if calculated t-statistics value $<$ table t-statistics value.

From the regression result,

Table t-statistics value = 2.026

Calculated t-statistics value = 3.362

Since the calculated t-statistics value of 3.362 is greater than the table t-statistics value of 2.026 at 5 percent level of significance, we accept the alternative hypothesis and reject the null hypothesis. It therefore implies that foreign direct investment has a significant relationship with the Nigerian capital market's turnover ratio.

Hypothesis five

H₀: Foreign direct investment does not have any significant relationship with the Nigerian capital market's value of transaction;

H₁: Foreign direct investment has a significant relationship with the Nigerian capital market's value of transaction.

Decision Rule

Accept H₀: if calculated t-statistics value > table t-statistics value.'

Reject H₀: if calculated t-statistics value < table t-statistics value.

From the regression result,

Table t-statistics value = 2.026

Calculated t-statistics value = 2.858

Since the calculated t-statistics value of 2.858 is greater than the table t-statistics value of 2.026 at 5 percent level of significance, we accept the alternative hypothesis and reject the null hypothesis. It therefore implies that foreign direct investment has a significant relationship with the Nigerian capital market's value of transaction.

4.4 DISCUSSION OF FINDINGS

The result of the analysis revealed that foreign direct investment has a significant relationship with market capitalization in Nigeria. This implies that foreign direct investment significantly relate with developments in market capitalization in Nigeria. In the current period, foreign direct investment has a positive relationship with market capitalization, however, in the second and third lagged periods foreign direct investment has inverse relationship with market capitalization in Nigeria. This finding is in agreement with Umar, Ismail and Sulong (2015) whose finding showed a mixed but significant relationship between foreign direct investment and market capitalization. Again, this study has been supported by Vladimir, Tomislav and Irena (2012) who studied the relationship between stock market and FDI in Croatia. Their finding showed evidence of a positive but significant relationship between FDI and capital market development in Croatia.

The study again showed a positive and significant relationship between foreign direct investment and number of listed companies in Nigeria in the first and third lagged periods. In the second lagged period however, foreign direct investment had an inverse relationship with number of listed companies in Nigeria. This implies an increase in foreign direct investment led to increases in number of listed companies in the first and third lagged periods but a decrease in the second lagged period. In other words, foreign direct investment promotes growth in number of listed companies in the Nigerian capital market in the first and third lagged periods. This finding is in agreement with the findings of Hossain and Nasrin (2012) who found foreign direct investment to be strongly related with capital market development in Bangladesh.

The study further revealed that foreign direct investment had a significant positive relationship with all share index in the first lagged and third lagged periods but a negative relationship in the second period. This implies that increases in foreign direct investment can trigger high increases in all share index in the current and three lagged periods but in the previous two periods, such increase led to large decreases in all share index. This finding has been strongly supported by Umar, Ismail and Sulong (2015) who investigated the impact of stock market development on foreign direct investment in Nigeria. Using the Auto Redistributive Lag technique, their findings showed that foreign direct investment triggers positive development in stock market in the medium to long term period.

The study further revealed that foreign direct investment has a positive and significant relationship with turnover ratio. This implies that increases in the foreign direct investment leads to significant increases in the liquidity of the Nigerian capital market. In other words, the higher the inflow of foreign direct investment to Nigeria, the more the liquidity of the Nigerian capital market. This finding has been supported by Maduka (2014) who in his study found a positive relationship between foreign direct investment and turnover ratio in Nigeria. Also supporting this study is Ezeoha, Ogamba, and Onyiuke (2009) who found a positive relationship between stock market turnover ratio and foreign private investment in Nigeria.

Lastly, the study revealed that there is a positive and significant relationship between foreign direct investment and value of transaction in the first and second lagged periods. In the third lagged period however, foreign direct investment had an inverse relationship with value of transaction in the Nigerian capital market. This implies that inflows of foreign direct investment enhance the value of transaction in the Nigerian capital market in the current and previous two periods. However, in the previous third lagged periods, such increase promotes inverse developments in value of transaction. This finding negates the findings of Ojong, Arikpo & Ogar (2015) who study the determinants of foreign direct investment in Nigeria and found using the ordinary least squared analysis a strong relationship between FDI and value of transaction in Nigeria.

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of findings

The major aim of this study was to examine the relationship between FDI and capital market development in Nigeria. In view of this, the relationships between market capitalization, number of listed companies, all share index, turnover ratio, value of transaction and foreign direct investment were examined using Vector Auto Regression (VAR) technique. Consequently, the following major findings were made:

- (i) There is a positive and significant relationship between foreign direct investment and market capitalization in Nigeria.
- (ii) There is a positive and significant relationship between foreign direct investment and number of listed companies in the current and previous three periods.
- (iii) There is a positive and significant relationship between foreign direct investment and all share index in Nigeria in the first and third lagged periods.
- (iv) Foreign direct investment has a positive and significant relationship with turnover ratio in Nigeria.
- (v) Foreign direct investment has a significant positive relationship with foreign direct investment in Nigeria in the first and second lagged periods.

5.2 CONCLUSION AND RECOMMENDATIONS

This study examined the relationship between foreign direct investment and market capitalization, number of listed companies, all share index, turnover ratio, and value of transactions in Nigeria using Vector Auto Regressive (VAR) technique. The study showed a positive and significant relationship foreign direct investment and market capitalization, turnover ratio, all share index, number of listed companies and value of transaction. From the above findings, the study concludes that foreign direct investment is an effective variable that promote significant development in the Nigerian capital market. Based on the above findings the following recommendations were made:

- (i) Government should encourage foreign direct investments inflow to Nigeria by loosening their registration requirements to trigger positive developments in the Nigerian capital market.
- (ii) Government should put in place suitable conditions such as steady power supply, good road networks, etc. for the profitable operation of foreign direct investment to boost the capital market performance in Nigeria.
- (iii) Government should encourage foreign direct investors to quote their securities on the Nigerian capital market by providing special benefits such as tax holidays, to quoted FDI.
- (iv) Regulatory authorities should make policies to boost investors' confidence in the market by promoting transparency, fair trading and discouraging capital flight.
- (v) Regulators of the Nigerian capital market should broaden scope of the market by introducing new investment instruments such as derivatives, futures, swaps, etc., to enhance foreign participation in the market and boost it value.

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DATA MINING APPLICATIONS IN HEALTHCARE MANAGEMENT

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ABSTRACT

The issue of health care is the prime importance for the society and is a significant indicator of social development. Health is the best understood as the indispensable basis for defining a person's sense of well being. In this paper I have focused to compare a variety of techniques, approaches and different tools and its impact on the healthcare sector. The goal of data mining application is to turn that data are facts, numbers, or text which can be processed by computer into knowledge or information. This paper aims at the detailed study report of different types of data mining applications in healthcare sector and to reduce the complexity of the study of healthcare data transactions.

Keywords: Data Mining, Artificial Neural Network, Electronic Medical Records(EMR), Health Care, Diagnosis & Treatment.

1. INTRODUCTION

The purpose of data mining is to extract useful information from large databases or data warehouses. Data mining applications are used for commercial and scientific sides [1]. This study mainly discusses the Data Mining applications in the scientific side. Scientific data mining distinguishes itself in the sense that the nature of the datasets is often very different from traditional market driven data mining applications. In this work, a detailed survey is carried out on data mining applications in the healthcare sector, types of data used and details of the information extracted. Data mining algorithms applied in healthcare industry play a significant role in prediction and diagnosis of the diseases. There are a large number of data mining applications are found in the medical related areas such as Medical device industry, Pharmaceutical Industry and Hospital Management. To find the useful and hidden knowledge from the database is the purpose behind the application of data mining. Popularly data mining called knowledge discovery from the data. The knowledge discovery is an interactive process, consisting by developing an understanding of the application domain, selecting and creating a data set, preprocessing, data transformation. Data Mining has been used in a variety of applications such as marketing, customer relationship management, engineering, and medicine analysis, expert prediction, web mining and mobile and mobile computing. In health care institutions leak the appropriate information systems to produce reliable reports with respect to other information in purely financial and volume related statements. Data mining tools to answer the question that traditionally was a time consuming and too complex to resolve. They prepare databases for finding predictive information. Data mining tasks are Association Rule, Patterns, Classification and Prediction, Clustering. Most common modeling objectives are classification and prediction. The reason that attracted a great deal of attention in information technology for the discovery of useful information from large collections is due to the perception that we are data rich but information poor. Some the sample data mining applications are:

- Developing models to detect fraudulent phone or credit-card activity
- Predicting good and poor sales prospectus.
- Predicting whether a heart attack is likely to recur among those with cardiac disease.
- Identifying factors that lead to defects in a manufacturing process.

Expanding the health coverage to as many people as possible, and providing financial assistance to help those with lower incomes purchase coverage [2]. Eliminating current health disparities would decrease the costs associated with the increased disease burden borne by certain population groups. Health administration or healthcare administration is the field relating to leadership, management, and administration of hospitals, hospital networks, and health care systems [1,3]. In the Healthcare sector Government spends more money. Proposal in draft NHP 2001 is timely that State→ health expenditures be raised to 7% by 2015 and to 8% of State budgets thereafter [16]. Health spending in India at 6% of GDP is among→ the highest levels estimated for developing countries. Public spending on health in India has itself→ declined after liberalization from 1.3% of GDP in 1990 to 0.9% in 1999. Central budget allocations for health have stagnated at 1.3% of the total Central budget. In the States it has declined from 7.0% to 5.5% of the State health budget. This paper mainly compares the data mining tools deals with the health care problems

2. LITERATURE REVIEW

A literature review is a text written by critical points of current knowledge including substantive find theoretical and methodological contributions to a particular topic. Literature reviews are secondary sources and do not report any new or original experimental work. HianChyeKoh and Gerald Tan mainly discusses data mining and its applications with major areas like Treatment effectiveness, Management of healthcare, Detection of fraud and abuse, Customer relationship management[1]. JayanthiRanjan presents how data mining discovers and extracts useful patterns of this large data to find observable patterns. This paper demonstrates the ability of Data mining in improving the quality of the decision making process in pharma industry. Issues in the pharma industry are adverse reactions to the drugs [2]. M. Durairaj, K. Meena illustrates a hybrid prediction system consists of Rough Set Theory (RST) and Artificial Neural Network (ANN) for dispensation medical data. The process of developing a new data mining technique and software to assist competent solutions for medical data analysis has been explained. Propose a hybrid tool that incorporates RST and ANN to make proficient data analysis and indicative predictions. The experiments on spermatological data set for predicting excellence of animal semen is carried out. The projected hybrid prediction system is applied for pre-processing of medical database and to train the ANN for production prediction. The prediction accuracy is observed by comparing observed and predicted cleavage rate[17]. K. Srinivas, B. Kavitha Rani and Dr. A. Goverdhan discusses mainly examine the potential use of classification based data mining techniques such as Rule Based, Decision tree, Naïve Bayes and Artificial Neural Network to the massive volume of healthcare data. Using an age, sex, blood pressure and blood sugar medical profiles it can predict the likelihood of patients getting a heart disease[4]. ShwetaKharyadiscussed various data mining approaches that have been utilized for breast cancer diagnosis and prognosis Decision tree is found to be the best predictor with 93.62% Accuracy on benchmark dataset and also on SEER data set[5]. Elias Lemuye discussed the AIDS is the disease caused by HIV, which weakens the body's immune system until it can no longer fight off the simple infections that most healthy people's immune system can resist. Apriori algorithm is used to discover association rules. WEKA 3.6 is used as the data mining tool to implement the Algorithms. The J48 classifier performs classification with 81.8% accuracy in predicting the HIV status[6]. Arvind Sharma and P.C. Gupta discussedData mining can contribute with important benefits to the blood bank sector. J48 algorithm and WEKA tool have been used for the complete research work. Classification rules performed well in the classification of blood donors, whose accuracy rate reached 89.9%[7].

3. DATA MINING

Data mining is the non trivial process of identifying valid, novel, potentially useful, and ultimately understandable patterns in data. With the widespread use of databases and the explosive growth in their sizes, organizations are faced with the problem of information overload. The problem of effectively utilizing these massive volumes of data is becoming a major problem or all enterprises. Definition Data mining or knowledge discovery in database, as it is also known, is the non-trivial extraction of implicit, previously unknown and potentially useful information from the data. This encompasses a number of technical approaches, such as clustering, data summarization, classification, finding dependency networks, analyzing changes, and detecting anomalies [8]. Development of data mining The current evaluation of data mining functions and products is the results of influence from many disciplines, including databases, visualization, statistics, cluster analysis and machine learning. (See Fig. 1).



Fig:1 Historical Perspective of Data Mining

4. DATA MINING APPLICATIONS IN HEALTHCARE SECTOR

Healthcare industry today generates large amounts of complex data about patients, hospital resources, disease diagnosis, electronic patient records, medical devices etc. Larger amounts of data are a key resource to be

processed and analyzed for knowledge extraction that enables support for cost-savings and decision making. Data mining applications in healthcare can be grouped as the evaluation into broad categories[1,10],

Treatment effectiveness

Data mining applications can develop to evaluate the effectiveness of medical treatments. Data mining can deliver an analysis of which course of action proves effective by comparing and contrasting causes, symptoms, and courses of treatments.

Healthcare management

Data mining applications can be developed to better identify and track chronic disease states and high-risk patients, design appropriate interventions, and reduce the number of hospital admissions and claims to aid healthcare management. Data mining used to analyze massive volumes of data and statistics to search for patterns that might indicate an attack by bio-terrorists.

Customer relationship management

Customer relationship management is a core approach to managing interactions between commercial organizations-typically banks and retailers-and their customers, it is no less important in a healthcare context. Customer interactions may occur through call centers, physicians' offices, billing departments, inpatient settings, and ambulatory care settings.

Fraud and abuse

Detect fraud and abuses establish norms and then identify unusual or abnormal patterns of claims by physicians, clinics, or others attempt in data mining applications. Data mining applications fraud and abuse applications can highlight inappropriate prescriptions or referrals and fraudulent insurance and medical claims.

Medical Device Industry

Healthcare system's one important point is medical device. For best communication work this one is mostly used. Mobile communications and low-cost of wireless bio-sensors have paved the way for development of mobile healthcare applications that supply a convenient, safe and constant way of monitoring of vital signs of patients[11]. Ubiquitous Data Stream Mining (UDM) techniques such as light weight, one-pass data stream mining algorithms can perform real-time analysis on-board small/mobile devices while considering available resources such as battery charge and available memory.

Pharmaceutical Industry

The technology is being used to help the pharmaceutical firms manage their inventories and to develop new product and services. A deep understanding of the knowledge hidden in the Pharma data is vital to a firm's competitive position and organizational decision-making.

Hospital Management

Organizations including modern hospitals are capable of generating and collecting a huge amount of data. Application of data mining to data stored in a hospital information system in which temporal behavior of global hospital activities is visualized[12]. Three layers of hospital management:

- Services for hospital management
- Services for medical staff
- Services for patients

System Biology

Biological databases contain a wide variety of data types, often with rich relational structure. Consequently multi-relational data mining techniques are frequently applied to biological data[13]. Systems biology is at least as demanding as, and perhaps more demanding than, the genomic challenge that has fired international science and gained public attention.

4. RESULTS OF COMPARATIVE STUDY

This chapter, a comparative study of data mining applications in healthcare sector by different researchers given in detail. Mainly data mining tools are used to predict the successful results from the data recorded on healthcare problems. Different data mining tools are used to predict the accuracy level in different healthcare problems. In this study, the following list of medical problems has been analyzed and evaluated.

- Heart Disease
- Cancer
- HIV/AIDS

- Blood
- Brain Cancer
- Tuberculosis
- Diabetes Mellitus
- Kidney dialysis
- Dengue
- IVF
- Hepatitis C

In the Table 1, the most important healthcare problems specifically in disease side and research results have been illustrated. The diseases are the most critical problems in human. To analyze the effectiveness of the data mining applications for diagnosing the disease, the traditional methods of mathematical / statistical applications are also given and compared. Listed eleven problems are taken for comparison with this work.

Graph chart formed by using this table with the values of health care problems In this chart, the prediction accuracy level of different data mining applications has been compared.

S.No	Type of disease	Data mining tool	Technique	Algorithm	Traditional Method	Accuracy level(%) from DM application
1	Heart Disease	ODND, NCC2	Classification	Naïve	Probability	60
2	Cancer	WEKA	Classification	Rules. Decision Table		97.77
3	HIV/AIDS	WEKA 3.6	Classification, Association Rule Mining	J48	Statistics	81.8
4	Blood Bank Sector	WEKA	Classification	J48		89.9
5	Brain Cancer	K-means Clustering	Clustering	MAFIA		85
6	Tuberculosis	WEKA	Naïve Bayes Classifier	KNN	Probability, Statistics	78
7	Diabetes Mellitus	ANN	Classification	C4.5 algorithm	Neural Network	82.6
8	Kidney dialysis	RST	Classification	Decision Making	Statistics	75.97
9	Dengue	SPSS Modeler		C5.0	Statistics	80
10	IVF	ANN, RST	Classification			91
11	Hepatitis C	SNP	Information Gain	Decision rule		73.20

Table 1. Data mining applications in healthcare

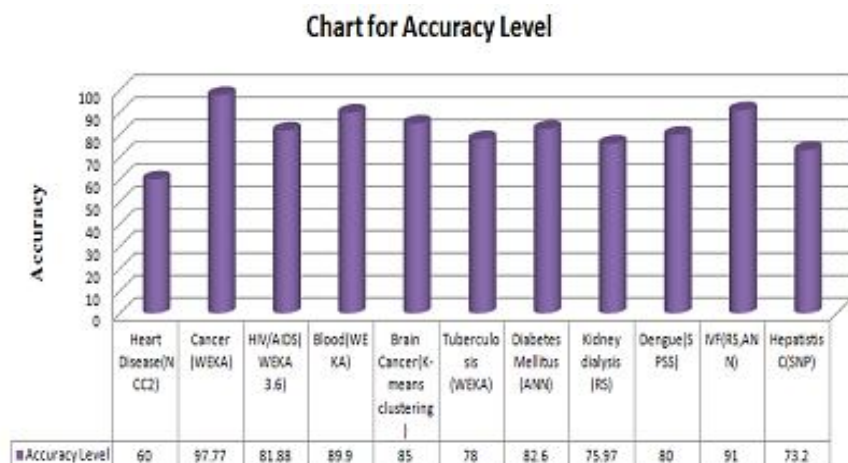


Fig. 2. Chart for Accuracy Level of using Data mining tools for diagnosis

5. CONCLUSION

This paper aimed to compare the different data mining application in the healthcare sector for extracting useful information. The prediction of diseases using Data Mining applications is a challenging task but it drastically reduces the human effort and increases the diagnostic accuracy. Developing efficient data mining tools for an application could reduce the cost and time constraint in terms of human resources and expertise. Exploring knowledge from the medical data is such a risk task as the data found are noisy, irrelevant and massive too. In this scenario, data mining tools come in handy in exploring of knowledge of the medical data and it is quite interesting. It is observed from this study that a combination of more than one data mining techniques than a single technique for diagnosing or predicting diseases in healthcare sector could yield more promising results.

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CASHLESS RURAL INDIA

(A Study on cashless economy in India with reference to the Semi Hilly Himachal Pradesh)

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ABSTRACT

India, on an edge of major change towards an unprecedented economic growth along with robust advancements in the nation's HDI, has around 65% of its population aged below 35 years and will add almost 10-12 million more to it every year in coming two decades. Urban India has 137 million Internet users, whereas rural has 68 million, growing by 58% each year. Increasing smart phones and 3G subscriptions are further strengthening it. This statistics motivates us towards the infusion of the idea of effective utilisation of modern banking practices especially associated with mobile and internet in rural India, marching towards the fulfilment of dream of a cashless India by Modi Government in near future. But there are many structural problems which needs to be considered and resurrected with very hard efforts. Only our youth is well versed or is learning the modern banking effectively. Further the facilities in the rural regions, especially remote ones is well away from even basic facilities and has such related problems. Hence a study is being conducted in the lower region of Himachal Pradesh having a minimal facility and least connectivity in particular.

Keywords: Modern Banking and Connectivity Issues, The Cashless Economy and Reality.

INTRODUCTION

India, on an edge of major change towards an unprecedented economic growth along with robust advancements in the nation's HDI, having around 65% of its population aged below 35 years and will add almost 10-12 million more to it every year in coming two decades. Urban India has 137 million Internet users, whereas rural has 68 million, growing by 58% each year. This statistics motivates us towards the infusion of the idea of effective utilisation of modern banking practices especially associated with mobile and internet in rural India, marching towards the fulfilment of dream of a cashless India by Modi Government in near future. But there are many structural problems which needs to be considered and resurrected with very hard efforts. Further the facilities in the rural regions are well lesser than the basic ones and having other such related problems. Hence a study is being conducted in the lower region of Himachal Pradesh, having a lack or minimal facility and least connectivity. No exactly relevant literature was available. Related studies are skipped up. Discussing about the research gap, the area has hardly found to be touched with the help of a grass root study. Accordingly, following are the objectives formulated for the study:

1. To Test Whether being Well Versed with new Systems & Technologies has a positive impact on Usage of modern Banking Facilities.
2. To Test whether the youth is more probable to use Modern Banking Facilities, Because of them being well versed with new Systems & Technology.
3. To Explore main problems faced by rural / remote region in using cash less transactions preventing them to contribute towards the national goal of cashless economy in India.
4. To test whether lesser availability or lack of facilities / other technical and structural problems have a negative impact on use of cash less transactions.

Discussing about the need of the study, as described in the research gap, The area has hardly found to be touched with the help of a grass root study and a locale or regionally representing study based upon a primary survey has been hardly found in context of problems of modern banking in rural India. The research is expected to part up a small component of this research grey area. The Study is well feasible to pursue, based on the premise that a snowball sampling based survey is well easy to conduct, and a primary survey has not been held so far.

RESEARCH METHODOLOGY

Snowball Sampling has been used for the study, with 51 young sampled as convenience in local educational institute(s), then they referred 51 Middle-Aged Samples from their references. The study will be useful for the Banking entities operating and / or planning to expand their business in the region, and offering or willing to offer its modern banking services. Accordingly following are the assessed limitations of this study are that the sample is not a direct representative of national or international sample and being the sample collected based on convenience and snowball sampling, hence may not be an exact reference to the population of the region.

SUMMARY RESULTS INTERPRETATION

Middle Aged	Young	Particulars
Gadgets Owned		
1.29412	1.52941	Average Electronic Gadgets Owned Per Respondent
0	3.92157	Percentage Owning 4 Types of Electronic Gadgets
5.88235	11.76471	Percentage Owning 3 Types of Electronic Gadgets
17.64706	17.64706	Percentage Owning 2 Types of Electronic Gadgets
76.47059	66.66667	Percentage Owning 1 Electronic Gadget
0	0	Percentage Owning No Electronic Gadget
Usage of Electronic Gadgets		
1.29412	1.45098	Average of Electronic Gadgets Usage Per Respondent
0	1.96078	Percentage Using 4 Types of Electronic Gadgets
7.84314	13.72549	Percentage Using 3 Types of Electronic Gadgets
13.72549	11.76471	Percentage Using 2 Types of Electronic Gadgets
78.43137	72.54902	Percentage Using 1 Electronic Gadget
0	0	Percentage Using No Electronic Gadget
Internet Banking / Transaction Awareness		
35	36	Respondents aware of Internet Banking
68.62745	70.58824	Percentage Aware of Internet Banking
Usage of Internet Banking / Transactions		
18	15	Respondents Using Internet Banking
35.29412	29.41176	Percentage Using Internet Banking
Personal Usage of Modern Banking Practices		
3.72549	2.254902	Average Transactions Per Month of Above Modern Banking Methods
35.29412	56.86275	Percentage Never used Above Modern Banking Methods
49.01961	33.33333	Percentage Using 1-5 Times / Month Above Modern Banking Methods
9.80392	7.84314	Percentage Using 6-15 Times / Month Above Modern Banking Methods
5.88235	1.96078	Percentage Using +15 Times / Month Above Modern Banking Methods
Business Usage of Modern Banking Practices		
3.09804	0.98039	Average Transactions Per Month of Above Modern Banking Methods
56.86275	78.43137	Percentage Never used Above Modern Banking Methods
29.41176	19.60784	Percentage Using 1-5 Times / Month Above Modern Banking Methods
5.88235	0	Percentage Using 6-15 Times / Month Above Modern Banking Methods
7.84314	1.96078	Percentage Using +15 Times / Month Above Modern Banking Methods
Demonetization Impact		
15.68627	15.68627	Percentage Found Demonetization Extremely Hard
13.72549	13.72549	Percentage Found Demonetization Tough & Hard
50.98039	52.94118	Percentage Found Demonetization Somewhat Problematic, But Survivable
7.84314	7.84314	Percentage Found Demonetization Passive & Smooth
11.76471	9.80392	Percentage - NIL / NA

CONCLUSION

It has been initially observed from the study outcomes that irrespective of youth being more techno-savvy and gadget friendly, Middle aged segment covered in the region has shown its more averseness and usage for modern banking practices, being their more involved in Personal and Business Handling of funds. Majority of the sample covered Found Demonetization Somewhat Problematic, But Survivable.

THE IMPACT OF ADVERTISING ON THE CONSUMER BEHAVIOR WITH REFERENCE TO THE CONSUMER DURABLE INDUSTRY IN RAJASTHAN

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ABSTRACT

Every organization has to justify the spending on every matter. Such a matter is the advertisement. Specially when we talk about the advertising in the consumer durable products, we have to be more specific about the impact of this advertisement on the buying decision of the consumers. This paper has made an attempt to find out the impact of the advertising on the buying decision of the consumers. This has been done by taking 200 samples from the city of Jaipur and Kota of Rajasthan. The responses were collected on the basis of two major categories as environmental stimulus and emotional stimulus of advertisement on the buying decisions. The data so collected were tested on SPSS-20 by using multiple regression analysis and ANOVA. The result showed that there exists a significant relationship but the impact is very low.

Key words: Advertisement, Environmental, Emotional, Buying Decision.

INTRODUCTION

Advertisement of the product has been an essential element in the sales promotion activity of almost all the organization. It has a long lasting and multifaceted impact over the mind of the customers. Starting from informing the consumers about the product and the creating a mindset for purchasing the product advertisement plays a vital role. When we talk about the consumer durable market, the products involved in it has a long life and involves comparatively high amount of money. This is the reason why the customers are little choosier while purchasing the durable products. In this modern age the customers are analyzing all the aspects of the product both the pre purchase and post purchase factors. The marketers are trying to attract the mind of the customers through all possible means of advertisement. Now real question is that whether the advertisement has been successful enough to generate positive buying behavior and increase sales in the consumer durable section or not? This paper deals with the impact of the advertisement on the decision making process of the consumers.

LITERATURE REVIEW

Advertising is successful mass communication tools in the hands of the marketers. As in case of the mass communication the advertisement also conveys the message to a large audience at the same time. The different components of the advertisement are communication process, marketing process, economic and social process, a public relation process public persuasion process (Arens, 1996). Dunn et al. (1978) viewed advertising from its functional perspectives, hence they define it as a paid, non-personal communication through various media by business firms, non-profit organization, and individuals who are in some way identified in the advertising message and who hope to inform or persuade members of a particular audience.

Morden (1991) had viewed advertising as the means of creating awareness of the product in the mind of the potential customer. It creates a level of knowledge about the product. Interactive marketing with flexible advertising has been the new development in the world of advertisement. This has developed with the development of the advanced technology. The marketer's are focusing on target groups for their advertisement. The customers are also demanding to get the advertisement when and where they want. This is possible with the modern communication technology (Newell & Merier, 2007; Kondo & Nakahara, 2007).

Ayanwale et al (2005) revealed that there is a significant impact of the advertisement on the consumers of the Bournvita food drinks. This was also supported by the research of Adelaar et al. (2003) on the quality of the Bournvita. Advertising is a non-personal and paid form where ideas, concepts, products or services, and information, are promoted through media (visual, verbal, and text) by an identified sponsor to persuade or influence behavior (Ayanwale et al. 2005, and Bovee et el. 1995). Television advertising is a form of advertising in which goods, services, organizations, ideas, etc., are promoted via the medium of television.

The reach of the Television as a medium of advertisement is very wide (Abideen et al., 2011). Over a number of years in the past, many models and constructs have been discussed in the marketing and advertising literature, each having the objective of trying to understand the processes used by consumers to make brand or product evaluations when they are exposed to advertisements (Muehling et al., 1993). These works have investigated relationships among cognitive responses directed towards the brand, advertisement, brand attitudes, and finally, purchase intentions and behavior. A review of the literature states that, involving attitude towards advertisement influence brand attitudes and supports the advertisement-brand attitude relationship across different media and

product types (Muehling et al., 1988). Mass media and advertising also make available information about consumption and the value of material goods (Abideen et al., 2011). O'Guinn and Faber (1989) explained that once buying behavior is developed, the individual face great difficulty in controlling buying even after its detrimental effects are recognized.

Emotional Response

Advertisement is one of the effective tools of integrated marketing communication to emotionally motivate consumers to buy the products. It also has strong linkage with entertainment and the proliferation of media has blurred the distinguishing lines between advertisements and entertainment (Moore, 2004). Advertising is to create brand awareness, preference, and selection of product or services. The most influencing theory in marketing and advertising research is attitude-towards-the-ad. However, the attitude that is formed towards the ad help in influencing consumer's attitudes toward the brand until their purchase intent (Goldsmith and Lofferty, 2002). Consumer buying behavior is based on the concept and idea that he/she simply decided to purchase a product or service at the spot (Adelaar et al. 2003).

According to the traditional attitude theory consumer behavior is predicted from consumer attitude when consumers buy the brand, which they like the most. An attitude may be defined as "*acquire behavioral disposition*" (Smith and Swinyard, 1983). However Adelaar et al. (2003) suggested that behavior is a result of emotional response, which is affected by three independent factors:

Pleasure: the state in which person feel good, happy, or joyful in a particular situation.

Arousal: the state of feeling that is varying from person to person in different situations i.e. feeling of excitement, active, bored, or sleepy.

Dominance: this defines individual feelings, which are in control of or free to act in a particular situation.

Therefore, the aim of consumer behavior analysis is to explain why consumers act in particular ways under certain circumstances. It tries to determine the factors that influence consumer-buying behavior, especially the economic, social and psychological aspects. This analysis helps to determine the direction that consumer behavior is likely to make and to give preferred trends in product development, attributes of the alternative communication method etc (Ayanwale et al. 2005).

The advertisement becomes effective by creating an emotional response in the mind of the consumer by creating an ability to recall the brand ad (Goldsmith and Lofferty, 2002). Thus, the relative importance of brand recall is felt when the customers takes its help while making a buying decision regarding the product with the help of that brand awareness (Keller, 2006). This brand awareness help in ensuring the recall ad, which has the competitive advantage over those brands that are not recalled easily. Thus positive attitude towards ads have more ability to recall the ads then those having negative attitude (Goldsmith and Lofferty, 2002). The freshness and the quantity of recall off the add during the time of the purchasing of the products creates an emotional response towards the advertisement. (Holden and Lutz, 1992).

In the advertisement if different brand attributes are highlighted then they are being recalled at different stages of the buying decisions of the customers. This creates brand association (Romaniuk and Sharp, 2004).

Environmental Response

The environmental response is generated by the belief of the consumer on a particular product generated by the impact of the advertisement. The belief may be specific and developed on the basis of cognitive structure (Heberlein and Wisconsin, 1998). Environmental variables mostly affect the buying behaviors of consumer (Greenley and Foxall, 1997).

The outcome of various market research suggest that the environment provides certain level of experience to the consumers, these experience are used as advertisement and other selling and promotional activity of the product (Adelaar et al. 2003).

The society gives a base for the creation of a cultural climate give a scope of expression and impulse and moment desire (Wood, 1998). Sensory stimuli can reduce self-control mechanisms; which can hinder or even reduce the ability of consumers to resist the temptation to engage in desire moment (Kappas, 2002). Impulse buying may also be driven by other variables such as rewards, possessions, materialism, moment desire, post-purchase decision and self-exploration (Greenley and Foxall, 1997). Therefore, businesses offer consumers specific types of media experiences, which are used for setting the stage or creating a context that promotes or sells related products or services (Rifkin, 2000).

Although, those purchasers who plan to buy a product but they may not have yet decided features and brand that they want, can be considered impulse buyers (Goldsmith and Lofferty, 2002).

RESEARCH METHODOLOGY

The paper is based on the primary data analysis for getting the desired result. The respondents were selected from the city of Jaipur and Kota of Rajasthan. The sampling technique was convenient sampling and 200 respondents of various malls and daily market were selected. The respondents were given a well structured questionnaires containing various question regarding the impact of advertisement on their buying decision. The questions were related to the emotional response and environmental response generated by the advertisement on the customer. The impact of these stimulus on the buying decision were studied by inquiring whether they have bought that product as a result of the stimulus generated by the advertisement or not. The data was analyzed by using SPSS 20. The analysis was done by using Multiple Regression analysis and ANOVA. The hypotheses taken were:

H1: *There is no significant relationship between emotional response generated by advertisement and consumer buying behavior.*

H2: *There is no significant relationship between environmental response generated by advertisement and consumer buying behavior.*

DATA ANALYSIS

Four variables were taken under the emotional response are pleasure, dominance, arousal and brand recall. The two variables taken under environmental response are information rates and sensory stimulus. The buying decision is taken as the dependence variable. This method was used by Tammo and Bajmolt et al. (1998) and Adelaar et al. (2003). They had used the five point measurement scale ranging from ranging from (1= strongly disagree, 5= strongly agree) for measuring the response.

The results of the analysis have been reflected in the following tables. The table -1 shows the result of the regression analysis. Here the buying decision has been taken as the dependent variable and all other advertising impact were taken as the independent variable. Here both the environmental response and the emotional response have been taken together. The value of the R-square and the adjusted R-square is 0.030 and 0.025 respectively. This signifies that the independent variables have been able to explain only 2.5% variation in the dependent variable. The p-value of the model is 0.014. The P-value is less than 0.05 indicating the acceptance of the null hypothesis. As both the responses have been taken together therefore both the Null hypothesis has been accepted.

Table-1: Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.173 ^a	.030	.025	.49435	.030	6.084	1	198	.014	2.408

a. Predictors: (Constant), Pleasure

b. Dependent Variable: Buying decision

The acceptance of the null hypothesis indicated that there is a significant impact of the advertisement stimulus on the buying behavior of the respondents. The table-2 below shows the result of the ANOVA test among the dependent and independent variables. The result of the test shows that the p-value is only 0.014 which is less than the 0.05. This indicates that there is strong association among the independent variables.

Table-2: ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	1.487	1	1.487	6.084	.014 ^b
Residual	48.388	198	.244		
Total	49.875	199			

a. Dependent Variable: Buying decision

b. Predictors: (Constant), Pleasure

The table-3 below shows the result of the test of collinearity among the variables excluded from the regression model. The result shows that they are having VIF (variance inflation factor) close to 1 indicating that they are not correlated to each other. This indicates that the model of regression is good one and results so obtained can

be relied upon. This analysis gives an idea how much the buying behavior is affected by the various stimulus generated by the advertisement.

Table-3: Test of co linearity of the excluded variables.

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics		
						Tolerance	VIF	Minimum Tolerance
1	Dominance	.082 ^b	1.173	.242	.083	.999	1.001	.999
	Arousal	-.045 ^b	-.645	.520	-.046	1.000	1.000	1.000
	Brand Recall	-.003 ^b	-.038	.969	-.003	.999	1.001	.999
	Information rate	.105 ^b	1.498	.136	.106	.998	1.002	.998
	Sensor stimuli	.053 ^b	.751	.454	.053	.988	1.012	.988

a. Dependent Variable: Buying decision

b. Predictors in the Model: (Constant), Pleasure

CONCLUSIONS

Consumer durable products are really durable and going to stay with the consumer for a long time. This paper has tried to find out the impact of the advertisement on the buying decision of the consumer of the durable products. The result showed that there exists a significant impact of the advertisement on the buying behavior of the customers. But the impact is explained only up to 2.5% of the decision. This result indicates that there may be some other significant variable influencing the buying decisions of the durable products. This opens up the way for the further research into the matter. Therefore it is concluded that along with the focusing on the various modes of advertisement. The organization should also give importance to other promotional and service factors to attract the customers.

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GLOBALIZATION AND CONTRACT FARMING IN INDIA

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ABSTRACT

Contract Farming has been in existence for many years as a means of organizing the commercial agricultural production of both large – scale and small –scale farmers. In an age of market liberalization, globalization and expanding agri business, there is a danger that small- scale farmers will find difficulty in fully participating in the market economy. The era of globalization, the concept of ‘Contract Farming’ is an effective way to co-ordinate and promotes production and marketing in agriculture. Contract Farming is essentially an agreement between unequal parties, companies, Government bodies or individual entrepreneurs on the one hand and economically weaker farmers on the other. The prime advantage of a contractual agreement for farmers is that the sponsor will normally undertake to purchase all produce grown, within specified quality and quantity parameters. The majority of smallholder producers experience difficulties in obtaining credit for production inputs. The returns farmers receive for their crops on the open market depend on the prevailing market prices as well as on their ability to negotiate with buyers. Farmers entering new contract farming ventures should be prepared to balance the prospect of higher returns with the possibility of greater risk. Such risk is more likely when the agribusiness venture is introducing a new crop to the area. Contract Farming is not a panacea to solve all related problems of agricultural production and marketing systems.

Key Words: Contract Farming, Access to Credit, Skill Transfer, Increased Risk, Quality consistency, etc.

INTRODUCTION

Contract Farming has been in existence for many years as a means of organizing the commercial agricultural production of both large – scale and small –scale farmers. In an age of market liberalization, globalization and expanding agri business, there is a danger that small- scale farmers will find difficulty in fully participating in the market economy. The era of globalization, the concept of ‘Contract Farming’ is an effective way to co-ordinate and promotes production and marketing in agriculture. “Contract Farming can be defined as an agreement between farmers and processing or marketing firms for the production and supply of agricultural products under forward agreements, frequently at predetermined prices.”

Contract Farming is essentially an agreement between unequal parties, companies, Government bodies or individual entrepreneurs on the one hand and economically weaker farmers on the other. The main feature of Contract Farming is that the buyer/contractor supplies all the material inputs and technical advice required for cultivation to the cultivator. This approach is widely used, not only for tree and cash crops but also, increasingly for fruits and vegetables, poultry, pigs, dairy products and even prawn and fish. Indeed, Contract Farming is characterized by its “enormous diversity” not only with regard to the products contracted but also in relation to many different ways in which it can carry out. The advantages, disadvantages and problems arising from contract farming will vary according to the physical, social and market environments. More specifically, the distribution of risks will depend on such factors as the nature of the markets for

both the raw material and the processed product, the availability of alternative earning opportunities for farmers, and the extent to which relevant technical information is provided to the contracted farmers. These factors are likely to change over time, as will the distribution of risks.

HISTORY OF CONTRACT FARMING

Contract Farming can be traced back to colonial period when commodities like Collin Indigo were produced by the Indian farmers for English factories. Seed production has been carried out through contract farming by the seed companies quite successfully for more than four decades in the country. The new agricultural policy of 2000 sought to promote growth of private sector participation in agribusiness through contract farming and land bearing arrangements to accelerate technology transfers, capital inflows and assured market for crops. The colonial period saw the introduction of cash crops such as tea, coffee, and rubber, poppy and indigo in various parts of the country, mostly through a central expatriate-owned estate surrounded by small out grower’s model. ITC introduced cultivation of Virginia tobacco in Coastal Andhra Pradesh in the 1920’s incorporating most elements of a fair contract farming system and met with good farmer response. This was replaced by auctions in 1984. Organized public and private seed companies, which emerged in the 1960’s. The PepsiCo introduced tomato cultivation in Punjab in the 1990’s under farming to obtain inputs for its paste-manufacturing facility established as a pre-condition to its entry in to India. This was sold to Hindustan Lever in 2000, which had

earlier acquired the kisan Karnataka. Contract Farming was the strategy of choice for almost all food processing projects contemplated in the 1980's and 1990's. Contract Farming is again vogue, and even tried for bulk production of subsistence crops, such as paddy rice, maize and wheat. Commodity co-operatives, which emerged in the 1950's, provided most services envisaged under ideal contract farming to their members and bought back the supplies offered at contracted prices, although these were not strictly contract arrangements. They succeeded enormously, leading to their replication and compelling private companies also to adopt similar approaches. Contract Farming is now considered to be a corrective to market imperfections and serving a useful purpose in India in its own limited sphere. Contract Farming has been promoted in the recent three decades as an institutional innovation to improve agricultural performance in less developed countries. This system was accepted and used as one of the promising institutional frameworks for the delivery of price incentives, technology and other agricultural inputs. Local Governments, private local firms, Multinational companies, some international aid and lending agencies etc have been involved in these contract farming schemes (Glover 1994).

ADVANTAGES FOR FARMERS

The prime advantage of a contractual agreement for farmers is that the sponsor will normally undertake to purchase all produce grown, within specified quality and quantity parameters. Contracts can also provide farmers with access to a wide range of managerial, technical and extension services that otherwise may be unobtainable. Farmers can use the contract agreement as collateral to arrange credit with a commercial bank in order to fund inputs. Thus, the main potential advantages for farmers are:

1. Provision of inputs and production services;
2. Access to credit;
3. Introduction of appropriate technology;
4. Skill transfer; Guaranteed and fixed pricing structures; and
5. Access to reliable markets.

Provision of inputs and production services Many contractual arrangements involve considerable production support in addition to the supply of basic inputs such as seed and fertilizer. Sponsors may also provide land preparation, field cultivation and harvesting as well as free training and extension. This is primarily to ensure that proper crop husbandry practices are followed in order to achieve projected yields and required qualities. There is, however, a danger that such arrangements may lead to the farmer being little more than a laborer on his or her own land. It is often difficult for small-scale farmers outside the contract-farming context to gain access to inputs. In Africa, in particular, fertilizer distribution arrangements have been disrupted by structural adjustment measures, with the private sector having yet to fill adequately the void created by the closure of parastatal agencies. In many countries a vicious circle has developed whereby the low demand for inputs provides no incentive for the development of commercial distribution networks and this, in turn, further adversely affects input availability and use. Contract farming can help to overcome many of these problems through bulk ordering by management.

ACCESS TO CREDIT

The majority of smallholder producers experience difficulties in obtaining credit for production inputs. With the collapse or restructuring of many agricultural development banks and the closure of many export crop marketing boards (particularly in Africa), which in the past supplied farmers with inputs on credit, difficulties have increased rather than decreased. Contract farming usually allows farmers access to some form of credit to finance production inputs. In most cases it is the sponsors who advance credit through their managers. However, arrangements can be made with commercial banks or government agencies through crop liens that are guaranteed by the sponsor, i.e. the contract serves as collateral. When substantial investments are required of farmers, such as packing or grading sheds, tobacco barns or heavy machinery, banks will not normally advance credit without guarantees from the sponsor. The tendency of certain farmers to abuse credit arrangements by selling crops to buyers other than the sponsor (extra-contractual marketing), or by diverting inputs supplied by management to other purposes, has caused some sponsors to reconsider supplying most inputs, opting instead to provide only seeds and essential agrochemicals. The policies and conditions that control advances are normally described in attachments to contract.

INTRODUCTION OF APPROPRIATE TECHNOLOGY

New techniques are often required to upgrade agricultural commodities for markets that demand high quality standards. New production techniques are often necessary to increase productivity as well as to ensure that the commodity meets market demands. However, small-scale farmers are frequently reluctant to adopt new

technologies because of the possible risks and costs involved. They are more likely to accept new practices when they can rely on external resources for material and technological inputs. Nevertheless, the introduction of new technology will not be successful unless it is initiated within a well managed and structured farming operation. Private agribusiness will usually offer technology more diligently than government agricultural extension services because it has a direct economic interest in improving farmers' production. Most of the larger sponsors prefer to provide their own extension rather than rely on government services.

SKILL TRANSFER

The skills the farmer learns through contract farming may include record keeping, the efficient use of farm resources, improved methods of applying chemicals and fertilizers, knowledge of the importance of quality and the characteristics and demands of export markets. Farmers can gain experience in carrying out field activities following a strict timetable imposed by the extension service. In addition, spillover effects from contract farming activities could lead to investment in market infrastructure and human capital, thus improving the productivity of other farm activities. Farmers often apply techniques introduced by management (ridging, fertilizing, transplanting, pest control, etc.) to other cash and subsistence crops.

GUARANTEED AND FIXED PRICING STRUCTURES

The returns farmers receive for their crops on the open market depend on the prevailing market prices as well as on their ability to negotiate with buyers. This can create considerable uncertainty which, to a certain extent, contract farming can overcome. Frequently, sponsors indicate in advance the price(s) to be paid and these are specified in the agreement. On the other hand, some contracts are not based on fixed prices but are related to the market prices at the time of delivery.

ACCESS TO RELIABLE MARKETS

Small-scale farmers are often constrained in what they can produce by limited marketing opportunities, which often makes diversification into new crops very difficult. Farmers will not cultivate unless they know they can sell their crop, and traders or processors will not invest in ventures unless they are assured that the required commodities can be consistently produced. Contract farming offers a potential solution to this situation by providing market guarantees to the farmers and assuring supply to the purchasers. Even where there are existing outlets for the same crops, contract farming can offer significant advantages to farmers. They do not have to search for and negotiate with local and international buyers, and project sponsors usually organize transport for their crops, normally from the farm gate.

PROBLEMS FACED BY FARMERS

For farmers, the potential problems associated with contract farming include:

1. Increased risk;
2. Unsuitable technology and crop incompatibility;
3. Manipulation of quotas and quality specifications;
4. Corruption;
5. Domination by monopolies; and
6. Indebtedness and over reliance on advances.

INCREASED RISK

Farmers entering new contract farming ventures should be prepared to balance the prospect of higher returns with the possibility of greater risk. Such risk is more likely when the agribusiness venture is introducing a new crop to the area. There may be production risks, particularly where prior field tests are inadequate, resulting in lower-than-expected yields for the farmers. Market risks may occur when the company's forecasts of market size or price levels are not accurate. Considerable problems can result if farmers perceive that the company is unwilling to share any of the risk, even if partly responsible for the losses. In Thailand, for example, a company that contracted farmers to rear chickens charged a levy on farmers' incomes in order to offset the possibility of a high chicken mortality rate. This was much resented by the farmers, as they believed that the poor quality of the day-old chicks supplied by the company was one reason for the problem.

UNSUITABLE TECHNOLOGY AND CROP INCOMPATIBILITY

The introduction of a new crop to be grown under conditions rigorously controlled by the sponsor can cause disruption to the existing farming system. For example, the managers may identify land traditionally reserved for food crops as the most suitable for the contracted crop.

Harvesting of the contracted crop may fall at the same time as the harvesting of food crops, thus causing competition for scarce labour resources. Particular problems may be experienced when contract farming is related to resettlement programmers. In Papua New Guinea, for example, people from the Highlands were resettled in coastal areas to grow oil palm and rubber. This required the farmers, who were traditionally sweet potato eaters, to learn cultivation techniques for new food crops and to adapt their dietary practices accordingly. Two factors should be considered before innovations are introduced to any agricultural environment. The first is the possible adverse effect on the social life of the community. When tobacco growers in Fiji were encouraged to cure tobacco themselves rather than sell it in the fresh green form, it was found that they were unable to handle the highly technical curing operation with any degree of continuity.

This was attributed to intermittent social commitments and customary obligations that overrode contractual responsibilities and eventually resulted in the cancellation of their contracts. The second factor is the practicality of introducing innovations or adaptations. The introduction of sophisticated machines (e.g. for transplanting) may result in a loss of local employment and overcapitalization of the contracted farmer. Furthermore, in field activities such as transplanting and weed control, mechanical methods often produce less effective results than do traditional cultivation methods. Field extension services must always ensure that the contracted crop fits in with the farmer's total cropping regime, particularly in the areas of pest control and field rotation practices.

MANIPULATION OF QUOTAS AND QUALITY SPECIFICATIONS

Inefficient management can lead to production exceeding original targets. For example, failures of field staff to measure fields following transplanting can result in gross over planting. Sponsors may have unrealistic expectations of the market for their product or the market may collapse unexpectedly owing to transport problems, civil unrest, change in government policy or the arrival of a competitor. Such occurrences can lead managers to reduce farmers' quotas. Few contracts specify penalties in such circumstances. In some situations management may be tempted to manipulate quality standards in order to reduce purchases while appearing to honor the contract. Such practices will cause sponsor-farmer confrontation, especially if farmers have no method to dispute grading irregularities. All contract farming ventures should have forums where farmers can raise concerns and grievances relating to such issues.

CORRUPTION

Problems occur when staff responsible for issuing contracts and buying crops exploits their position. Such practices result in a collapse of trust and communication between the contracted parties and soon undermine any contract. Management needs to ensure that corruption in any form does not occur. On a larger scale, the sponsors can themselves be dishonest or corrupt. Governments have sometimes fallen victim to dubious or "fly-by-night" companies who have seen the opportunity for a quick profit. Techniques could include charging excessive fees to manage a government-owned venture or persuading the government and other investors to set up a new contract farming company and then sell that company overpriced and poor quality processing equipment. In such cases farmers who make investments in production and primary processing facilities run the risk of losing everything.

DOMINATION BY MONOPOLIES

The monopoly of a single crop by a sponsor can have a negative effect. Allowing only one purchaser encourages monopolistic tendencies, particularly where farmers are locked into a fairly sizeable investment, such as with tree crops, and cannot easily change to other crops. On the other hand, large-scale investments, such as for nucleus estates, often require a monopoly in order to be viable. In order to protect farmers when there is only a single buyer for one commodity, the government should have some role in determining the prices paid. Drucker suggests that privately managed monopolies under public regulation are preferable to non-regulated private or public monopolies. The greatest abuses do tend to occur when there are public monopolies, where buying prices are set by the government, or where farmers have made long-term investments in perennial crops. In 1999 the Kenya Tea Development Authority experienced serious unrest amongst its growers, reportedly because of the Authority's inefficient extension services and alleged "manipulation" of farmers. There was also discontent in Kenya among sugar farmers because the price set by the government did not change between 1997 and 1999. Indebtedness and over reliance on advances were high, as they thought contract farming did not pay. One of the major attractions of contract farming for farmers is the availability of credit provided either directly by the company or through a third party. However, farmers can face considerable indebtedness if they are confronted with production problems, if the company provides poor technical advice, if there are significant changes in market conditions, or if the company fails to honour the contract. This is of particular concern with long-term investments, either for tree crops or for on-farm processing facilities. If

advances are uncontrolled, the indebtedness of farmers can increase to uneconomic levels. In one venture “compassionate” advances for school fees, weddings and even alimony resulted in many farmers receiving no payments at the end of the season. Dropout rates for farmers in that particular project.

ADVANTAGES FOR SPONSOR

Companies and government agencies have a number of options to obtain raw materials for their processing and marketing activities. The benefits of contract farming are best examined in the light of the other alternatives, namely spot market purchases and large-scale estates. The main potential advantages for sponsors can be seen as:

1. Political acceptability;
2. Overcoming land constraints;
3. Production reliability and shared risk;
4. Quality consistency; and
5. Promotion of farm inputs.

POLITICAL ACCEPTABILITY

It can be more politically expedient for a sponsor to involve smallholder farmers in production rather than to operate plantations. Many governments are reluctant to have large plantations and some are actively involved in closing down such estates and redistributing their land. Contract farming, particularly when the farmer is not a tenant of the sponsor, is less likely to be subject to political criticism. As a result of the restructuring of their economies, many African governments have promoted contract farming as an alternative to private, corporate and state owned plantations. In recent years many countries have seen a move away from the plantation system of production to one where smaller-scale farmers grow crops under contract for processing and/or marketing. The decision to choose contract farming does not make a company totally immune from criticism. For example, the considerable opposition to the role of multinational corporations in India in the late 1990s had a negative effect on investment in contract farming by foreign agribusiness corporations.

OVERCOMING LAND CONSTRAINTS

Most of the world’s plantations were established in the colonial era when land was relatively plentiful and the colonial powers had few scruples about either simply annexing it or paying landowners minimal compensation. That is, fortunately, no longer the situation. Most large tracts of suitable land are now either traditionally owned, costly to purchase or unavailable for commercial development. Moreover, even if it were possible for companies to purchase land at an affordable price, it would rarely be possible to purchase large enough parcels of land to offer the necessary economies of scale achieved by estate agriculture. Contract farming, therefore, offers access to crop production from land that would not otherwise be available to a company, with the additional advantage that it does not have to purchase it.

PRODUCTION RELIABILITY AND SHARED RISK

The failure to supply agreed contracts could seriously jeopardize future sales. Plantation agriculture and contract farming both offer reasonable supply reliability. Sponsors of contract farming, even with the best management, always run the risk that farmers will fail to honor agreements. On the other hand, plantation agriculture always runs the risk of labour disputes. In the case of horticultural production some companies do prefer estate rather than contracted production. In Gambia and Ghana, for example, a number of crops are grown under the estate model, as are strawberries and flowers in Kenya. Working with contracted farmers enables sponsors to share the risk of production failure due to poor weather, disease, etc. The farmer takes the risk of loss of production while the company absorbs losses associated with reduced or nonexistent throughput for the processing facility. Where production problems are widespread and no fault of the farmers, sponsors will often defer repayment of production advances to the following season. Both estate and contract farming methods of obtaining raw materials are considerably more reliable than making purchases on the open market. The open market is rarely an acceptable option for organizations that have significant assets tied up in processing facilities and need to have guaranteed quantities of raw material to justify their investment. For example, it is hardly ever an acceptable option for companies who make regular shipments of horticultural produce to supermarkets and for export. Companies must ensure that crops are harvested and sold on a carefully scheduled and consistent basis: a factor that is normally assured under a well-directed contract farming scheme.

QUALITY CONSISTENCY

Markets for fresh and processed agricultural produce require consistent quality standards. Moreover, these markets are moving increasingly to a situation where the supplier must also conform to regulatory controls

regarding production techniques, particularly the use of pesticides. For fresh produce there is an growing requirement for “traceability”, i.e. suppliers to major markets increasingly need to be confident of identifying the source of production if problems related to food safety arise. Both estate and contracted crop production require close supervision to control and maintain product quality, especially when farmers are unfamiliar with new harvesting and grading methods. Often, large numbers of crops within a single project have to be transplanted, harvested and purchased in a uniform manner so as to achieve product consistency.. Agribusiness producing for markets demanding high quality standards, such as fruits and vegetables for export, often find that small-scale farmers and their families are more likely to produce high-quality products than farmers who must supervise hired labour.⁸ Also contract farming makes quarantine controls more manageable. It is easier for quarantine authorities to inspect a limited number of exporters of a single commodity, who closely supervise farmers, than to inspect hundreds, or sometimes thousands, of individual producers selling through open markets. Much of the production of “organic” foods is being done on contract, as an integrated operation facilitates a clear crop identity from farmer to retailer. In some highly sophisticated operations, containers are now being loaded on the farm for direct delivery to the supermarket.

PROMOTION OF FARM INPUTS

An example of an unusual but, nevertheless, interesting benefit for sponsors comes from the Philippines. A feed milling company experienced difficulties in marketing its feed, which was more expensive than that produced by competing companies. To solve this problem it developed rearing schemes for pigs and poultry under contract in order to provide a market outlet for its feeds and to demonstrate their performance to other farmers living near the contracted farmers.

PROBLEMS FACED BY SPONSOR

The main disadvantages faced by contract farming developers are:

1. Land availability constraints;
2. Social and cultural constraints;
3. Farmer discontent;
4. Extra-contractual marketing; and
5. Input diversion.

LAND AVAILABILITY CONSTRAINTS

Farmers must have suitable land on which to cultivate their contracted crops. Problems can arise, when farmers have minimal or no security of tenure as there is a danger of the sponsor’s investment being wasted as a result of farmer landlord disputes. Difficulties are also common when sponsors lease land to farmers. Such arrangements normally have eviction clauses included as part of the conditions. Some contract farming ventures are dominated by customary land usage arrangements negotiated by landless farmers with traditional landowners. While such a situation allows the poorest cultivator to take part in contract farming ventures, discrete management measures need to be applied to ensure that landless farmers are not exploited by their landlords. Before entering into contracts, the sponsor must ensure that access to land is secured, at least for the term of the agreement.

SOCIAL AND CULTURAL CONSTRAINTS

Problems can arise when management chooses farmers who are unable to comply with strict timetables and regulations because of social obligations. Promoting agriculture through contracts is also a cultural issue. In communities where custom and tradition play an important role, difficulties may arise when farming innovations are introduced. Before introducing new cropping schedules, sponsors must consider the social attitudes and the traditional farming practices of the community and assess how a new crop could be introduced. Customary beliefs and religious issues are also important factors. For example, Easter for some Christians is an inappropriate time for sowing vegetable crops. Harvesting activities should not be programmed to take place during festivals, and failure to accommodate such traditions will result in negative farmer reaction. It must also be recognized that farmers require time to adjust to new practices.

FARMER DISCONTENT

A number of situations can lead to farmer dissatisfaction. Discriminatory buying, late payments, inefficient extension services, poor agronomic advice, unreliable transportation for crops, a mid-season change in pricing or management’s rudeness to farmers will all normally generate dissent. If not readily addressed, such circumstances will cause hostility towards the sponsors that may result in farmers withdrawing from projects.

EXTRA-CONTRACTUAL MARKETING

The sale of produce by farmers to a third party, outside the conditions of a contract, can be a major problem. Extra-contractual sales are always possible and are not easily controlled when an alternative market exists. For example, a farmer cooperative in Croatia bought cucumbers, red peppers and aborigines on contract. The cooperative's advances to the farmers included all necessary production inputs. Unfortunately members often sold their vegetables to traders at higher prices than the cooperative had contracted. The outside buyers offered cash to farmers as opposed to the prolonged and difficult collection of payments negotiated through the cooperative. Sponsors themselves can sometimes be a cause of extra-contractual practices. There are several companies working with the same crop (e.g. cotton in some southern African countries), they could collaborate by establishing a register of contracted farmers. Managers must be aware of produce being sold outside the project and also be aware of produce from outside being channeled into the buying system. This occurs when non-contracted farmers take advantage of higher prices paid by an established sponsor. Non-contracted crops are filtered into the buying system by outside farmers through friends and family who have crop contracts. Such practices make it difficult for the sponsor to regulate production targets, chemical residues and other quality aspects.

INPUT DIVERSION

A frequent problem is that farmers are tempted to use inputs supplied under contract for purposes other than those for which they were intended. They may choose to use the inputs on their other cash and subsistence crops or even to sell them. Clearly this is not acceptable to the sponsor, as the contracted crop's yields will be reduced and the quality affected. Steps to overcome such problems include improved monitoring by extension staff, farmer training and the issuing of realistic quantities of inputs. However, the knowledge that a contract has the advantages of technical inputs, cash advances and a guaranteed market usually makes the majority of farmers conform to the agreement. Unless a project is very poorly managed, input diversion is usually an annoyance rather a serious problem.

CONCLUSION

Contract Farming is not a panacea to solve all related problems of agricultural production and marketing systems. But contract farming could be evaluated as a way of providing earlier access to credit, input, information and technology and product markets for the small scale farming structure. Contract farming might also be seen as a way or as a part of rural development and promoted to improve agricultural performance especially in Third World Countries. Besides farming to both sides, there are some problems. For successful implementation of contract farming, having co-ordination and collaboration consciousness and acting in an organized manner are advisable for both sides. On the Other hand, Government attitudes and incentives are also important aspects.

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THE SMALL SCALE BIOGAS PLANT FOR RURAL ENERGY

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ABSTRACT

Integrated/combined farming is one good way to optimize the use of resources and to maximize income (Faridah, 2001). Ruminant livestock is a type of other livestock types that plays an important role in sustainable agricultural systems because this type of livestock produces fertilizers and can utilize agricultural waste as their fodder. Manure can be an alternative energy source for livestock farmers. An anaerobic digester will partially convert manure to energy in the form of biogas which contains methane. The main product of cassava crops is cassava. In this research was used a toxic cassava which usually plant around pesantren. That could use as food material. The cassava leaf could used as source of silage production, which the silage quality is good until 60 days of storage. This silage was prepared for drying season which in that time is difficult to find out the fresh feed. The cow dung are able to used as green manure fertilizer for cassava plant. The cow dung was fermented by anaerobic bioreactor to achieve biogas and slurry. The biogas with methane as main component is bioenergy that able to used as mantel lamp (Petromax) for lightening and gas stove for cooking in Pesantren. The Slurry is able to used as fertilizer and the eel cultivation.

Key Words : Cow dung, Biogas, anaerobic bioreactor, methane, Pesantren, Cassava leaf, Slurry.

1. INTRODUCTION

The Indonesian village as the agraris environment have potential for supporting program food feed and energy secure. The relationship between plant and Livestock as tradisonal farming is the optimizing of utilization of land resources, human resources, and capital resources for producing food, feed and fuel.

At the village, Farmer and the family usually have traditional pesantren use as the educational facilities. Pesantren or Pondok Pesantren are Islamic boarding schools in Indonesia. *Pesantren* provide to Indonesian citizens at low cost; although today some modern *pesantren* charge higher fees than previously, they are still significantly cheaper than non-*pesantren* educational institutions. The traditional pattern was for students to work in the headmaster's rice fields in exchange for food, shelter, and education.

Farming done by most farmers in Indonesia is an integrated farming system or integration with the aim to increase income through several commodities made either from crops, plantations and livestock. Farming done using both an integrated system and diversification leads to integrated business making one farming to another farming mutually beneficial. At first, farmers diversify farming to meet a variety of needs of family consumption (Rusastra *et al.*, 2004).

Integrated/combined farming is one good way to optimize the use of resources and to maximize income (Faridah, 2001). Ruminant livestock is a type of other livestock types that plays an important role in sustainable agricultural systems because this type of livestock produces fertilizers and can utilize agricultural waste as their fodder.

Integrated crop/livestock agriculture is recognized for its capacity to 1) fertilize soil with an on-farm input, livestock manure; 2) encourage and allow growers to maintain semi-permanent pasture fields, which can improve soil quality; 3) increase crop yield; 4) enhance on-farm biodiversity and related ecosystem services such as pollination, and weed/pest management; 5) enhance economic gains to growers; and 6) confer social benefits to growers and communities.

Manure can be an alternative energy source for livestock farmers. An anaerobic digester will partially convert manure to energy in the form of biogas which contains methane. The aim to study biogas production on dairy farms are:

- Manure is easily collected on dairy farms where cows are routinely confined
- Biogas is most efficient when used directly for heating, and
- Dairy farms have a year-round demand for hot water.

In the digester, bacteria decompose organic materials in the absence of air with the release of methane and carbon dioxide. This process is shown in Figure 1. Acid-forming bacteria break down or liquefy the volatile solids, changing them in to simple fatty acids. The methane-forming bacteria then convert these volatile acids to

methane and carbon dioxide. These bacteria are sensitive to changes in their environment. Rapid digestion and efficient biogas production occur within limited ranges of temperature and are influenced by the composition of the raw material.

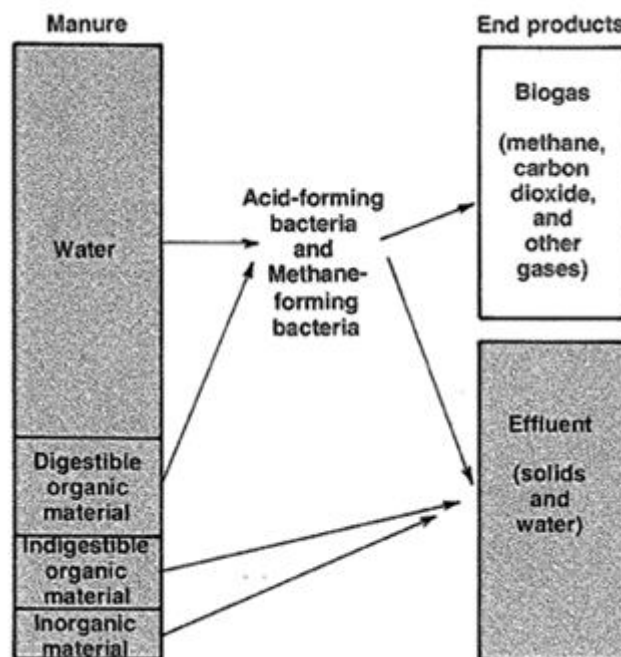


Figure 1. The breakdown of manure in an anaerobic digester

Silage is fermented, high-moisture stored fodder which can be fed to cattle, sheep and other such ruminants (cud-chewing animals)^[1] or used as a biofuel feedstock for anaerobic digesters. It is fermented and stored in a process called *ensilage*, *ensiling* or *silaging*, and is usually made from grass crops, including maize, sorghum or other cereals, using the entire green plant (not just the grain). Silage can be made from many field crops, like cassava leaf.

As other forages, cassava leaf can not stand for long time without any treatment, consequently the excess of cassava leaf are sometimes left in the field underutilized. Preservation of the excess of cassava leaf available, such as through silage making, will maximize and improve the efficiency of the excess cassava leaf utilization as feed. As silage, the excess of cassava leaf available can be stored and utilized for a longer period of time as a protein feed supplement. Hang (1998), Kayouli and Lee (2000), Ly and Rodríguez (2001) reported that silage making is an appropriate method to conserve cassava leaf as feed.

The application of small scale food-energy technology based on waste-integrated system (3-5 cows) is a fortune to develop innovation technology for support food, feed and energy self sufficient

2. METHODE

SILAGE FROM CASSAVA LEAF

Cassava Leaf Silage was prepared according to the procedure below :

1. Cassava leaf including young stems, petioles and leaf were harvested from farmer's cassava field when the tubers were being harvested.
2. The leaf were spread out on a roofed and well ventilated floor for a night to let them be wilt, then chopped using a hand operated chopping machine.
3. The chopped cassava leaf was weighed and then thoroughly mixed with wet cassava waste at a weight ratio of 4 parts of the chopped cassava leaf : 1 part of wet cassava waste.
4. The mixture was then put in polypropylene plastic bag of 60 cm width by 100 cm length and compacted to expel air from the bag.
5. The bags were then tightened using rubber bands and stored for three months.

BIOGAS PRODUCTION

Cow dung used as source of biogas production. The type anaerobic bioreactor was used in this research is 8 m³ of fixed dome bioreactor as Fig 2.

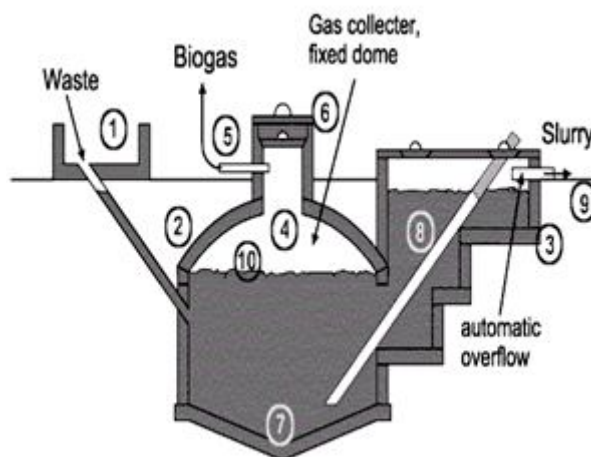


Figure 2. The Biogas Reactor

Note : 1). Inlet of effluent 2) Dome cover 3) Slurry collector zone 4) Gas collector 5) Biogas outlet 6) Manhole 7) Reactor base cone 8) Agitator stick 9) Slurry outlet 10) Influent

The condition use in the bioreactor are :

- Feed is the mixture of manure and water by 1 : 1 (w/w)
- Feed 150 kg/day
- The retention time is 14-30 days
- Empty volume reactor 15-20 %
- The variable were analyzed are characterisic biogas, influen and effluent COD

3. RESULT AND DISCUSSION

Silage from Cassava Leaf

The nutrition content in the silage from cassava leaf were showed at Table 1

Table 1. Nutrition content

Component	%				
	0-days	15-days	30-days	60-days	90-days
Water	55.04	51.38	51.07	58.13	58.02
Ash	2.79	2.60	2.33	2.60	2.62
Carbohydrate	26.08	28.25	28.30	28.30	28.27
Fiber	8.76	8.05	8.65	8.70	8.65
Fat	1.80	1.95	1.40	1.50	1.45
Protein	15.66	15.70	11.90	11.21	11.80

From Tabel 1, shown that the content of nutrition of cassava leaf silage, have not significant quality decreased until 90-days fermentation.

- Cassava leaf silage thus has the potential to serve as a protein bank to correct nutrient deficiency, especially during the dry season where most of ruminant livestock are fed low protein diets based predominantly on crop-residues and native grass. The Cassava leaf could used as source of silage production, which the silage quality is good until 60 days of storage. This silage was prepared for drying season which in that time is difficult to find out the fresh feed.

BIOGAS PRODUCTION

- a. The composition biogas

The composition of produced biogas showed at Tabel 2

Component	%
CH ₄	53,8
N ₂	11,5
CO ₂	34,7

b. COD

The concentration of feed (influent) and slurry (effluent) of anaerobic reactor showed at Table 3

Table 3 The COD of Influent and Effluent

Unit	COD (mg/l)
Influent	90.150
Effluent	30.850

c. C/N

The C/N retio of the feed (influent) and slurry (effluent) of anaerobic reactor showed at Table 4

Table 4 The C/N retio of the feed (influent) and slurry (effluent)

Unit	C-org.	Ntotal	C/N
Influent	69.2	1,98	35,0
Effluent	52,4	2.18	24.0

d. Utilization of Biogas

This biogas are able to use for fuel (cooking and lightening)



Figure 3. Utilization of biogas for mantle lamp and gas stove

The Technology Model of Plant-Livestock Integrated for Traditional *Pesantren* (Islamic Boarding School)

- The main product of Cassava crops is cassava. In this research was used a toxic cassava which usually plant around *pesantren*.. The cassava was treated to be cassava flour (tapioca). That could use as food material
- The Main product of cow are meat and milk as the food for human.
- The Cow dung are able to used as green manure fertilizer for cassava plant.
- The Cow dung was fermented by anaerobic bioreactor to achieve biogas and slurry.
- The Biogas with methane as main component is bioenergy that able to used for cooking and lightening (Petromak) in *Pesantren*.
- The Slurry is able to used as cassava fertilizer and the eel pond.

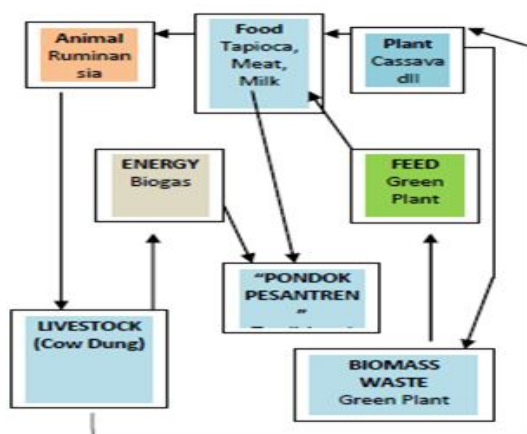


Figure 4. The Technology Model of Plant-Livestock Integrated for Traditional *Pesantren* (Islamic Boarding School)

4. CONCLUSSION

1. Cassava leaf silage has the potential to serve as a protein bank to correct nutrient deficiency, especially during the dry season where most of ruminant livestock are fed low protein diets based predominantly on crop-residues and native grass.
2. The Cassava leaf could used as source of silage production, which the silage quality is good until 60 days of storage. This silage was prepared for drying season which in that time is difficult to find out the fresh feed.
3. The Cow dung are able to used as green manure fertilizer for cassava plant.
4. The Cow dung was able to fermented by anaerobic bioreactor to achieve biogas and slurry. The Biogas with methane as main component is bioenergy that able to used for cooking and lightening (Petromak) in Pesantren.
5. The Slurry is able to used as fertilizer and for the eel cultivation.

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IOT BASED REVELATION OF NEUROPATHY

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ABSTRACT

This paper is to build and design a foot pressure, movement analysis system with addition of heart rate monitoring system within the smart footwear. To identify the neuropathy, patient simply has to wear the sensing shoes. If aged people who cannot walk, they can also identify by standing on the kit. If the patient's condition changes or any abnormal condition is found, then our system will send an alert message to the patient as well as the doctor through smart phone. Once the system detects abnormalities in the user's foot pressure distribution or foot motion, it triggers an alert to the handheld devices which is registered. IoT comes as a boon in health care field. The IoT revolution is redesigning modern health care with promising technological, social prospects, and economic. In this report, the opportunities and challenges for IoT in realizing this vision of the future of health care are highlighted. The results show that such a device can be built at a low cost and can accurately measure the foot pressure distribution to detect anomalies.

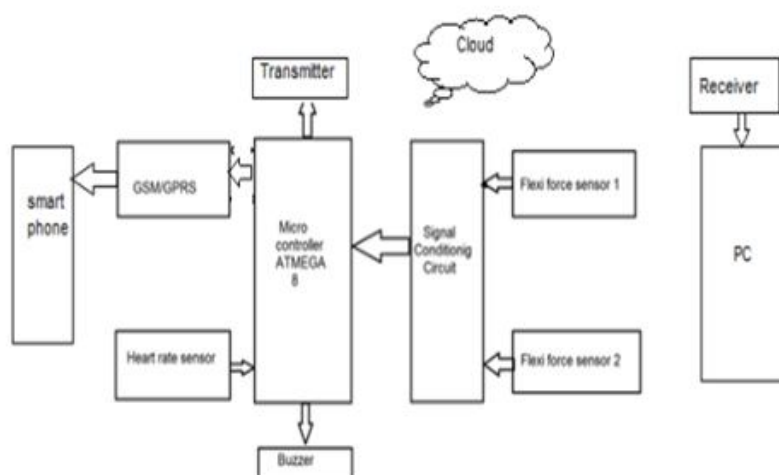
Keywords: Flexi force sensor, Signal conditioning circuit, Microcontroller, Smartphone, TCRT1000Sensor.

I. INTRODUCTION

As we know that our feet and hands are high pressure applied area. In human body peripheral neuropathy causes nerve damage in the arm and legs. If it is not treated correctly it is harmful to patient. Thus, it is necessary that early detection and treatment of foot neuropathy is carried out to prevent serious issue. Our object in this project is to design the pressure measurement system and to identify the neuropathic patients. All this is done using our system which a patient can use at home to measure its own foot pressure and heart rate. If the system detects neuropathy, it sends alert message to doctor as well as patient. All this information is available on cloud at any time if the neuropathy is detected in a patient then doctor can treat the patient easily which can help to control neuropathy patient. Also it helps the doctor for research in neuropathic diseases so that time by time neuropathy treatment will be improved. Our system detects the problem with distribution pressure under the foot. In our system additional part is IoT. The health care services is based on IoT. IoT concept is to connect the set of any network anywhere. The Iot include the advanced connectivity of the devices, system that connects machine to machine. Therefore, IoT concept is used to connect any medical device, imaging device, smart device and sensor. It also provides the security and new services and as well as platform. This is real time monitoring medical servers. Health database plays the important role in creating the health record and delivering on demand services to required section.

II. METHODOLOGY

Our system consists of five units- Microcontroller, heart rate sensing, foot unit, cloud part and hand held unit. In the first unit that is foot unit is used to take foot pressure of patient. Also we used heart rate sensor for measuring pulse rate. Using signal conditioning circuit to convert force into voltage signal. This signal is applied to microcontroller unit and also the signal from the heart rate sensor is given to the microcontroller. Both the signals from unit are data sent to hand held unit. The GSM is used to transfer data to mobile unit. The handheld unit communicates wirelessly with the foot unit and heart rate sensor, also all real-time data is collect, stored in the memory card in our mobile unit for analysis by a doctor afterward. The flexi force sensor is used to monitor the user's foot progress and actively looks for situations leading to foot injuries. This sensor is placed on the user's shoe once the system detects an abnormality in the user's foot pressure distribution, the system is an alert to the handheld device for alert given through the buzzer unit. All the data will be stored in a SD memory card for future reference and also for an analysis by a doctor. And also all the data present on cloud which are available at any time. Using this application we get information or patient record any time.

BLOCK DIAGRAM**ATmega328P**

-ATmega328P has High Performance, Low Power AVR 8-Bit Microcontroller .It worked on Advanced RISC Architecture.It has 32 x 8 General Purpose Working Registers and Upto 20 MIPS Throughput at 20 MHz. 4/8/16/32K Bytes of In-System Self-Programmable Flash program memory and 256/512/1K Bytes EEPROM (ATmega48PA/88PA/168PA/328P).In-System Programming by On-chip Boot Program True Read-While-Write Operation.Two 8-bit Timer/Counters with Separate Prescaler and Compare Mode.One 16-bit Timer/Counter with Separate Prescaler, Compare Mode, and Capture Mode and Six PWM Channels Programmable Serial USART and Master/Slave SPI Serial is used for interfacing.External and Internal Interrupt Sources in microcontroller.It has Six Sleep Modes: Idle, ADC Noise Reduction, Power-save, Power-down, Standby, and Extended . The ATmega328 has 32 KB and 1 KB of EEPROM, 2 KB of SRAM .

Flexi Force Sensor

The Flexi Force sensor is an ultra-thin and flexible printed circuit, which can be easily integrated into most applications. With its paper-thin construction, flexibility and force measurement ability,the Flexi Force sensor can measure force between almost any two surfaces and is durable enough to stand up to most environments. Flexi Force has better force sensing properties, linearity, hysteresis,drift, and temperature sensitivity than any other thin-film force sensors. The "active sensing area" is a 0.375 diameter circle at the end of the sensor. The sensors are constructed of two layers of substrate. This substrate is composed of polyester film . On each layer, a conductive material (silver) is applied, substrate together to form the sensor. The silver circle on top of the pressure-sensitive ink defines the active sensing area. Silver extends from the sensing area to the connectors at the other end of the sensor, forming theconductive leads. The diameter o and sensing area of force sensitive resistor with round ,0.5".FSr resistance is depending upon the how much pressure is being applied to the sensing area. TO measure the voltage at junction to find the force applied . Flexi force sensors are simple to set up and accurate ,and great for sensing pressure.

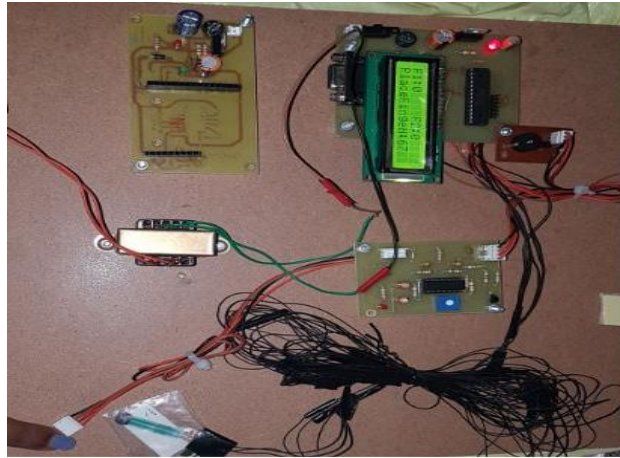


1.Flexi force sensor

Heart Rate Sensor

The heart rate sensor is used Principle of PhotoPlethysmoGraphy (PPG) . The sensor consists of a super bright red LED and light detector. The LED needs to be super bright as the maximum light must pass spread in finger and detected by detector. Now, when the heart pumps a pulse of blood through the blood vessels, the finger becomes slightly more opaque and so less light reached the detector. With each heart pulse the detector signal

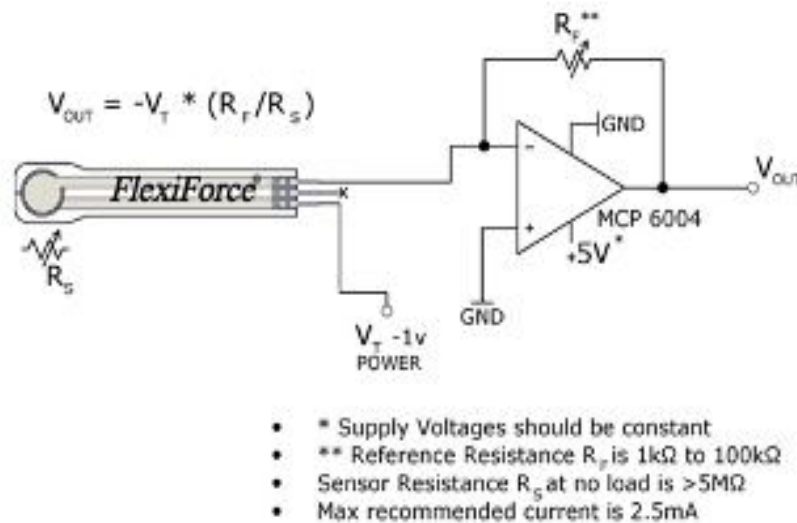
varies. This variation is converted to electrical pulse. This signal is amplified through an amplifier which outputs analog voltage between 0 to +5V logic level signal. It works on the principle of light modulation by blood flow through finger at each pulse.



1. Heart rate sensor module

Signal Conditioning Circuit

This circuit converts the resistive response to the voltage. The range of sensor is depending upon the feedback resistor R_f , the threshold voltage V_T and the operating voltage of op amp. We have used the op amp in inverting mode for better stability hence it becomes necessary to use negative threshold voltage for positive output voltage V_{out} otherwise need to go for multistage amplifier. Following are the specifications of the sensor Measure both static and dynamic forces Simple



2. Signal conditioning analog dig.

GSM Module

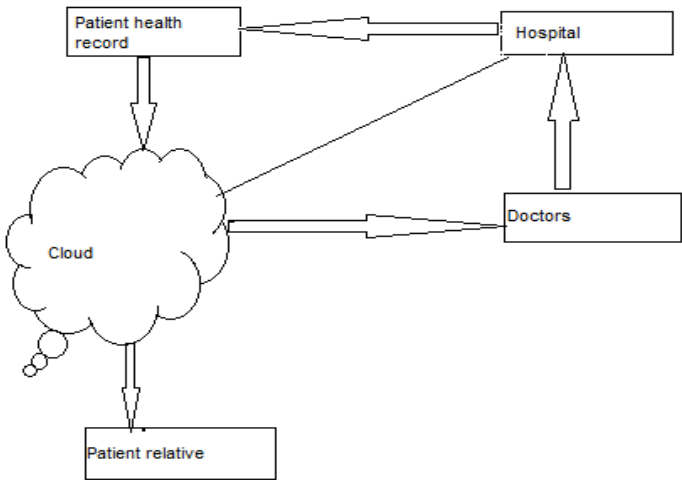
Output Power Class 4(2W) at GSM 850/900Mhz. Control via AT commands (ITU, GSM, GPRS and manufacture supplementary). Supply voltage range: 3.22v-4.2v nominal: 3.8v Power consumption: Idle Mode; 1.8mA, Speech Mode: 200mA (avg) Dimensions (mm): 3*20*20 and weight (g): 3.2.

III. IOT BASED HEALTHCARE SYSTEM ON CLOUD

Now days the internet of things is used to revolution in healthcare in the privacy, reliability, securing the tracking and the monitoring is biggest challenges in healthcare system. The IOT has capabilities to connect object to object, device to machine, mobile to human.

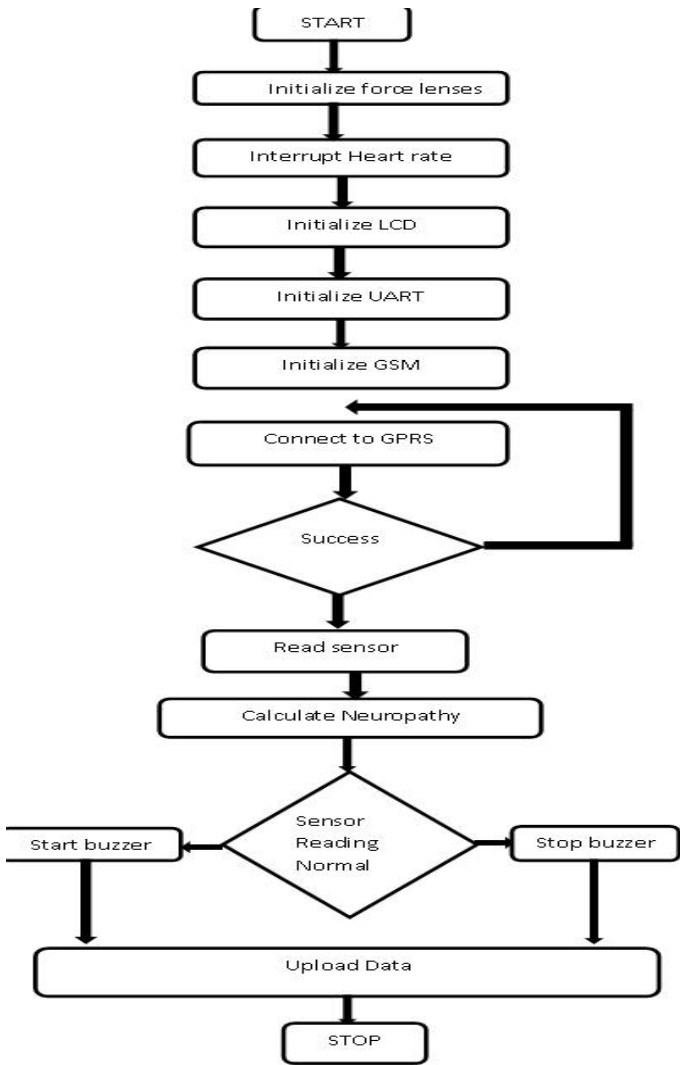
It is used in monitoring and medical management system. It can track pulse, blood pressure and send the report to patient's phone as well as to the doctor. With the help of IOT improvement in patient safety and on paper medical records and also sharing of patient data among clinics. Using the IOT concept in hospital system are totally changed. It is time consuming time keeping system, speech recognition system and email. This health

care cloud base system to automated process and collecting patient data and to deliver data to medical center.And its real time data collecting process.



3. Cloud concept flow

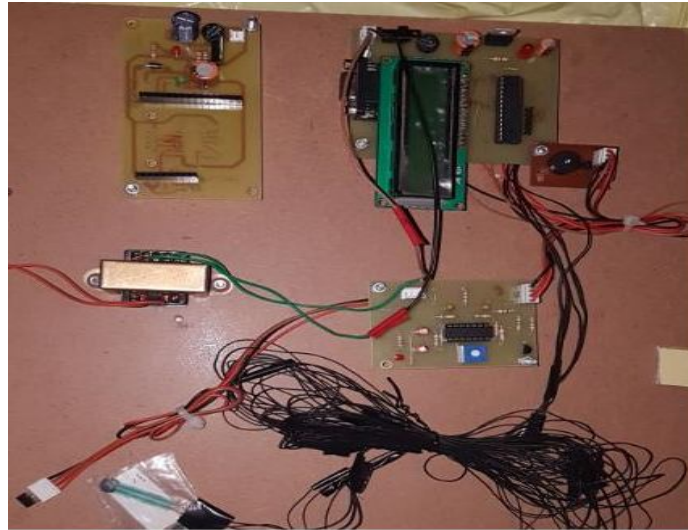
IV. PROJECT FLOW



V. CONCLUSION AND FUTURE SCOPE

21st century is the era of internet, this motivated us to design and implement a health monitoring framework using IoT concept. Internet of things is evaluated to acquire the world in numerous fields but Telehealth care

reaches to the top. Hence this work presenting a newer concept which will help to achieve betterment in the medical field for taking proper care of the patient. Vital checks can be done and compared to the previous data which is uploaded in the cloud.



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