Volume 6, Issue 1 (XIII)
January - March 2019

ISSN 2394 - 7780

ज्ञान-विज्ञान विमुक्तये
UGC
University Grants Commission
Journal No.: 63571

International Journal of
Advance and Innovative Research

Indian Academicians and Researchers Association
www.iaraedu.com

International Journal of Advance and Innovative Research

Volume 6, Issue 1 (XIII): January - March 2019

Journal - 63571

UGC Journal Details

Name of the Journal :	International Journal of Advance & Innovative Research
ISSN Number :	
e-ISSN Number :	23947780
Source:	UNIV
Subject:	Multidisciplinary
Publisher:	Indian Academicians and Researchers Association
Country of Publication:	India
Broad Subject Category:	Multidisciplinary

International Journal of Advance and Innovative Research

Volume 6, Issue 1 (XIII) : January – March 2019

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Research Papers

International Journal of Advance and Innovative Research
Volume 6, Issue 1 (XIII): January - March, 2019
ISSN 2394 - 7780

SPORTS AND COUSELLING AS VERITABLE TOOLS FOR WOMEN EMPOWERMENT

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ABSTRACT
This paper examined the role of sports and counseling as veritable tools for women empowerment. It considered sports and counseling as means to harness human potentials for national growth. It also looked at empowerment as a measure designed to improve the level of autonomy and zeal in people to help them to represent their aspiration responsibly. It highlighted the components of empowerment and how they can be achieved. It outlined how women can be empowered through sports counseling using HIPPEESI as an acrounm for Health, Intellectual, Physical, Political, Economical, Emotional, and Social-Intelligence empowerment. The paper concluded by stating that sports and counseling are veritable platform for women empowerment, if the benefits are properly harnessed. Sports and counselling keeps participants active which enables them to function optimally even as they age. Therefore, empowering women through sports and counselling would be a laudable venture. The paper made some recommendations which include; women should be encouraged to develop interest in sports and sports related careers, women who are professionals in sport and sport related careers should be involved at sports policy making levels to ensure that appropriate decision are taken and sport federations should widen the scope of their programmes by involving sports counsellors to accommodate more programmes targeted at women empowerment.

Keywords: Sports, Counselling and Women Empowerment

INTRODUCTION
Sport as a social activity has become a criterion for determining global prowess and promotion of social relationship amaia nations. Sports has grown to be a vital instrument for nation building (Nwankwo, 2017). Several authorities have conceptualized sport differently. Choocho (2011), posited that sport is a competitive physical activities engaged in, to improve physical abilities, skills and provide entertainment. Earlier, Walt (2004), described sport as physical activities targeted at improving total well being and form relationships while sport can be described as physical activities organized to enhance abilities and skills while providing amusement. In this paper, sports is conceptualized as organized social activity which has become a valuable instrument to harness human potentials for national building and growth.

Sports is one activity that bring people from completely different background to participate directly or indirectly (Nwankwo, 2017). Deemua (2017) posited that sports helps individuals to develop valuable skills which enables them to achieve programmatic goals. Sports provide individuals with platforms to improve fitness, skills, develop self-efficacy and self confidence. Unfortunately, women have not really utilized the opportunities in sports to their benefit hence the need for women to be counseled and empowered through sports in order to tap fully their potentials.

Counseling is a cluster of formalized services through which help is given to individuals in situations where adjustment, planning, interpretation of information, and choice are needed (Denga, 2001). It involves rendering assistance to individuals or group of people to enable them direct themselves and relate their needs effectively to the requirements, demand and opportunities of social, educational, occupational and psychological situations (Eduwen, 2014). Okeke (2003) viewed counselling as a learning-oriented process, which occurs usually in an interactive relationship, with the aim of helping a person learn more about the self, and to use such understanding to enable the person to become an effective member of society thereby empowering the person to be his/her best in a chosen career. It is also a process by which a helper expresses care and concern towards a person with a problem, and facilitates that person's personal growth and brings about change through self-knowledge (Anagbogu, 2002).

From the above definitions, it can be deduced that counseling is a helping relationship that fosters change in a client to enable him or her to live a well adjusted and purposeful life. Effective counselling helps to improve the self-image of women and facilitate achievement in their life tasks, especially in the area of sports (Ekechukwu, 2014). Hence, there is a need to empower women through sports and counseling for them to be psychologically, physically, socially adjusted and to function effectively in the society.

Empowerment can be described as assistance to enable individuals to deal with their sense of weakness and inability to impact, identify and utilize their resources. Neenu (2016), posited that empowerment is a

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management technique to release the full potential of every employee in an organization. It is a management practice of sharing information, rewards and power with employees so that they can be involved in decision making and improve performance. Earlier, Page and Czuba (1999), posited that empowerment is a multidimensional social procedure that nurtures authority in individuals to have control over themselves and their society by acting on issues they consider important. Wikipedia (2018), referred to it as measure designed to promote autonomy and confidence in people to enable them to represent their interest in a self determined way.

Women's empowerment according to UNFA (1994), is the improvement of the status of women to enhance their ability to contribute at all levels in all spheres of life. Agene (2017), posited that women's empowerment is equipping women with the understanding of their legal rights, maintain healthy home, improve social and economic impact and develop skills to advocate for change in their societies. Rahman (2013), postulated that women's empowerment is a process of awareness and capacity building of women which results to more participation, greater decision-making power, control and transformative action. Women's empowerment is basically the authority or power given to women to be fulfilled (Ta, 2015). It is a process through which women develop authority over their lives and are able to take decision on issues that concern them (Un Commission on status of women, 2002); Components of women's empowerment according to Un Commission on status of women (2002), are:

1. Women's sense of self-worth
2. Their right to have and to determine choices
3. Their right to have access to opportunities and resources
4. Their right to have power to control their own life
5. Their ability to influence the direction of social change to create a more just social and economic order nationally and internationally.

To achieve the above, women's right to education, training, awareness, expansion of choices, increased access, control over resources and actions to transform the structures that sustain gender discrimination and inequality sports and counselling becomes a veritable and important tool to use.

EMPOWERING WOMEN THROUGH SPORTS

Women's empowerment has been addressed by many authors using various avenues. There is need to further examine the need for the use of sport as a platform for this purpose. Sport is an inevitable instrument for realizing various goals including gender equality which would facilitate the achievement of the sustainable Development Goals. Through sport women would increase their confidence, develop high sense of belonging and mastery of motor skills. Sport is a necessary tool to loose marginality tag that has been on women. Puri (2016), posited that when women exhibit high skill in sports, they do not only demonstrate physical strength but take a step towards gender equality.

EMPOWERING WOMEN THROUGH COUNSELLING

Counseling is an empowerment programme that helps clients (women) gain self-knowledge, self-awareness, self-direction, self-determination, self-development and self-actualization that will ursher her to fullness of living, knowledge acquisition and problem-solving skills. This agrees with the old adage that says when you train a woman you train a nation (Ekechukwu & Bruno, 2014). To this end, this paper presented women empowerment through sports and counseling using the following acronyms HIPPEESI which stand for Health, Intellectual, Physical, Political, Economical, Emotional and Social-Intelligence empowerment.

Health-Women's health status is an important determination of the extent to which they can be empowered. Sport counselling is a known instrument for the achievement of good health. Sport has positive influence on every dimension of health, since it affords all round fitness which is a requirement for effective involvement in every human endeavour. Sport counseling offers useful tips on how to keep the body healthy, active and functional. It impacts positively on psychological health, and also helps to prevent cognitive decline (Skrupskas, 2014). The obvious achievement of good health through sport counselling cannot be overemphasized. Sports counseling affords women the opportunity of enjoying health at a higher dimension. It helps in the development of healthy lifestyle which is a necessity for enhanced performance in all human activity. Optimal health among women is ensured through sports and counseling (Division of Advancement of Women of United Nations Secretariat, 2008).

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Intellectual – One of the unabigiuous benefits of sport is the development of healthy mind which plays important role in every human activity. Involvement in sport enables individuals to develop their brain both in structure and function. Sport has the potential to inculcate in women the ability to receive and process information effectively and apply same through exhibition of motor skills. Proficiency in the performance of motor skills involve a complex process of interaction of the body and mind which in turn builds self-esteem. High self esteem builds confidence and self-worth which encourages the individual to be ambitious (Chhun, 2012). Sport counseling fosters cognitive development and mental wellbeing of athletes (Olympic Org 2018). It helps women athletes to overcome mental barriers, increase confidence and improve their motivation. It also helps sport women understand the underlying psychological mechanisms of optimal physical performance.

Physical-Participation in sport precipitates improved physique and gait which enhances sense of worth. High sense of worth impacts positively on performance in every sphere of life. Sport and counseling have the competence to build in women positive self image as they get rid of excessive body weight and awkward movement through sporting activities and strictly adhering the advice from counseling. Sport and counseling changes how women view their physique. Gumtack (2016), stated that sport provide opportunities for building reasonable physique. Regular participation in sport prevents addition of muscle bulk and puts the body in shape (Clark, 2012) while Kamui-oncea (2015), commented that the current women star in marshal art has the good looks to create the perfect package for a mega star.

Political-Sport as a human activity does not only make individuals stronger and tougher but builds confidence and resilience which are requirements for politics. Sports exposes people to crowd and politics as a game of numbers therefore women can be more politically viable through sports. Abisha and Vincent (2015), observed that women are more in population than men yet women in sport are less than men, this obviously influences leadership positions in sport which are currently twited to men. Involvement of more women in sports would expose them to leadership positions in sport and afford them the opportunity to challenge unfavourable gender issues in the sport industry.

Women who excel in sport leadership positions would definitely perform better than their counterparts in other sphere of leadership positions because of the added quality of physical fitness which only sport can afford and the leadership skills they acquire as they function in teams. Dalerei (2015), posited that engagement in sports and living in its values, will make women to develop leadership skills and over-come biases. According to him, leadership skills learned in sport can translate in other career paths.

Sports is a reliable avenue for inculcating in women the required level of boldness that would enable them to occupy and function efficiently in an appointed position. Knight (2016), noted that coaches encourage the players to execute the game plans with boldness, courage and confidence to ensure victory. According to Nysochina, Vorobiova, Vasylenko and Vysochin (2018), athletes overcome difficulties through training and develop will power which enables them to compete with boldness.

Sport strives on contest for supremacy as women compete and win in sport, they realise their strength and appreciate their ability which builds their sense of supremacy and trigger their desire to vie for positions, especially in the sport sector. Involvement in sport teaches leadership, teamwork and communication skills that can enhance people's participation in every area of life (Skaggs, 2015).

Economic-Sport has emerged as a lucrative business that has far reaching economic influence on the participants. The performance level of women can improve their financial buoyancy thereby making them more economically viable. Dealing on sport equipment could be a line of business for women which would afford them the opportunity of constructive competition among men, they could advertise sport products and earn a living through that. Women may not only take sport journalism as a professional but could reposition women in sport industry through their publications. Involvement in sport can improve individuals skills that may enhance their level of employability (Sport & Economic Development, 2018).

The health benefits of sport also have economic connotation since good health is a prerequisite for improved economy. Through active sport participation women would reduce medical expenses and improve productivity. Sport England (2010), estimated the value of health benefits from those that participate in sport at eleven point two billion pounds. They further stated that sport and sport related activities support over 2.3% of all jobs in England. Sport sector has in exhaustible career opportunities that can empower women economically with ease.

Social-Obviously, sport and counseling increases the social horizon of individuals which positions it as a unique platform for women empowerment. Through sport and counseling, women would come in contact with opportunities that would enable them to rediscover themselves and their potentials. They would come across

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situations, conditions and circumstances that would awaken them to the realities of life which would bring out the best in them. Sport and counseling programmes have the endowement to promote positive message of non-discrimination and violence among women (Olympic org, 2018).

Women are mostly at risk during violent situations, the level of aggression they develop through sport would give them courage to face such situations realizing that they are human beings that should stand for themselves. Through sport, women can have a stronger voice in their society and stamp out abuse, discrimination and violence (Dalerci, 2015). Sport and counseling are avenues to prove to everyone that gender based violence and discrimination is unnecessary. Sport and counseling have the potential to equip women with skills that would be applied for self defense in times of aggression. Through sport and counseling, women would realize their ability to face the realities of life and resist intimidation. They would also experience their power and capacity to be in charge and bring up younger ones to protect their world (Bjjee, 2017).

Sport and counseling provides a sense of belonging (Olumilua, 2017), provides opportunities for marginalized groups, it has the ability to build a strong sense of morality and appreciation of diversity (Global sport development, 2016). Interaction which naturally exists among teammates builds bridges where boundaries exist to enhance cooperation and respect for one another. Global Sport Development (2016), also asserted that sport as a bridge builder has been put to test and what sport participants enjoy most is the bounds formed with their teammates.

Women have the natural disposition to make peace, their involvement in sport would sharpen this natural endowment, while counseling will build in them different skills to be proficient in sport be it physically, mentally, or socially. Olympic Org (2015), stressed that sport and counseling can contribute to peace and the harmonious development of peaceful society. Sport and counseling have the capacity to connect, unit, develop individuals and societies hence women involvement in sport would enhance their social value to the benefit of the society. Sport and Citizenship (2011), opined that sport create links between human and communities which unite people and contribute to social cohesion.

CONCLUSION

Sport and counseling can effectively be used as a platform for women's empowerment if its benefits are properly harnessed. There are various other benefits of sport and counseling that are not highlighted in this paper which justify the utilization of sport and counseling as avenues for women's empowerment. Sport and counseling keeps athletes active which enable them to function optimally in every area of life even as they age. The dynamic nature of sport and counseling unfolds fresh and viable opportunities which affirm its position as veritable tools for empowerment. Therefore, women's empowerment through sport and counseling would be a laudable venture which would produce assets to humanity.

RECOMMENDATIONS

This paper therefore recommends that;

1. Women should be encouraged to develop interest in sport and sport-related careers through awareness programmes, sponsorships and regular organization of sport programmes.
2. Sport federations should widen the scope of their programmes to accommodate more sports programmes targeted at women empowerment. Mass participation at all levels should be emphasized.
3. Counseling services should be readily available to female athletes to enable them overcome psychological barriers, increase confidence and improve their motivation in sports.
4. Counselors, psychologists and others in the helping profession should assist athletes build and maintain high self-esteem that would enable them handle problems that may come their way.
5. There should be grant for entrepreneurs who organize sport programmes for women and such programmes should be given adequate publicity and recognition.
6. Sport policies should include exchange programmes that would afford women the opportunity of being exposed to the global best practices.
7. Women who are professionals in sport and sport related careers should be involved at policy making levels to ensure that appropriate decisions concerning women are taken.
8. There should be no discrimination between the incentive for women in sport and their men counterparts.
9. Grants should be made available for women who are interested in venturing into the marketing aspect of the sport industry.

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International Journal of Advance and Innovative Research
Volume 6, Issue 1 (XIII): January - March, 2019
ISSN 2394 - 7780

ANALYSIS OF DISCRETE TIME NB/GEO/1 QUEUING MODEL WITH SYSTEM CAPACITY (L,K)

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ABSTRACT
In order to provide the analysis of manufacturing system in a simple and a computationally effect method, we have used discrete time analysis approach for the problems that arises out of manufacturing. In our study we consider the discrete time NB/G/1 queuing system with infinite waiting room as a major research, we consider it as the time interval between the consecutive arrivals of the customers. The probability of having an interval of an integer number of k time unites between the arrivals of customer number N and customer number N+1 are consider as discrete distribution and service time is also considered as discrete distribution. The inter-arrival time and service time are independent and identically distributed (iid) random variable. We obtain an explicate expression for the distribution of the system occupancy, the time is assumed into equal intervals called slots. Further some numerical results are carried out for the justification of model in the form of table and graphs.

Keywords: Manufacturing system, Discrete time analysis, Infinite waiting, Arrivals of customer, Departure epoch.

1. INTRODUCTION
In this paper, we study a discrete time queue with working vacation, which is denoted by NB/Geo/1 (WV). The semi-vacation policies has been introduced by Servi and Finn. Such a vacation is called a working vacation (WV). The discrete-time queues where the inter-arrival time and service time are positive integer random variables are more suitable to model and analyse the digital communication system. During a working vacation period, arriving customers are served according to arrival order. When a working vacation ends, if there are customer in the queue, the server switches service rate to the normal level. Otherwise, the server enters the idle period and a new regular busy cycle starts when a customer arrival occurs.

If an arriving packet finds the server busy, it joins the queue in first in and first out (FIFO) order. A server transports packets in batches of the minimum number L and maximum K. The service time following common geometric distribution with successful probability 'p_1' and unsuccessfully 'q_1'.

Neuts,M [2] provide an matrix-geometric solutions in stochastic models. Kim, J.D., et al.,[7] have carried out and analyzed the analysis of queue-length distribution of the M/G/1 queue with working vacations. Latouche, G., and Ramaswami, V. [3] have presented introduction to matrix analytic methods in Stochastic Modeling. Sivasamy, R and Elangovan, R. [4] also discussed about bulk service queues of M/G/1 type with accessible batches and single vacation.

Pukazhenthi and Ezhilvanan [8] the analysis of discrete time queues with single server using correlated times. Vijaya Laxmi Pikala, *et.al.*, [9] have studied the discrete-time renewal input bulk service queue with changeover time. Mathias [6] studies a inter-departure time distribution for batches and studies correlation between inter-departure time and batch sizes. Chaudhry and Templeton [1] have presented extensive discussions of bulk service systems that operate according to a rule admitting non-accessible batch. Sivasamy and Pukazhenthi [6] have carried out and analyzed the discrete time bulk service queue for the accessible batch with the arrivals time being geometrical distribution and services time being negative binomial distribution. Pukazhenthi and Ezhilvanan [10] discussed the discrete time queue length distribution with a bulk service rule. H. Takagi,[5] Queueing Analysis, A foundation of performance evaluation, vacation and priority systems.

Here we are going to discuss about the analysis of discrete time queue of packets. Arrival of the customers according to a negative binomial arrival process with parameter p, where $p(0 < p < 1)$ is considered as the probability of an arrival that occurs in the slot. The service time is assumed to follow geometrical probability law, probability p_1. A transition probability matrix at the embedded point has been developed using the embedded Markov Chain (MC) techniques, to obtain the steady state distributions of the numbers in the queue. In the form of table and graphs the sensitively analysis values has been presented

2. MODEL DESCRIPTION
2.1 Arrival process
Assume that the customers arrival follow the negative binomial distribution with probability p . The inter arrival times are independent and identically distributed (i.i.d). The queue packets in an infinite capacity, on the bulk

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service rule of ($L \le j \le K$) the L size is minimum and K size is maximum. The discrete- time queue where the time axis is divided in to equal intervals are called as slot. It is assumed that all queueing activities are arrival and departures occur at the slot boundaries and therefore they may occur at the same time. The negative binomial distribution with probability mass function (p.m.f) $\{a(x;\alpha,p) = Pr(A_n = x)\}$ and the arrival time are independent of the number of slots in the batch.

$$a(x,\alpha_1,p) = \binom{x-1}{\alpha_1-1} p^{\alpha_1}(1-p)^{x-\alpha_1} \; ; \qquad \{x = \alpha_1, \alpha_1+1, \alpha_1+2 \ldots\} \qquad \ldots (1)$$

Customer arrival A(z) is denoted as the probability generating function of $\{a(x,\alpha_1,p)\}$

$$A(z) = \sum_{k=0}^{\infty} a(x,\alpha_1,p) z^k = \left(\frac{pz}{1-qz}\right)^{\alpha_1} \qquad if|z| < q^{-1} \; and \; p+q = 1 \qquad \ldots (2)$$

Hence $E(A)$ is the mean of the arrival times and $V(A)$ is the variance.

$$E(A) = \frac{\alpha_1}{p}, \; E(A^2) = \frac{\alpha_1(\alpha_1+q)}{p^2} \text{ and } Var(A) = \frac{\alpha_1}{p^2}$$

2.2 Working vacation

The server working vacation during the normal busy period is an independent and identically distributed random variable S_b which follows a geometrical distribution. A server begins a working vacation at the epoch when the queue becomes empty. During a working vacation period, arriving customers are served according to arrival order. When a working vacation ends, if there are customers in the queue, Otherwise, the server enters the idle period and a new regular busy cycle starts when a customer arrival occurs. We assume that inter-arrival times, and working vacation times are mutually independent, the service discipline is first in first out (FIFO). The working vacation follows geometric distribution with (p.m.f) b(k), working vacation times are independent of the number of slots in the batch $b(k) = Pr \; (B_n = k); \{k = 0,1,2, \ldots\}$

$$b(k) = \; p_1(1-p_1)^{k-1} \; ; k = 0,1,2 \ldots . \qquad \ldots (3)$$

The mean, $E(B^2)$ and $var(B)$ are

$$i.e., E(B) = 1/p_1 , \qquad E(B^2) = (2-p_1)/p_1^2 \text{ and } var(B) = q_1/p_1^2$$

$$B(k) = (1-p_1)^{k-1} p_1 : \qquad k = 0,1,2 \ldots . \qquad \ldots (4)$$

The probability of working vacation is denoted as p_1. The number of slots required to compute a batch service is denoted as B_n and secure in a sequence of independent trials with probability p_1, the probability of failure is denoted as $q = 1 - p_1$

$$B(z) = \sum_{k=0}^{\infty} b(k) \, z^k \qquad = \sum_{k=0}^{\infty} (1-p_1)^{k-1} p_1 \, z^k \qquad = \frac{p_1}{q_1} \sum_{k=0}^{\infty} (q_1 z)^k$$

$$B(z) = \frac{p_1}{q_1(1-q_1 z)}$$

The first order derivatives,

$$B'(z) = \frac{p_1}{q_1}(1-q_1 z)^{-1}$$

and second order derivatives,

$$B''(z) \; = p_1(1-q_1 z)^{-2}$$

By putting z =1 we get

$$B'(1) = \frac{p_1}{(1-q_1 z)^2} = \frac{p_1}{{p_1}^2} = \frac{1}{p_1}$$

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$$B''(1) = \frac{2p_1q_1}{(1-q_1)^3} = \frac{2p_1q_1}{{p_1}^3} = \frac{2q_1}{{p_1}^2}$$

Hence,

$$E(B) = B'(1) = \frac{1}{p_1} \qquad \ldots(5)$$

The variance of customers in working vacation time distribution

$$V(B) = B''(1) + B'(1) - \left(B'(1)\right)^2$$

$$= \frac{2q_1}{{p_1}^2} + \frac{1}{p_1} - \left(\frac{1}{p_1}\right)^2$$

Hence,

$$V(B) = \frac{q_1}{{p_1}^2} \qquad \ldots(6)$$

3. Queueing system Utilization

The probability of the system resources which is used by the traffic is known as utilization. It arrives at negative binomial arrivals and geometric working vacation, then it is generally given by the mean arrival rate over the mean working vacation rate is

$$\rho = \frac{E(B)}{KE(A)} = \frac{p}{Kp_1} \qquad \ldots(7)$$

which is less than 1

4. Distribution of system occupancy at departure epochs

The number of packets which has 0,1,2,… ∞ accumulated at the system is considered here as X_n, just the n[th] batch is lift with the server. By using the Markov Chain technique at this server the steady state distribution $\{x(k) = \lim_{n\to\infty} x_n(k) = \lim_{n\to\infty} \Pr(X_n = k) : \quad k = 0,1,2,\ldots\infty\}$ of the system occupancy at the departure of epoch is derived. The random variable that denote the number of packets that are reaching the system during the n[th] service is considered as 'U_n'. The distribution is $\{U_n(k); k = 0,1,2,\ldots\}$ can be derives followed by the steps given below:

$$U(k) = \sum_{x=k+\alpha_1}^{\infty} \binom{x-\alpha_1}{k} \binom{x-1}{\alpha_1-1} p^{\alpha_1}(1-p)^{x-\alpha_1}\, p_1(1-p_1)^{x-\alpha_1-1}; \quad k = 0,1,2,\ldots\infty \qquad \ldots(8)$$

That is let $r = x - \alpha_1 - k$ which gives $r + k = x - \alpha_1$; further as r=0 and $x = \infty$ implies thus above equation can be rewritten as

$$U(k) = \sum_{x=k+\alpha_1}^{\infty} \binom{x-\alpha_1}{k} \{p^{\alpha_1}(1-p)^{x-\alpha_1}\} \{p_1(1-p_1)^{x-\alpha_1-1}\} \binom{r+k+\alpha_1-1}{\alpha_1-1} \qquad \ldots(9)$$

$$U(k) = \{p^{\alpha_1}{p_1}^k (1-p_1)^k\} \sum_{r=0}^{\infty} \binom{r+k}{k} (1-p)^r \binom{r+k+\alpha_1-1}{\alpha-1} (1-p_1)^r$$

$$U(k) = \{p^{\alpha_1}{p_1}^k (1-p_1)^k\} \sum_{r=0}^{\infty} \frac{(k+\alpha_1-1)!\ (r+k+\alpha_1-1)!}{k!\, r!\, (\alpha_1-1)!\, (k+\alpha_1-1)!} (1-p)^r\ (1-p_1)^r$$

$$U(k) = \{p^{\alpha_1}{p_1}^k (1-p_1)^k\} \sum_{r=0}^{\infty} \frac{(r+k)!}{r!\, k!} \frac{(r+k+\alpha_1-1)!}{(r+k)!\, (\alpha_1-1)!} (1-p)^r\ (1-p_1)^r$$

$$U(k) = \{p^{\alpha_1}{p_1}^k (1-p_1)^k\} \frac{(k-\alpha_1-1)!}{k!\, (\alpha_1-1)!} \sum_{r=0}^{\infty} \binom{r+k+\alpha_1-1}{\alpha_1-1} (1-p)^r\ (1-p_1)^r$$

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$$U(k) = \binom{k+\alpha_1-1}{\alpha_1-1} \frac{p^{\alpha_1} p_1^k (1-p_1)^k}{(1-(1-p)(1-p_1))^{k+\alpha_1}} \quad \ldots(10)$$

since $$\sum_{r=0}^{\infty} \binom{r+k}{k} d^r = \frac{1}{(1-d)^{k+1}}$$

$$U(k) = \binom{k+\alpha_1-1}{\alpha_1-1} \beta^{\alpha_1} (1-\beta)^k \quad \ldots(11)$$

From it is deduced that for $k = 0,1,2, \ldots \infty$

$$\beta = \frac{p_1}{p + p_1 - pp_1}$$

To form a Markov chain for the discrete state space $\{0,1,2, \ldots\}$ with one step transition probability matrix $P = p_{ij}$ is shown as the sequence $\{x_n\}$ of random variable are as follows:

Case:1 if $0 \leq i \leq L-1$ and $j = 0$:

$$p_{ij} = \sum_{r=0}^{K-1} U(r)$$

Case:2 if $0 \leq i \leq L-1$ and $j \geq 1$:

$$p_{ij} = U(K-L+j)$$

Case:3 if $L \leq i \leq K$ and $j = 0$:

$$p_{ij} = \sum_{r=0}^{K-i} U(r)$$

Case:4 if $L \leq i \leq K$ and $j \geq 0$:

$$p_{ij} = U(K-i+j)$$

Case:5 if $i \geq (K+1)$ and $j \geq (i-k)$:

$$p_{ij} = U(j+K-i)$$

Case:6 Otherwise

$$p_{ij} = 0$$

By solving the following system of equations is $X_n P = X_n$ and $X_n e = 1$. In which the 'e' denotes the row vector of unites we can obtain the unknown probability row vector $X_n = (X_0, X_1, X_2, \ldots)$. Latouch and Ramasami(1999) algorithm can be used for solving the system of equation. Here from the unit step probability function of $p_{i,j}$, the i and j has been selected for all $i, j \geq N$ the values of $p_{i,j}$ are so small then it is ignored. Thus the square matrix of order (N+1) is considered as $\sum_{j=0}^{N} p_{ij} = 1$ and $p_{iN} = 1 - \sum_{j=0}^{N-1} p_{ij}$ for all $0 \leq i \leq N$ and $p = p_{ij}$.

5. Distribution of System Occupancy Just Before Departure Epochs

Let Y_n be the random variable denote system occupancy immediately after the beginning of the n^{th} service period.

$$Y_n = \begin{cases} X_{n-1} & if X_{n-1} > L \\ L & if X_{n-1} \leq L \end{cases} \quad \ldots(12)$$

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As the respected distribution of Y_n is $\{y_n(k) = \Pr(Y_n = k) : k = L, L+1, L+2, \ldots\}$ could be seen that $\{y(k) = \lim_{n\to\infty} Y_n(k) = \Pr(Y_n = k) : k = 0,1,2, \ldots \infty\}$ which is

$$Y_n = \begin{cases} X(i); & if X_{n-1} = k > L \\ \sum_{i=0}^{L} X(i); & if X_{n-1} and\ k = L \end{cases} \quad \ldots(13)$$

Let G_n random variable denotes system occupancy just before the n^{th} batch service epoch. It is observed that $\{g(k) = \lim_{n\to\infty} g_n(k) = \Pr(G_n = k) : k = 0,1,2, \ldots \infty\}$ and it is

$$g(k) = y(k)^* v(k);\ K \geq L$$

where $y(k)^* v(k)$ acts as the usual convolution operator distribution y (k) and v (k). It is unnecessary to remark that distribution $\{x(k)\}$ and $\{g(k)\}$ is related to each other as follows:

$$X(i) = \begin{cases} g(i+k) & if\ i > L \\ \sum_{j=L}^{K} g(i) & if\ i = o \end{cases} \quad \ldots(14)$$

6. Distribution of inter-departure time and number of packets in batch

The time (number of slots) between the departure of two consecutive batches of packets is denoted by the random variable D. In the system at a departure epoch at least L packets are given. The next departure time consists only of service time B of the served batch. If there are not enough packets to form a batch, i.e. $X < L$, the inter-departure time consists of (i) the inter-arrival time of the (L-X) packets are needed to form a batch and (ii) the service time of that batch. Hence the distribution $\{d(k) = \Pr(D = k)\}$ of inter-departure time D is

$$d(k) = b(k) \sum_{i=L}^{\infty} g(i) + \sum_{i=0}^{L-1} \left[a^{*(L-i)} * b(k)\right] x(i)\ ; k \geq 1 \quad \ldots(15)$$

7. Service time of the distribution:

Let S be a random variable denoting the number of packets in a batch at the beginning of a batch service and $\{S(k) = \Pr(S = k)$ for $k = L, L+1, \ldots K\}$. Then the pdf is given by,

Case:1 If y(L), J=L

$$S(J) = x(L) + \sum_{i=0}^{L-1} x(i) \sum_{r=i}^{L} h(r-j)\ , j = L$$

Case:2 If $y(j), L < j < k$

$$S(J) = x(j) + \sum_{i=0}^{L-1} x(i) h(j-i), L < j < 1$$

Case 3: $\sum_{r=k}^{\infty} y(r),\ j = k$

$$S(J) = \sum_{i=k}^{\infty} x(j) + \sum_{i=0}^{L-1} x(i) \sum_{r=k}^{\infty} h(r-i), j = K$$

Now,

The joint distribution $\{f(k,j) = \Pr(D = k,\ S = j) : k \geq 1, L \leq j \leq K\}$ D and S is follows:

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$$h(k,j) = \partial(K,j)\left\{b(k)\sum_{i=k}^{\infty} x(i)\right\} + \partial(L,j) + \sum_{i=0}^{L-1}\left[a^{*(L-i)} * b(k)\right]x(i)\{1-\partial(L,j)-\partial(K,j)\}s(j)b(k) \quad \ldots(16)$$

Where,

$$\partial(i,j) = \begin{cases} 1 & ; \text{if } i = j \\ 0 & ; \text{otherwise} \end{cases}$$

The expectation of the random variable D, S and their product D, S are given below.

$$E(D) = E(B) + E(A)\sum_{i=0}^{L-i}(L-i)x(i) \quad \ldots(17)$$

$$E(S) = \sum_{k=L}^{k} k\, s(k) \quad \ldots(18)$$

$$E(D,S) = E(S)E(B) + LE(A)\sum_{I=0}^{L-1}(L-i)x(i) \quad \ldots(19)$$

The variance of D and S can be calculated in this similar manner. The co-efficient correlation 'r' can be computed to know how strongly these two random variables depends on each other and we can defined as follows

$$r = \frac{E(D,S) - E(D)E(S)}{\sqrt{Var(D)}\sqrt{Var(S)}}$$

Let S_1 be the random variables denoting the number of lots in a batch just before the batch departs and $\{s_1(k) = \Pr(S_1 = k) \; : \; k = L, L+1, L+2, \ldots, K\}$

$$s_1(j) = \begin{cases} \sum_{j=k}^{\infty} g(j) & j = k \\ g(j) & L \le j < k \end{cases}$$

The moment of S_1 can be calculated from (19). Using (14) in one could rewrite (15) in terms of g (.) values as follows:

$$d(k) = b(k)\sum_{i=L}^{\infty} g(i+K) + \sum_{i=0}^{L-1}\left[a^{*(L-i)} * b(k)\right]g(i+K) + \left(a^{*L} * b(k)\right)\sum_{j=L}^{K-1} g(j) \quad \ldots(20)$$

The joint distribution of D and S_1 with the usual arguments lead to the following difference-differential equation $\{g(k,j) = \Pr(D = k, S_1 = j) \; : k \ge 1, L \le j \le K\}$

$$g(k,j) = \partial(K,j)\left(b(k)\sum_{i=L}^{\infty} g(i+K) + \sum_{i=0}^{L-1}\left[a^{*(L-i)} * b(k)\right]g(i+K)\right) + \left(1-\partial(K,j)\right)\left(a^{*L} * b(k)\right)g(j)$$

Thus

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$$E(D,S_1) = K\left(E(B)\sum_{i=L}^{\infty} g(i+K) + \sum_{i=0}^{L-1}[(L-i)E(A)+E(B)]g(i+k) \right) + \left(LE(A)+E(B)\right)\sum_{j=L}^{K-1} j\, g(j) \quad \ldots(21)$$

As in (15), the correlation co-efficient, between D_b and S_1 and let it be r_1.

$$r_1 = \frac{E(D,S_1) - E(D)E(S_1)}{\sigma_D \sigma_{S_1}}$$

8. Measure and Analysis of cost Performance

Random variables D and S_1 which involves cost function can be formulated. Coefficient of variation (CV) of S and coefficient of determination (CD) of r are incurred by the different cost values can be outlined as given below:

$\$c_1$ = Cost due to Coefficient of Variation $CV(S)$ (Cost due to $CV(S_1)$)

$\$c_2$ = Cost due to Coefficient of determination $CD(r)$ (Cost due to $CV(r_2)$)

TEC_1 and TEC_2 are the total expected cost which has the input parameters p, p_1, α, L and K of the queuing system generally given by (D,S_1) and (D,S)

$$TEC_1 = TEC_1(p,p_1,\alpha,L,K) \;, TEC_2 = TEC_2(p,p_1,\alpha,L,K)$$

$$TEC_1(p,p_1,\alpha,L,K) = c_1 r^2 \quad , TEC_2(p,p_1,\alpha,L,K) = c_2 r_1^{\,2}$$

The convex function is denoted as TEC_1 and TEC_2, if L increases also r^2 and $r_1^{\,2}$ increase. One can locate minimum in specific cases because the closed form of expression is not available for TEC. By using the numerical value with $c_1 = 120.00, c_2 = 400.00, p = 0.940, p_1 = 0.550$, α =6 and K= 15 an attempt made.

Table-1: Cost Function Values

L	$c_1 r^2$	TEC_1	$c_2 r_1^2$	TEC_2
1	0.08	16.957	0.01	60.375
2	0.31	8.721	0.07	50.916
3	0.69	6.266	0.23	43.871
4	1.20	5.361	0.63	38.492
5	1.83	**5.136**	1.50	34.488
6	2.53	5.269	3.24	31.892
7	3.26	5.580	6.31	**30.951**
8	3.95	5.944	11.09	31.884
9	4.52	6.247	17.45	34.470
10	4.93	6.427	24.22	37.522
11	5.22	6.494	29.14	38.850

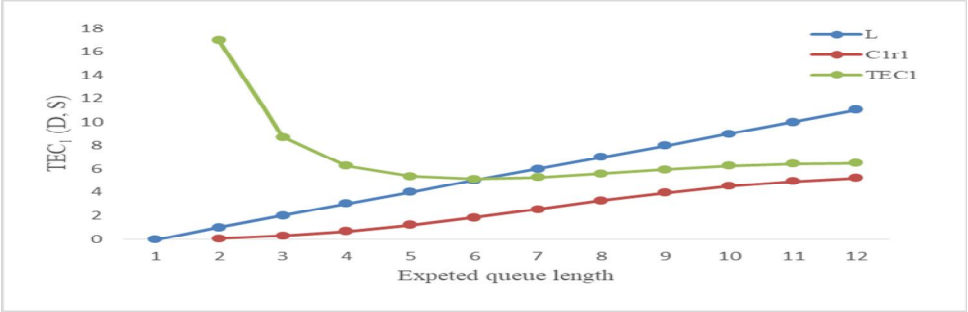

Fig-1: Graph of TEC_1 for Different Values L

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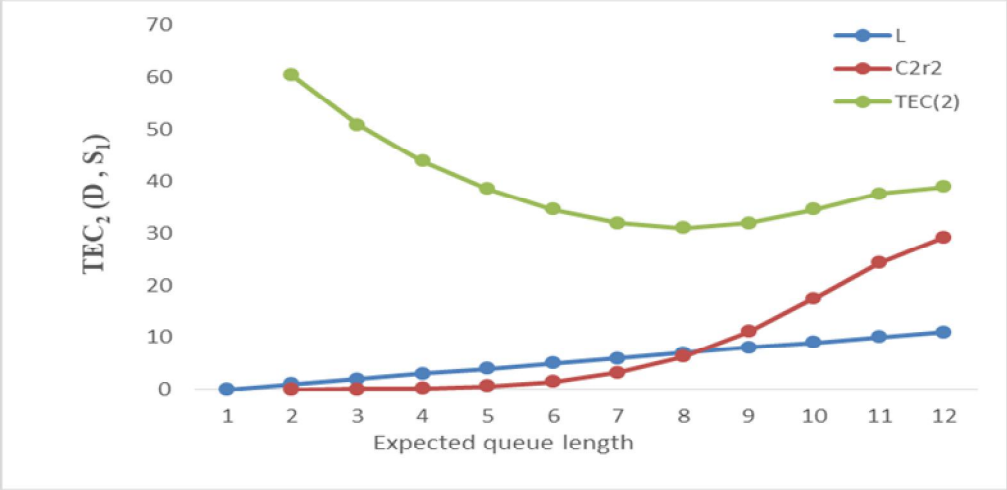

Fig-3: Graph of TEC_2 for Different Values L

At table 3 the corresponding results of TEC_1/TEC_2 are present where CV= (S.D/Mean) only. When L=5 it is noticed that local minimum TEC_1 occurs and when L=7 the local minimum TEC_2 occurs. Based on the local minimum on L information the faculty rendering batch service with the rule (L,K) can call the server (the transportation vehicle from outside) to come to the service point and therefore saving the amount of transportation cost. Which is the primary objective in transportation and optimization problems.

9. CONCLUSION

Using discrete time analysis the inter departure time distribution of a batch service from has been investigated. The individual lot of the inter departure time distribution of a batches are derived. The coefficient of correlation of batch inter departure time. The distribution of the number of slot in a batch and the batch size are also computed. The proposed system approach is computationally efficient further this approach allows modelling more complicated system. It will be the object of further research to observe how other batching strategies affect the departure process of a batch server.by using the table and graph the cost of performance measure are reported to demonstrate how to parameters of the model influences the behaviour of the system.

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International Journal of Advance and Innovative Research
Volume 6, Issue 1 (XIII): January - March, 2019
ISSN 2394 - 7780

A NEW RP-UPLC METHOD FOR SIMULTANEOUS ESTIMATION OF SOFOSBUVIR AND LEDIPASVIRIN BULKAND TABLET DOSAGE FORM AND ITS FORCE DEGRADATION STUDIES

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ABSTRACT
There are no methods available for the estimation of Sofosbuvir and Ledipasvir by RP- Ultra High Performance Liquid Chromatography and it is required to develop the novel method with cost effective, time consuming with good sensitivity and less retention time and to know the interference of degradation products which can be performed in the routine analysis. Separation was achieved on a Endeavorsil (2.1 x 50mm,1.8µm)column at a detection wavelength of 240nm, using a mobile phase of Buffer (50%) and Acetonitrile (50%) in a isocratic elution mode at a flow rate of 0.3ml per min for Sofosbuvir and Ledipasvir with an injection volume of 4.0µl. The retention time for Sofosbuvir and Ledipasvir were found to be 0.432 and 0.697min.The developed method shows linearity in the range of Sofosbuvir and Ledipasvir 40-200µg/ml, 9-45µg/ml. The LOD and LOQ values for Sofosbuvir and Ledipasvir were 2.96µg/ml, 9.96µg/ml and 2.98µg/ml, 9.98µg/ml. The regression coefficient for drug was found to be 0.999. The mean recoveries ranged from 98 – 102% for Sofosbuvir and Ledipasvir. The stability indicating results explain that the method was recovered in the presence of degradation products also. A simple, rapid, precise and accurate new RP- UPLC method was developed and validated for the quantitative determination of Sofosbuvir and Ledipasvirin bulk drug and tablet dosage form.

Keywords: Ultra High Performance Liquid Chromatography, Ledipasvir, Sofosbuvir Method development and validation, Degradation studies, ICH Guidelines.

INTRODUCTION
Sofosbuvir[1]is a hepatitis c virus drug used in combination with Ledipasvir. The combination drug Sofosbuvir and Ledipasvir marketed under the brand name Harvonil. Sofosbuvir S)-Isopropyl2-((S)-(((2R,3R,4R,5R)-5-(2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)-4-fluoro-3-hydroxy-4-methyltetrahydrofuran-2-yl)methoxy)-(phenoxy) phosphorylamino)propionate. Its molecular formula is $C_{22}H_{29}FN_3O_9$.Molecular weight is 529.458 g/mol. Sofosbuvir (trade name Sovaldi) is a direct acting antiviral medication used as part of combination therapy to treat chronic Hepatitis C, an infectious liver disease caused by infection with Hepatitis C Virus. Sofosbuvir is a white to off-white crystalline solid with a solubility of ≥ 2 mg/ml across the pH range of 2-7.7 at 37°C and is slightly soluble in water.

Ledipasvir[2]is a direct acting antiviral medication used as part of combination therapy to treat chronic Hepatitis C, .Its molecular formula is$C_{49}H_{54}F_2N_8O_6$.Molecular weight is 888.9999 g/mol. It is soluble in water and buffers at pH 1-8 and sparingly soluble in butanol and freely soluble in formic acid and 2-methyl tetrahydrofuran.

Literature survey reveals only sofobuvir was estimated individually by UPLC[3], UPLC-MS/MS[4] method in combination with other drug by UPLC[5,6]. But yet not a single method has been reported for its determination in tablet dosage forms in combination of Sofosbuvir and Ledipasvir by RP-Ultra-performance liquid chromatography (UPLC) method. This study was designed to develop a simple and reliable method to quantitate in a relatively short time with high sensitivity and to know the interference of degradation products. Therefore, this study focused on the development and forced degradation studies of simple and rapid UPLC method which can be employed for the routine analysis of Sofosbuvir and Ledipasvirin bulk drug and formulation and the method were validated as per ICH guidelines[7].

EXPERIMENTAL DESIGN
Instrumentation
Ultra-Performance Liquid Chromatography equipped with Auto Sampler and PDA detector. UPLC Data collections and processing was done using EMPOWER software. The analytical column used for the separation was Endeavorsil (2.1 x 50mm, 1.8µm), Analytical balance (contech balance), pH meter (DIGITAL pH METER 802, Systronics), Sonicator (SONIC, VIBRA CELL).

Chemicals and Reagents
Sofosbuvir and Ledipasvir (99.8%) were obtained as gift sample from Pharma train lab, Hyderabad, India. Acetonitrile (UPLC grade; MERCK), Ortho phosphoric acid (AR Grade, MERCK), and HPLC grade water were used for the entire study.

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Chromatographic conditions

The determination was carried out on UPLC equipped with Auto Sampler and PDA detector. Optimized chromatographic conditions were shown in table no.1.The corresponding peaks and retention times were recorded for the standard and sample.

Table No-1: Optimized chromatographic conditions

Chromatographic parameters	Conditions
Colum	Endeavorsil (2.1 x 50mm,1.8µm)
Flow rate	0.3ml/min
Wavelength	240nm
Column temperature	30°c
Injection volume	4µl
Run time	3min
Mobile phase(Diluent)	Acetonitrile: Buffer(phosphate buffer p^H 3)(50:50v/v)
Elution	Isocratic mode

PREPARATION OF THE SOFOSBUVIR AND LEDIPASVIR STANDARD & SAMPLE SOLUTION

Standard Solution Preparation

Accurately weighed and transferred 40 mg Sofosbuvir and 9mg Ledipasvir pure drugs into a 10ml clean dry volumetric flask. Added diluent and sonicated to dissolve it completely and made volume up to the mark with the same solvent (Stock solution).Further pipetted1.0 ml of Sofosbuvir and Ledipasvir of the above stock solution into a 10ml volumetric flask and diluted upto the mark with diluent. Further pipetted 3.0ml of Sofosbuvir and Ledipasvir into a 10ml volumetric flask and diluted upto the mark with diluent.

Sample Solution Preparation

Accurately weighed and transferred 40mg Sofosbuvir (9mg Ledipasvir) tablet powder into a 10ml clean dry volumetric flask. Added about 7ml of diluent and sonicated to dissolve it completely and make volume up to the mark with the same solvent (Stock solution).Further pipetted1.0 ml of sample from the above stock solution into a 10ml volumetric flask and diluted up to the mark with diluent. Further pipetted 3.0 ml of sample solution into a 10ml volumetric flask and diluted up to the mark with diluent.

Method Development

Injected 4µl of blank, standard and sample solutions and chromatograms were recorded and calculated the %Assay and shown in table no.2.

Table No-2: Results of tablet dosage form

Compound name	Brand name	Label claim (mg)	Test concentration (µg/ml)	Mean amount estimated (µg/ml) (n=6)	% Assay	% RSD
Sofosbuvir&	Harvonil	400 mg	120	117.96	98.3	0.7
Ledipasvir		90 mg	27	26.92	99.7	0.3

System suitability parameters

For assessing system suitability, six replicates of working standard samples of Sofosbuvir and Ledipasvir were injected and studied, the parameters like plate number (N), tailing factor (K), resolution, relative retention time and peak asymmetry of samples and table no.3.

Table No-3: System suitability parameters

S. No.	Name	RT (min)	Area (µV sec)	Height (µV)	USP resolution	USP tailing	USP plate count
1	Sofosbuvir	0.432	7702720	241453	--	1.58	2547.35
2	Ledipasvir	0.697	121954	14488	3.05	1.35	3877.36

Method Validation

The validation of UPLC method for the determination of Sofosbuvir & Ledipasvir was carried out according to ICH guide lines.

Specificity and Selectivity

Specificity is the degree to which the procedure applies to a single analyte and is checked in each analysis by examining blank matrix samples for any interfering peaks. The UPLC chromatogram recorded for the drug matrix showed no interfering peaks for Sofosbuvir & Ledipasvir with blank. The figures showed that the

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selected drugs were clearly separated. Thus the UPLC method proposed in this study was selective. Chromatograms were showed in fig.1, 2&3.

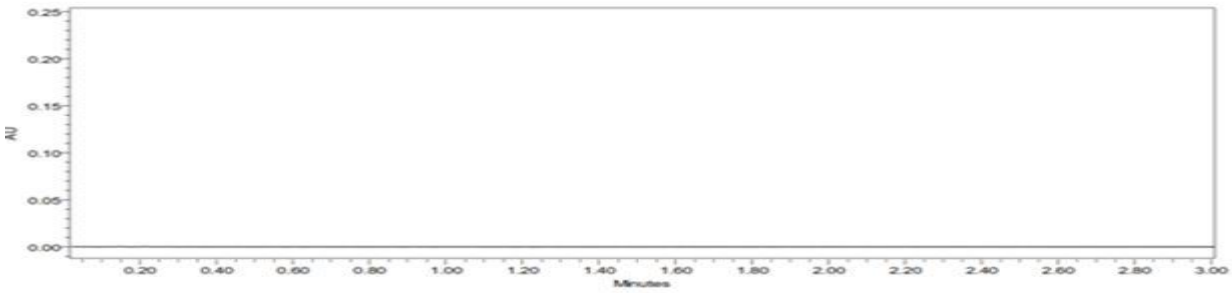

Fig-1: Chromatogram of blank

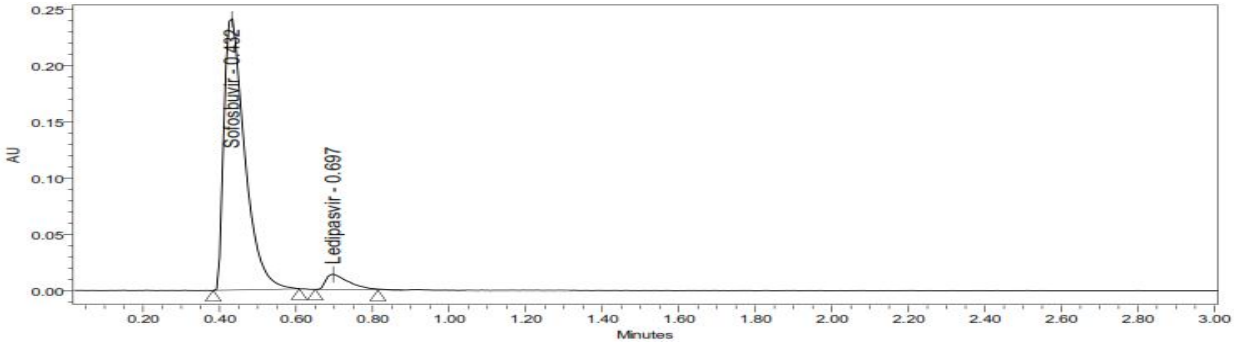

Fig-2: Standard Chromatogram of Sofosbuvir & Ledipasvir

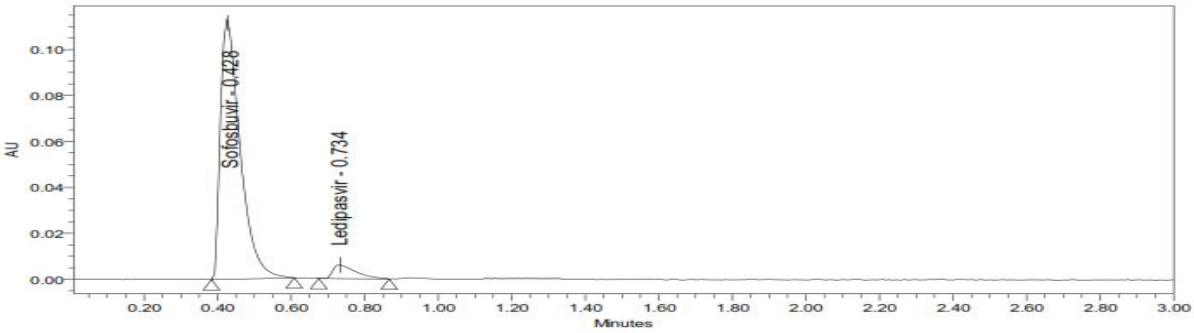

Fig-3: Sample Chromatogram of Sofosbuvir & Ledipasvir

Linearity

Accurately weighed and transferred 40 mg Sofosbuvir & 9 mg Ledipasvir standards into a 10ml clean dry volumetric flask .Added diluent and sonicated to dissolved it completely and make volume up to the mark with the same solvent (Stock solution).Further dilutions were prepared and injected each level into the chromatographic system and measured the peak area. Plotted a graph of peak area versus concentration (on X-axis concentration and on Y-axis Peak area) and shown in fig.4&5.From the calibration curve, regression equation was calculated and the results are shown in the table no.4.

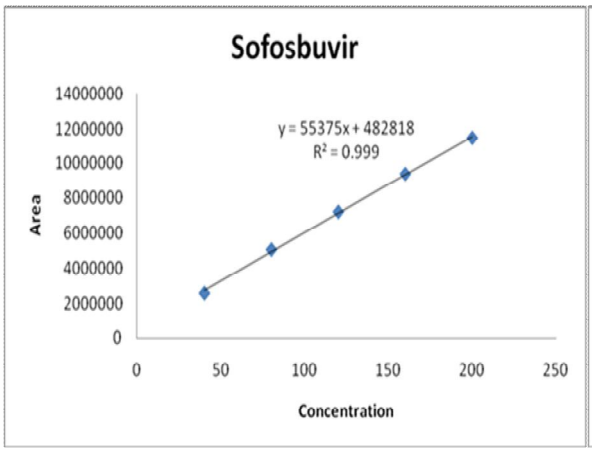

Fig-4: Calibration graph for Sofosbuvir

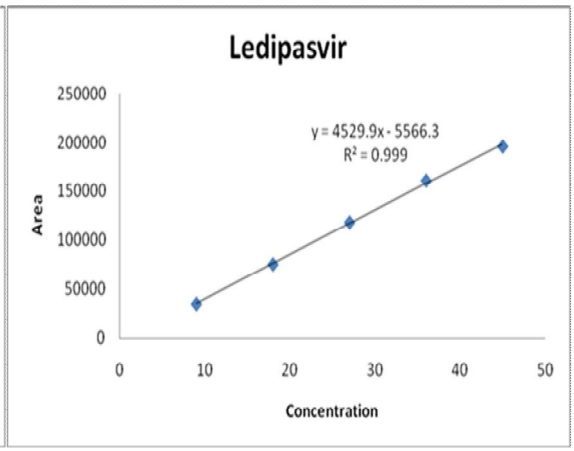

Fig-5: Calibration graph for Ledipasvir

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Table No-4: Linearity Results for Sofosbuvir & Ledipasvir

S. No.	Sofosbuvir		Ledipasvir	
	Concentration (µg/ml)	Area	Concentration (µg/ml)	Area
1	40	2558079	9	34657
2	80	5042405	18	75042
3	120	7198342	27	117770
4	160	9371867	36	160425
5	200	11468323	45	195811
	Slope (m)	55375	Slope (m)	4529.9
	Intercept (c)	482818	Intercept (c)	5566.3
	Correlation coefficient (R^2)	0.999	Correlation coefficient (R^2)	0.999

Accuracy

For accuracy determination, three different %concentrations were prepared separately i.e. 50%, 100% and 150% for the analyte and chromatograms were recorded for the same and calculated the individual recovery and mean recovery values. The results obtained were shown in table no.6 and 7.

Table No-6: Accuracy (recovery) data for Sofosbuvir

%Concentration (at specification Level)	Peak Area	Amount Added (mg)	Amount Found (mg)	*% Recovery	Mean Recovery
50%	3888916	20	20.02	100.10	99.95
100%	7609013	40	39.58	98.96	
150%	11626003	60	60.48	100.80	

Table No-7: Accuracy (recovery) data for Ledipasvir

%Concentration (at specification Level)	Peak Area	Amount Added (mg)	Amount Found (mg)	*% Recovery	Mean Recovery
50%	61068	4.5	4.59	101.94	100.13
100%	118579	9	8.91	98.98	
150%	178732	13.5	13.43	99.46	

*Mean of three determinations

PRECISION

Intermediate Precision/Ruggedness

To evaluate the intermediate precision (also known as Ruggedness) of the method, Precision was performed on different day within the laboratory. The standard solution was injected for six times and measured the area for all six injections in UPLC. The %RSD for the area of six replicate injections was found to be within the specified limits.

System Precision

The standard solution was injected for six times and measured the area for all six injections in UPLC. The %RSD for the area of six replicate injections was found to be within the specified limits.

Method precision

The method precision were assessed by injecting (n=6) solutions of sample in combination.

Results were shown in table no.8.

Table No-8: Precision results for Sofosbuvir & Ledipasvir

S. NO	TYPE	Sofosbuvir			Ledipasvir		
		Mean area	Std. deviation	% RSD	Mean area	Std. deviation	% RSD
1	System precision	7814792.5	24876.1	0.3	133235.5	2093.7	1.6
2	Method precision	7805918	23537.88	0.3	133486	2534.85	1.8
3	Intermediate precision	7694063	19800.7	0.3	127121	1875	1.5

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Robustness

As part of the Robustness, deliberate change in the Flow rate, Mobile Phase composition, Temperature Variation was made to evaluate the impact on the method. The flow rate was varied at 0.1 ml/min. The Organic composition in the Mobile phase was varied ±10% along with the actual mobile phase composition in the method. Results were shown in table no.9-12.

Table No-9: Results for variation in flow rate for Sofosbuvir

S. No	Flow Rate (ml/min)	System Suitability Results	
		USP Plate Count	USP Tailing
1	0.2	2496.4	1.49
2	0.3	2547.35	1.58
3	0.4	2684.3	1.35

Table no.10: Results for variation in flow rate for Ledipasvir

S. No	Flow Rate (ml/min)	System Suitability Results	
		USP Plate Count	USP Tailing
1	0.2	3741.8	1.29
2	0.3	3877.36	1.35
3	0.4	3956.1	1.22

Table No-11: Results for variation in mobile phase composition for Sofosbuvir

S. No	Change in Organic Composition in the Mobile Phase	Sofosbuvir	
		USP Plate Count	USP Tailing
1	10% less	2689.7	1.42
2	Actual	2547.35	1.58
3	10% more	2368.5	1.52

Table No-12: Results for variation in mobile phase composition for Ledipasvir

S. No	Change in Organic Composition in the Mobile Phase	Ledipasvir	
		USP Plate Count	USP Tailing
1	10% less	3891.1	1.24
2	Actual	3877.36	1.35
3	10% more	3815.7	1.30

Limit of Detection

It is lowest amount of analyte in a sample that can be detected but not necessarily quantities as an exact value under the stated, experimental conditions signal obtained from LOD solution (1.5% of target assay concentration). S/N Ratio value shall be 3 for LOD solution

Limit of Quantification

The quantitation limit of an analytical procedure is the lowest amount of an analyte of a sample which can be quantitatively determined with suitable precision and accuracy. Signal Obtained from LOD solution (5.0% of target assay concentration), S/N Ratio value shall be 10 for LOQ.

Results were shown in table no.13.

Table No-13: Results of LOD and LOQ

Drug name	LOD			LOQ		
	Baseline noise(µV)	Signal obtained(µV)	S/N ratio	Baseline noise(µV)	Signal obtained(µV)	S/N ratio
Sofosbuvir	48	142	2.96	48	479	9.96
Ledipasvir	48	143	2.98	48	478	9.98

Degradation studies

The International Conference on Harmonization (ICH) guideline entitled stability testing of new drug substances and products requires that stress testing be carried out to elucidate the inherent stability characteristics of the active substance. The aim of this work was to perform the stress degradation studies on the Sofosbuvir and Ledipasvir using the proposed method.

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Hydrolytic degradation under acidic condition
Pipetted 3.0 ml from working standard solution into a 10ml volumetric flask and 3 ml of 0.1N HCl was added. Then, the volumetric flask was kept at 60ºC for 6 hours and then neutralized with 0.1 N NaOH and make up to 10ml with diluent. Filter the solution with 0.22 microns syringe filters and placed in vials.

Hydrolytic degradation under alkaline condition
Pipetted 3.0 ml from working standard into a 10ml volumetric flask into and added 3 ml of 0.1N NaOH was added in 10 ml of volumetric flask. Then, the volumetric flask was kept at 60ºC for 6 hours and then neutralized with 0.1N HCl and make up to 10ml with diluent. Filter the solution with 0.22 microns' syringe filters and placed in vials.

Thermal induced degradation
Sofosbuvir and Ledipasvirsample was taken in Petri dish and kept in Hot air oven at 110^0 C for 24 hours. Then the sample was taken and diluted with diluents and injected into UPLC and analyzed.

5.5 Oxidative degradation
Pipetted 3.0 ml from working standard into a 10ml volumetric flask, 1 ml of 3% w/v of hydrogen peroxide added and the volume was made up to the mark with diluent . The volumetric flask was then kept at room temperature for 15 min. Filter the solution with 0.45 microns syringe filters and placed in vials. The results reveal that the sample solutions are stable and accurate without interference.

The results of degradation study were given in the table no.14.

Table No-14: Degradation results of Sofosbuvir and Ledipasvir

Sample Name	Sofosbuvir		Ledipasvir	
	Area	% Degraded	Area	% Degraded
Standard	7702720	--	121954	--
Acid	7500138	2.63	116198	4.72
Base	7382287	4.16	114966	5.73
Peroxide	7431584	3.52	118881	2.52
Thermal	7262124	5.72	117222	3.88
Photo	7351476	4.56	116259	4.67

RESULTS AND DISCUSSION

The present study was carried out in order to develop a sensitive and accurate forced degradation study of RP-UPLC method for the analysis of Sofosbuvir and Ledipasvir in pharmaceutical dosage forms. The mobile phase was Acetonitrile and Buffer (50:50v/v) in isocratic mode to produce good resolution and free from tailing and fronting. Sofosbuvir and Ledipasvir were eluted at 0.432 and 0.697min. From the specificity chromatograms it was clarified that the peaks of pure drug and sample were not showing any interferences by comparing the blank chromatogram. In order to test the linearity of the method, dilutions of the working standard solutions of drugs were prepared in the range of 40-200µg/ml Sofosbuvir and 9-45µg/ml Ledipasvir. A good linear relationship (r^2=0.999) was observed. The method was duly validated by evaluation of the required parameters as per ICH guidelines. The system suitability parameters were shown within the limits. The proposed method was found to be precise as the %RSD values for method and system were found to be less than 2%**.**The recoveries of Sofosbuvir and Ledipasvir obtained from the pre-analyzed samples containing known amounts of added drug were shown which were within the acceptable range indicating the high accuracy of the proposed method. Robustness of the method was found out by testing the effect of small deliberate changes in the chromatographic conditions and the areas of corresponding peaks. The main factors selected in this method were the flow rate (±0.3) and mobile phase composition and the results were recorded**.** LOD and LOQ of the method were calculated basing on signal to ratio and the values for the proposed UPLC method were within the limits**.** The drug content in the formulation was quantified using the proposed method of analysis and the amount of Sofosbuvir and Ledipasvir obtained in dosage form were in the range of 98.3% and 99.7%**.**Stability study results were recorded and reveal that the method was stable without any interferences and the proposed method can estimate in the presence of stress conditions.

CONCLUSION

The present work includes that a new RP-UPLC Method for simultaneous estimation of Sofosbuvir and Ledipasvir in bulk and tablet dosage form and its forced degradation studies was simple, accurate, precise, specific, economical and no interferences with the degradation studies and can be used for routine analysis.

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ACKNOWLEDGMENT
Authors are very thankful to principal A. Prameela Rani University College of pharmaceutical sciences, Acharya Nagarjuna University, Guntur, for providing the library facilities for literature survey to carryout entire study. Authors also thankful to PharmaTrain laboratories, Hyderabad, INDIA, for providing Sofosbuvir and Ledipasvir working standard as gift sample and for providing UPLC Instrument to carry out Research work.

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International Journal of Advance and Innovative Research
Volume 6, Issue 1 (XIII): January - March, 2019

ISSN 2394 - 7780

A STUDY OF MENTAL HEALTH AND JOB SATISFACTION AMONG MADRASA TEACHERS OF DISTRICT SHOPIAN

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ABSTRACT
The present Study was designed to study mental health and job satisfaction among madrasa teachers of district Shopian. The sample for the present study consisted of 90 Madrasa teachers (60 Male and 30 Female) who were selected from different Madrasas of District Shopian. The investigator employed two tools- Mental Health Checklist developed by Pramod Kumar and Job Satisfaction Scale developed by Meera Dixit for data collection purpose. Percentage statistics, t- test and Karl Pearson's coefficient of correlation were employed for the analysis of data using IBM SPSS (V.22). The findings revealed that majority of madrasa teachers had good mental health and were enjoying higher levels of job satisfaction. No teacher was found in the above average poor mental health level. None of the madrasa teacher, neither male nor female, was found in the below average level of job satisfaction. The male and female madrasa teachers didn't differ significantly on mental health as well as on job satisfaction. The findings also revealed that there is a positive relationship between Mental Health and Job Satisfaction among madrasa teachers having coefficient of correlation r = 0.965 (p > 0.01). The findings revealed that mental health had a significant impact on job satisfaction and vice- versa.

Keywords: Job Satisfaction, Madrasa Teachers, Mental Health, Shopian.

INTRODUCTION

Mental health

Mental health means a positive state of mind producing a sense of comfort which entitles a person to act effectively within the society. Mental health represents a status of psychological well-being, psychological maturity and the quality or ability of adjustment of the person with his/her environment and by means of it, he/she forms his/her adjustment with the demanding situations of life. So we can say that mental health is as important as physical health. Mental health comprises all the factors of the person's adjustment with himself/herself and others. Mental health like physical health is an ingredient of personality.

The World Health Organization defines mental health as, "a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community."

Kumar, Pramod defined, "Mental health is an index that shows the extent to which the person has been able to meet his environmental demands- social, emotional or physical."

Job satisfaction

Job satisfaction as the term itself implies means the satisfaction of a person with his job. Job satisfaction is a set of favorable and unfavorable feelings and emotions with which employees view their works. It may be defined as overall attitude towards the profession which results from a balancing and summation of many specific likes and dislikes experienced in connection with the job.

The term 'job satisfaction' refers to perceived feelings of an employee towards his or her job. Job satisfaction being a global aspect is affected by a large number of variables such as salary, congenial working conditions, experience, opportunities for advancement, promotion, age, competent and fair supervision, primary and secondary needs and perception of the employees.

The term job satisfaction has been defined variously since it was popularized by Hoppock (1935) in which he held that 'Job Satisfaction' is a combination of psychological, physiological and environmental circumstances that cause a person to say, "I am satisfied with my job."

According to Hoppock, "Job satisfaction depends upon the extent to which the job that we hold meets the needs that we feel it should meet. The degree of satisfaction is determined by the ratio between what we have and what we want."

In the field of education, job satisfaction is a sine qua non in developing the quality of instruction, educational and research output and teacher-student relationship. The madrasas are regarded as social system and madrasa teachers are important actors in that, competence of teachers determines the quality of education.

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Madrasa

Madrasa is a place or Islamic seminary where education is imparted. The word '*Madrasa*' is derived from Arabic language, meaning a building where Islamic teaching learning takes place (American Heritage Dictionary of English language). In the Arabic language the word *madrasah* is used in the same manner as '*School*' is used in the English language.

Currently *Madrasas* are identified as the centers of Islamic learning. They have their own curriculum. The Madrasas of Sub-continent generally follow a curriculum known as Dars-i-Nizami, which was first of all incorporated in 1747 by Mullah Nizamuddin Sihalvi, a renowned scholar of Islamic Philosophy in Lucknow.

Bano (2007) avers that madrasas are philanthropic autonomous bodies, running on the funds of well-wishers, philanthropists and NGO's, having their own curriculum and are providing free education along with free boarding.

SIGNIFICANCE OF THE STUDY

The quality of a nation is contingent upon the quality of its citizens; the quality of citizens is more than any other characteristics based upon the quality of education. The quality of education is mostly influenced by the performance of teachers; therefore it is required to study the factors influencing teacher's performance. The performance or effectiveness of a teacher is influenced by psycho- socio- economic factors like his personality, qualifications, attitude towards job, interests, job satisfaction, mental health etc. According to Shan (2001) job satisfaction of a teacher is a determinant of teacher commitment, a predictor of teacher retention and in turn a contributor to school effectiveness. Job satisfaction is correlated to positive work values, enhanced job performance, low rates of absenteeism, turnover and burnout and high levels of employee motivation. A professionally satisfied teacher has a good value pattern, high enthusiasm and zeal towards duties and has a friendly attitude, contributing immensely towards the student's educational advancements. Job satisfaction of teachers is influenced by their level of mental health. Mental health and job satisfaction of teachers are significantly correlated and are essential to the growth of educational system.

The pace of a convoy of vehicles is dependent upon the speed of the slowest vehicle within it. The strength of a chain is influenced by the strength of the weakest ring in the chain. In the same manner, the strength of the nation is based upon the strength of the minority sections of the nation. As the review of related literature revealed that a lot of research has been conducted on mental health and job satisfaction, but the present investigator could hardly find out any study carried on mental health and job satisfaction of madrasa teachers. As no study has been conducted on mental health and job satisfaction of madrasa teachers, the investigator felt the need for conducting a study on mental health and job satisfaction of Madrasa teachers of District Shopian.

The purpose of the study is to examine mental health and job satisfaction of madrasa teachers of District Shopian. It is increasingly realized by all those concerned with madrasa education that standard of education in madrasas can't be improved unless the madrasa teachers, who have the key role to play, possess good mental health and are competent and involved in their work. Hence it was decided to study the mental health and job satisfaction of madrasa teachers of district Shopian.

STATEMENT OF THE PROBLEM

A Study of Mental Health and Job Satisfaction among Madrasa Teachers of District Shopian.

OPERATIONAL DEFINTION OF THE KEY TERMS

Mental health

Mental health is an index which shows the extent to which the person has been able to meet his environmental demands- social, emotional or physical.

Job satisfaction

Job satisfaction is the result of various attitudes of an employee towards his job. These attitudes are related with specific factors such as salary, service conditions, advancement opportunities and other benefits. In case of job satisfaction of teachers, there are certain other factors also, which are important such as intrinsic aspect and rapport with students etc.

Madrasa teachers

The teachers who teach in the Madrasas of District Shopian.

Shopian

Shopian is one of the districts of Jammu and Kashmir. The district Shopian is located in the south and south-west extremity of Kashmir valley, lying in the close proximity of Pir-Panjal mountain range. The district Shopian is located between 33.43^{o} N to 74.49^{o} East of latitude and longitude respectively.

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OBJECTIVES OF THE STUDY

The objectives of the study were framed as

1 To study the level of Mental Health of madrasa teachers.

2 To study the level of Job Satisfaction of madrasa teachers.

3 To find out the significance of difference between male and female madrasa teachers on Mental Health.

4 To find out the significance of difference between male and female madrasa teachers on Job Satisfaction (Composite Score).

5 To find out the significance of difference between male and female madrasa teachers on Job Satisfaction (Dimensional Score).

6 To find out the relationship between Mental Health and Job Satisfaction of madrasa teachers.

HYPOTHESES OF THE STUDY

The following hypotheses were formulated for the present study

1 There is no significant difference between male and female madrasa teachers on mental health.

2 There is no significant difference between male and female madrasa teachers on job satisfaction (composite score).

3 There is no significant difference between male and female madrasa teachers on job satisfaction (dimension wise).

4 There is no significant relationship between mental health and job satisfaction of madrasa teachers.

RESEARCH METHOD

Considering the nature of the research problem, descriptive method of research was employed.

Population

The population for the present study comprised of all the teachers teaching in madrasas of District Shopian.

Sample

The sample for the present study consisted of 90 Madrasa teachers (60 Male and 30 Female) who were selected from different Madrasas of District Shopian. As the number of female teachers was less than the number of male teachers, so only 30 female teachers were accordingly selected.

Research tools used

The following tools were employed by the investigator for data collection for the present study

1) Mental Health Checklist (MHCL) by Pramod Kumar.

2) Job Satisfaction Scale (JSS) by Meera Dixit.

Statistical techniques employed

The following statistical techniques were employed for the analysis of data

1) t- test

2) Karl Pearson's coefficient of correlation.

3) Percentage

STATISTICAL ANALYSIS

The statistical analysis of the data of this Study has been given under following headings

- Descriptive analysis
- Comparative analysis
- Correlational analysis

SECTION A: DESCRIPTIVE ANALYSIS

Table Showing the overall levels of Mental Health among Madrasa teachers

Levels of Mental Health	N	%age
Extremely Poor Mental Health	0	0.0
Highly Poor Mental Health	0	0.0
Above Average Poor Mental Health	0	0.0

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Moderate Poor Mental Health	11	12.2
Good Mental Health	18	20.0
Highly Good Mental Health	36	40.0
Extremely Good Mental Health	25	27.8
Total	**90**	**100.0**

The above mentioned table depicts that none of the madrasa teachers fall in the Extremely Poor Mental Health, Highly Poor Mental Health and Above Average Poor Mental Health categories / levels. The table also shows that 12.20%, 20%, 40% and 27.80% madrasa teachers fall in the Moderate Poor Mental Health, Good Mental Health, Highly Good Mental Health and Extremely Good Mental Health levels respectively.

Table Showing the levels of Mental Health among male and female Madrasa teachers

Levels of Mental Health	Male Teachers		Female Teachers	
	N	%age	N	%age
Extremely Poor Mental Health	0	0.0	0	0.0
Highly Poor Mental Health	0	0.0	0	0.0
Above Average Poor Mental Health	0	0.0	0	0.0
Moderate Poor Mental Health	7	11.7	4	13.3
Good Mental Health	12	20.0	6	20.0
Highly Good Mental Health	24	40.0	12	40.0
Extremely Good Mental Health	17	28.3	8	26.7
Total	**60**	**100.0**	**30**	**100.0**

A perusal of the above mentioned table shows the levels of mental health of male and female madrasa teachers of district Shopian. The data reveals that none of the madrasa teachers, neither male nor female, fall in the Extremely Poor Mental Health, Highly Poor Mental Health and Above Average Poor Mental Health categories / levels. The table shows that 11.70% male and 13.30% female, 20% male and 20% female,40% male and 40% female and 28.30% male and 26.70% female madrasa teachers fall in the Moderate Poor Mental Health, Good Mental Health, Highly Good Mental Health and Extremely Good Mental Health levels respectively.

Table Showing the overall levels of Job Satisfaction among Madrasa teachers

Levels of Job Satisfaction	N	%age
Extremely High Satisfaction	14	15.6
High Satisfaction	45	50.0
Above Average Satisfaction	21	23.3
Average/Moderate Satisfaction	10	11.1
Below Average Satisfaction	0	0.0
Dissatisfaction	0	0.0
Extremely Dissatisfaction	0	0.0
Total	**90**	**100.0**

A perusal of the above table shows the levels of job satisfaction of madrasa teachers of district Shopian. The data reveals that 15.60% madrasa teachers of district Shopian fall in the Extremely High level of job satisfaction, 50% madrasa teachers fall in the High Satisfaction level of job satisfaction. The data further reveals that 23.30% madrasa teachers fall in the Above Average Satisfaction level and 11.10% fall in the Average/Moderate Satisfaction level of job satisfaction. The data also depicts that no madrasa teacher fall in the Below Average Satisfaction, Dissatisfaction and Extremely Dissatisfaction levels of job satisfaction.

Table showing the levels of Job Satisfaction among male and female Madrasa teachers

Levels of Job Satisfaction	Male Teachers		Female Teachers	
	N	%age	N	%age
Extremely High Satisfaction	12	20.0	2	6.7
High Satisfaction	27	45.0	18	60.0
Above Average Satisfaction	15	25.0	6	20.0
Average/Moderate Satisfaction	6	10.0	4	13.3
Below Average Satisfaction	0	0.0	0	0.0
Dissatisfaction	0	0.0	0	0.0
Extremely Dissatisfaction	0	0.0	0	0.0
Total	**60**	**100.0**	**30**	**100.0**

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The above mentioned table shows that 20% male madrasa teachers and 6.70% female madrasa teachers fall in the Extremely High Satisfaction level of job satisfaction. The table further shows that 45% male and 60% female,25% male and 20% female and 10% male and 13.30% female madrasa teachers fall in the High Satisfaction, Above Average Satisfaction and Average / Moderate Satisfaction levels of job satisfaction respectively. However, none of the madrasa teachers, neither male nor female, fall in the Below Average Satisfaction, Dissatisfaction and Extremely Dissatisfaction levels of job satisfaction.

SECTION B: COMPARATIVE ANALYSIS

MENTAL HEALTH

Table showing the mean comparison between male and female madrasa teachers on mental health

	Gender	N	Mean	Std. Deviation	t-value	Level of significance
Mental Health	Male Teachers	60	6.15	2.254	0.300	Insignificant
	Female Teachers	30	6.30	2.231		

The perusal of the above mentioned table shows that there is no significant difference between male and female madrasa teachers on mental health. As the mean score of female madrasa teachers (6.30) is slightly higher than the mean score of male madrasa teachers (6.15), whereas their S.Ds are (2.231) and (2.254) respectively. However, the t-value is (0.300), which is not statistically significant. Therefore, it can be inferred that male and female madrasa teachers do not differ significantly on Mental Health.

JOB SATISFACTION

Table showing the mean comparison between male and female madrasa teachers on composite score of Job Satisfaction Scale

	Gender	N	Mean	Std. Deviation	t-value	Level of significance
Job Satisfaction (overall)	Male Teachers	60	200.62	6.444	0.852	Insignificant
	Female Teachers	30	199.40	6.360		

The perusal of the above mentioned table depicts that male and female madrasa do not differ significantly on 'Overall' dimensions of Job Satisfaction Scale. The obtained t-value is (0.852) which is not statistically significant. So, it can be inferred that there is no significant difference between male and female madrasa teachers on Job Satisfaction. Both male and female madrasa teachers have similar satisfaction of Job.

Table showing the mean comparison between male and female madrasa teachers on 'Intrinsic Aspect of the Job' (A) dimension of Job Satisfaction Scale

	Gender	N	Mean	Std. Deviation	t-value	Level of significance
A	Male Teachers	60	28.17	1.542	2.062	Sig. at 0.05 level
	Female Teachers	30	27.60	1.037		

A: Intrinsic Aspect of the Job.

The perusal of the above mentioned table shows that there is a significant mean difference between male and female madrasa teachers on 'Intrinsic Aspect of The Job' dimension of Job Satisfaction Scale. The obtained t-value came out to be (2.062) which is significant at (0.05) level. The mean difference favours male teachers which reveal that male madrasa teachers have better intrinsic aspect of job than female madrasa teachers.

Table showing the mean comparison between male and female madrasa teachers on 'Salary, Promotional Avenues and Service Conditions' (B) dimension of Job Satisfaction Scale

	Gender	N	Mean	Std. Deviation	t-value	Level of significance
B	Male Teachers	60	28.20	1.929	1.313	Insignificant
	Female Teachers	30	27.73	1.388		

B: Salary, Promotional Avenues and Service Conditions.

The table depicts that male and female madrasa teachers do not differ significantly on 'Salary, Promotional Avenues and Service Conditions' dimension of Job Satisfaction Scale. The obtained t-value is (1.313) which is not statistically significant.

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Table showing the mean comparison between male and female madrasa teachers on 'Physical Facilities' (C) dimension of Job Satisfaction Scale

	Gender	N	Mean	Std. Deviation	t-value	Level of significance
C	Male Teachers	60	29.73	1.274	2.643	Significant at 0.01 level
	Female Teachers	30	28.87	1.795		

C: Physical Facilities

The perusal of above mentioned table shows that there is a significant difference between male and female madrasa teachers on 'Physical Facilities' dimension of Job Satisfaction Scale. The obtained t-value came out to be (2.643) which is significant at (0.01) level. The mean difference favors male teachers which mean that madrasas meant for males have better physical facilities than madrasas meant for females. As there are separate madrasas for males and females, so physical facilities vary from madrasa to madrasa.

Table showing the mean comparison between male and female madrasa teachers on 'Institutional Plans and Policies' (D) dimension of Job Satisfaction Scale.

	Gender	N	Mean	Std. Deviation	t-value	Level of significance
D	Male Teachers	60	23.45	.832	1.123	Insignificant
	Female Teachers	30	23.67	.922		

D:Institutional Plans and Policies

A quick glance on the above table reveals that there is no significant difference between male and female madrasa teachers on 'Institutional Plans and Policies' dimension of Job Satisfaction Scale. The obtained t-value is (1.123) which is not statistically significant. So, it can be inferred that male and female madrasa teachers have a similar say in Institutional Plans and Policies.

Table showing the mean comparison between male and female madrasa teachers on 'Satisfaction with Authorities' (E) dimension of Job Satisfaction Scale

	Gender	N	Mean	Std. Deviation	t-value	Level of significance
E	Male Teachers	60	23.50	.854	0.156	Insignificant
	Female Teachers	30	23.53	1.137		

E: Satisfaction with Authorities.

The above mentioned table depicts that male and female madrasa teachers do not differ significantly on 'Satisfaction with Authorities' dimension of Job Satisfaction Scale. The obtained t-value is (0.156) which is not statistically significant. The mean difference favors female teachers which means female madrasa teachers are slightly better satisfied with authorities than male teachers. However, statistically there is no significant difference between male and female madrasa teachers on satisfaction with authorities.

Table showing the mean comparison between male and female madrasa teachers on 'Satisfaction with Social Status and Family Welfare' (F) dimension of Job Satisfaction Scale

	Gender	N	Mean	Std. Deviation	t-value	Level of significance
F	Male Teachers	60	22.87	.676	1.509	Insignificant
	Female Teachers	30	22.67	.547		

F: Satisfaction with Social Status and family welfare.

The perusal of the above mentioned table shows that there is no significant difference between male and female madrasa teachers on 'Satisfaction with Social Status and Family Welfare' dimension of Job Satisfaction Scale. The calculated t-value is (1.509) which is not statistically significant. So, it can be revealed that male and female madrasa teachers have a similar satisfaction with their social status and family welfare.

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Table showing the mean comparison between male and female madrasa teachers on 'Rapport with Students' (G) dimension of Job Satisfaction Scale

	Gender	N	Mean	Std. Deviation	t-value	Level of significance
G	Male Teachers	60	25.82	.813	2.866	Sig. at 0.01 level
	Female Teachers	30	26.27	.640		

G: Rapport with Students.

The perusal of the above mentioned table shows that there is a significant mean difference between male and female madrasa teachers on 'Rapport with Students' dimension of Job Satisfaction Scale. The obtained t-value came out to be (2.866) which is significant at (0.05) level. The mean difference favors female teachers which reveal that female madrasa teachers are better than male madrasa teachers on establishing rapport with their students.

Table showing the mean comparison between male and female madrasa teachers on 'Relationship with Co-workers' (H) dimension of Job Satisfaction Scale

	Gender	N	Mean	Std. Deviation	t-value	Level of significance
H	Male Teachers	60	18.88	.958	0.864	Insignificant
	Female Teachers	30	19.07	.944		

H: Relationship with Co-workers.

A quick look on the above mentioned table depicts that there is no significant difference between male and female madrasa teachers on 'Relationship with Co-workers' dimension of Job Satisfaction Scale. The obtained t-value is (0.864) which is not statistically significant. However, the table shows that the mean score of female teachers is slightly higher than male teachers on establishing relationship with co-workers.

SECTION C: CO-RELATIONAL ANALYSIS

Table showing the Correlation between Mental Health and Job Satisfaction among Madrasa Teachers

Variables	r
Mental Health Vs Job Satisfaction	0.965^{**}
Mental Health Problems Vs Job Satisfaction	-0.965^{**}

**Significant at the 0.01 level

The perusal of the above mentioned table depicts that there is a positive relationship between Mental Health and Job Satisfaction among madrasa teachers having coefficient of correlation r = 0.965 (p > 0.01). The above table also reveals that mental health problems have a negative correlation with job satisfaction among madrasa teachers, which in other words mean that Mental Health is a positive and significant correlate of Job Satisfaction. This depicts that lower the Mental Health Problems higher will be the Job Satisfaction. In other words, better the Mental Health higher will be the Job Satisfaction and lower the Mental Health lower will be the Job Satisfaction. Thus it can be inferred that Mental Health and Job Satisfaction are positively and significantly correlated to each other.

Table showing the Correlation between Mental Health and Job Satisfaction among Male Madrasa Teachers

Variables	r
Mental Health Vs Job Satisfaction	0.969**
Mental Health Problems Vs Job Satisfaction	-0.969**

**Significant at the 0.01 level

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The perusal of the above mentioned table depicts that there is a positive relationship between Mental Health and Job Satisfaction among male madrasa teachers having coefficient of correlation r = 0.969(p > 0.01). The above table reveals that mental health problems have a negative correlation with job satisfaction among madrasa teachers, which in other words mean that Mental Health is a positive and significant correlate of Job Satisfaction. This indicates that lower the Mental Health Problems higher will be the Job Satisfaction. In other words, better the Mental Health higher will be the Job Satisfaction and lower the Mental Health lower will be the Job Satisfaction among male madrasa teachers.

Table showing the Correlation between Mental Health and Job Satisfaction among Female Madrasa Teachers

Variables	r
Mental Health Vs Job Satisfaction	0.959**
Mental Health Problems Vs Job Satisfaction	-0.959**

**Significant at the 0.01 level

The perusal of the above mentioned table depicts that there is a positive relationship between Mental Health and Job Satisfaction among female madrasa teachers having coefficient of correlation r = 0.959(p > 0.01). The above table reveals that mental health problems have a negative correlation with job satisfaction among female madrasa teachers, which in other words mean that Mental Health is a positive and significant correlate of Job Satisfaction. This suggests that lower the Mental Health Problems higher will be the Job Satisfaction. In other words, better the Mental Health higher will be the Job Satisfaction and lower the Mental Health lower will be the Job Satisfaction among female madrasa teachers.

FINDINGS OF THE STUDY

The major findings of the study were as under

1) It was found that 27.8% madrasa teachers possess Extremely Good level of Mental Health, 40% Highly Good level of Mental Health, 20% Good level of Mental Health and only 12.2% possess Moderate or Poor level of Mental Health. However, no teacher was found in the Above Average Poor, Highly Poor and Extremely Poor levels of Mental Health.
2) There was no significant difference between male and female madrasa teachers on Mental Health.
3) In madrasas of District Shopian, 15.6% teachers were found enjoying Extremely High level of Job Satisfaction, 50%High level of Job Satisfaction, 23.3% Above Average level of Job Satisfaction and only 11.1% Average/Moderate level of Job Satisfaction. However, none of the madrasa teacher was falling in the Below Average, Dissatisfaction and Extremely Dissatisfaction levels of Job Satisfaction Scale.
4) There was no significant difference between male and female madrasa teachers on Job Satisfaction (Overall / Composite Score).
5) There was a significant difference between male and female madrasa teachers on 'Intrinsic Aspect of Job', 'Physical Facilities' and 'Rapport with Students' dimensions of Job Satisfaction Scale. However, it is worth to mention here that there are separate madrasas for males and females. Most of the madrasas meant for females were newly established and were still in the process of developing their infrastructure as well as other facilities, so that these madrasas will be at par with madrasas meant for males.
6) There was no significant difference between male and female madrasa teachers on 'Salary, Promotional Avenues and Service Conditions', 'Institutional plans and policies', 'Satisfaction with authorities', 'Satisfaction with social status and family welfare' and 'Relationship with Co-workers' dimensions of Job Satisfaction Scale.
7) Mental health and job satisfaction were positively and significantly correlated to each other.
8) Mental health was found to be a significant and positive correlate of job satisfaction in case of both male and female madrasa teachers.

EDUCATIONAL IMPLICATIONS OF THE STUDY

The development of a nation is contingent upon the quality of its citizens; the quality of citizens is mostly based on quality of education. The quality of education is mostly influenced by the effectiveness and performance of

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teachers, which in turn is influenced by various psycho- socio- economic factors like attitude towards teaching profession, qualifications, interests, social recognition, mental health, job satisfaction etc. mental health and job satisfaction are determinants of teacher commitment, predictors of teacher retention and in turn contributors to school effectiveness. The madrasa management personnel, administrators and educational policy makers may utilize the findings of the present study. The educational implications of the present study are as under:

1. The findings may be employed for the development of madrasa educational system in particular and general education system in general.
2. The present study revealed that mental health is positively correlated with job satisfaction. Therefore candidates with good mental health should be preferred for teaching profession.
3. All the dimensions of job satisfaction viz. intrinsic aspect of the job, salary, promotional avenues and service conditions, physical facilities, institutional plans and policies, satisfaction with authorities, satisfaction with social status and family welfare, rapport with students and relationship with co-workers should be given due importance by the administrators and policy makers.
4. The teachers must limit their desires and should be realistic in their approach. They should take teaching as a noble profession and should be faithful to their profession.
5. The teachers as well as administrators should follow the religion fully for peace of mind and satisfaction in life. They should take work as worship.
6. There should be cooperation and mutual understanding between administrators and teachers, teachers and teachers, teachers and students and teachers and their family members for better mental health and satisfaction in teaching.

SUGGESTIONS FOR FUTURE RESEARCH

1) The study could be conducted on a large sample covering the entire Jammu and Kashmir state.
2) The study was confined to mental health and job satisfaction of madrasa teachers. Studies could be conducted on madrasa teachers with reference to their professional commitment, teaching effectiveness, occupational stress, locus of control, self-concept, self-esteem, personality, social intelligence, emotional intelligence and other aspects.
3) A comparative study could be conducted on teachers of madrasas, private schools and government schools with reference to their mental health, job satisfaction, personality and other dimensions.
4) The present study was a survey based study and involved quantitative data. However, research could be conducted with longitudinal approach involving observation of madrasa teachers over a long time frame.

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International Journal of Advance and Innovative Research
Volume 6, Issue 1 (XIII): January - March, 2019
ISSN 2394 - 7780

INCLUSION OF THE UNBANKABLE: PERFORMANCE ANALYSIS OF REGIONAL RURAL BANKS

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ABSTRACT
The cooperative banks and the commercial banks in India before 1975, had reasonable records in terms of geographical coverage and disbursement of credit, yet, the portfolio of the cooperative banks' was dominated by the rural rich, while the commercial banks had a clear urban bias. Therefore, Regional Rural Banks (RRBs) were established in India for a stronger institutional arrangement essentially for the purpose of taking banking services to the doorsteps of rural people, particularly to the unbankable. However, balancing the objective of financial inclusion and being profitable is a tightrope walk for the RRBs. The present study is an attempt to evaluate the performance of the RRBs in India with special reference to the Baroda Gujarat Grameen Bank, a RRB in Gujarat state of India.

Keywords: Microcredit, Regional Rural Banks, Financial Performance of RRBs, Financial Inclusion

INTRODUCTION
Various initiatives over the decades have been taken to bring about a reduction in number of the unbankable. The initiative in the fifties was state partnership with co- operatives, in the late sixties it was the nationalization of the banks and in the seventies the setting up of the Regional Rural Banks (RRBs). The other initiatives taken later have been the banking correspondents model, the SHG-Bank linkage model and the Micro Finance Institutions. The initiatives have yielded results as is evident from the fact that the percentage of the institutional finance has risen from 7.2% (rural population) in 1950-51 (Committee on Comprehensive Financial Services for Small Businesses and Low Income Households Report, 2013) to 54.4% (rural population) as per 2011 census.

The state sponsored, region-based, and rural oriented Regional Rural Banks (RRBs) were created on the recommendation of the Narsimham Committee in 1975. The objectives were to cover the gaps in the rural credit structure; to meet the credit requirement of weaker sections of rural society; to drive the moneylender "out of business" and bridge the gap unfilled by the rural cooperatives and commercial banks. It was envisaged that the RRBs would be able to have a local feel and familiarity of rural problems as the Cooperatives, and the professionalism and large resource base of the commercial banks. They carry an image of a "social bank" and are labeled as the original "microfinance bank". Microfinance is the provision of financial services to low-income clients or solidarity lending groups including consumers and the self-employed, who traditionally lack access to banking and related services. Microfinance is now being considered as one of the most important and effective mechanism for poverty alleviation and financial inclusion.

The mandate of promoting banking with a rural focus, however, would be an enduring phenomenon only when the financial health of the RRBs is sound. Institutional arrangements (Bhatt and Thorat 2004); role-played by the sponsor banks (Misra, 2006); operating efficiency (Bhatt and Thorat 2004, and Dunn 2002); product design (Micro-Credit Ratings International Limited Report 2003, and Dunn 2002); HR issues like attitude and behaviour of managers (Megicks, Mishra and Lean 2004), are some of the key factors that affect the ability of RRBs to achieve both outreach and viability objectives.

As per the 59th round of the National Sample Survey, only 27% of the farmers get formal credit. Over 22% still depend on the informal market. Over 51% have not taken credit in any form. The urgency for inclusion of the unbankable can be had from the fact that 74,499 villages in the country are unbanked (Reserve Bank of India, March 2012). Lok Capital (2011) estimates that the penetration potential of the existing microfinance model is approximately between 43 million to 52 million households, out of which 22.6 million are existing customers. This implies an unaddressed demand of 20 million to 29 million customers. Thus, large areas of India continue to be underserved. There are also regional imbalances as far as financial inclusion is concerned, which is evidenced from the fact that 54% of all microfinance clients are concentrated in the Southern States: Andhra Pradesh, Karnataka, Kerala and Tamil Nadu. According to CRISIL Inclusix 2013, an index to measure financial inclusion, credit penetration is low in western and north eastern parts of the country. Further, states having outstanding economic growth may rank low in financial inclusion. Gujarat is one such state. It contributes more than 7% to the Indian GDP and had an annual average GSDP growth rate of 9.1% during 2008-11, well above the national growth rate of 8.2% during the same period. Yet, it falls into the category of low financial inclusion.

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Regional Rural Banks are an important channel to bring about financial inclusion. A survey was conducted to find out the views of the RRB managers relating to the factors that affect the performance of the RRBs. The paper comprises of five sections including the introduction. Section 2 describes the research plan adopted for the study. Section 3 incorporated the views of the Managers of RRBs (Baroda Gujarat Gramin Bank) relating to the performance of the RRBs India. Sections 4 and 5 deal with policy implications and conclusion.

RESEARCH PLAN

Secondary data and primary data sources have been tapped to analyze the performance of the RRBs. For the primary data collection a survey of the managers of the BGGB was conducted.

According to the State wise Index of Financial Inclusion (IFI) Gujarat falls in the category of Low Financial Inclusion (<0.3) with an IFI score of 0.26 and Maharashtra under the category High Financial Inclusion (>0.5 - 1) with an IFI score of 0.53 and IFI rank 2 (RBI Working Paper on Financial Inclusion in India, July 2011).

BGGB covers fourteen districts of Gujarat, out of which three districts Dahod, Panch Mahal and Tapi have low level of inclusion (CRISIL Inclusix scores 21.7, 22.6 and 23.4 respectively) , five districts Dangs, Narmada, Surat, Valsad, Chhotaudepur and Kheda have below average level of inclusion (CRISIL Inclusix scores 33.1, 29.7, 32.4, 38.7 and 33.0 respectively) and four districts Anand, Vadodara, Bharuch and Navsari have above average level of inclusion (CRISIL Inclusix scores 43.9, 51.1, 42.2, 49.1 respectively). As such there is representation of districts having low, below average and above average level of financial inclusion under the BGGB jurisdiction. Further, six districts of Gujarat namely Dahod, Dang, Narmada, Panch Mahal, Banaskantha and Sabarkantha are receiving the Backward Regions Grant Fund (BRGF). The BRGF is designed to redress regional imbalances in development. Out of these six districts, four districts fall within the coverage area of BGGB.

As Gujarat fares low in financial inclusion; the Bank of Baroda has an average net NPA higher than the all India average; and BGGB fares poorly as compared to the other two RRBs operating in Gujarat and has four most backward districts in Gujarat, and has districts having low, below average and above average level of financial inclusion under its coverage area; Gujarat and Baroda Gujarat Gramin Bank have been selected for the study.

An attempt has been made to gather the views of the managers of the BGGB related to the various performance parameters identified through literature review.

The Regional Office at Valsad has been taken up for study. The Regional Office at Valsad covers five districts (network of 85 branches) namely Valsad (15), Dangs (04), Navsari (31), Surat (32) and Tapi (03). All the branch managers of Valsad, Dangs, Navsari and Tapi districts were contacted, except one. Thus the total respondents for the study were 52. For the study a survey research method was adopted. A non disguised, structured questionnaire was used as an instrument to collect the data.

PERFORMANCE OF THE RRBs: VIEWS OF THE MANAGERS

We have tried to find out the views of the managers of Baroda Gujarat Gramin Bank with regards to the performance of the RRBs. Five factors were identified from literature review which have an impact on the performance of RRBs. They are- governance issues, HR issues, use of technology, strategic issues and risk management.

GOVERNANCE ISSUES

The governance issues covered are support system required by the RRBs from the sponsor bank; incentive structure and the commercial orientation of the RRBs; constraints faced; conflicting roles of the stakeholders and its effect on the performance of the RRBs; multiple schemes available to the borrower and its effect on the RRBs' performance; change of policies with the change in governments; and the cost control measures adopted.

Table-1.1: Support System and Performance of RRBs

Kind of support from sponsor bank	Level of Importance (for performance of RRBs)				
	very important	important	undecided	not that important	not at all important
Advice on financial decisions	13	25	09	05	00
Meeting skill requirements	15	19	09	09	00
Management of operations	15	20	10	07	00
Competition for business	04	18	13	11	06

Source: Survey Data.

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From the table 2.1, it can be seen that the advice of the sponsor bank on financial decisions is important for the performance of RRBs followed by support for managing operations and thereafter for meeting skill requirements.

Table-1.2: Incentive Structure and Commercial Orientation

Factors that Affect Performance of RRBs	Yes	%
Incentive structure for key stakeholders(political leaders, policy makers, bank staff and clients)	21	40.38
Lack of commercial orientation of RRBs	31	59.62

Source: Survey Data.

59.62% of the respondents felt that the lack of commercial orientation and 40.38% of the respondents felt that the incentive structure affects the performance of the RRBs.

Table-1.3: Constraints Faced

Constraints	Type of Constraints	Its impact on Performance and what needs to be done
Policy-level	Country's laws and regulatory statutes	The impact is on: * recovery *profitability *implementation of government schemes *increase in NPA
Program-level	Criteria formulated by board members and used by managers to screen borrowers, make lending decisions, collect loans, and assess program performance	These do not have much impact on performance.
Client-level	Rules for borrowers and investors in accessing and using financial services	* It should be as per other competitors *Rules and forms to be filled up by clients for loans should be user friendly and be in the local language

Source: Survey Data.

The type of constraints, their impact on performance and course of action that could be taken are depicted in table 2.3.

Table-1.4: Conflicting Role/Interests of Stakeholders and its Effect on Performance

Role of Stakeholders and its Effect on Performance	No. of Respondents	%
Yes	30	57.69
No	22	42.31

Source: Survey Data.

A mixed response was found with regards to the conflicting role/interests of the stakeholders and the performance of the RRBs. 57.69% believed that the conflicting role/interests of the stakeholders had an impact on the performance. One of the examples given was - the insistence of the shareholders to increase lending and outreach and the officers giving larger loans without proper screening.

Table-1.5: Multiple Schemes Available to the Borrower and its Effect on the Performance of RRBs

Multiple Schemes available to Borrower and its Effect on Performance	Yes	%	No	%
	48	**92.30**	**04**	**7.70**

Source: Survey Data.

Nearly all the managers (92.30%) believed that multiple schemes for loans have a bearing on the performance of the RRBs as evidenced from table 2.5. The managers of the RRBs were of the opinion that multiple schemes available to the borrowers tempt them to apply for multiple loans. Loan defaults may occur if the loans are used largely for consumption purposes and if the borrowers lack entrepreneurial skills. The RRBs are responsible for implementing various schemes of the government like Aadhar Number based subsidies under the Direct Benefit Programme, Mission Mangalam, Protsahak Pension Yojana, and disbursement of a one-time loan to the weaker sections. Many beneficiaries consider these to be "free money" from the government. Neither the lenders nor the borrowers are interested in maintaining a long-term relationship. This may lead to increase in NPA for the RRBs.

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Table-1.6: Change in Government Policies Related to Loan with Change in Government (Ruling Political Party) and its Effect on the Performance of RRBs

Change in Government Policies and its Effect on Performance of RRBs	Yes	%	No	%
	41	78.85	11	21.15

Source: Survey Data.

Majority of the managers opined that change in government policies affects the performance of RRBs. Many a times with a change in government bankers may be instructed to implement the revised policies related to reduction in interest rates and or writing off unpaid loan balances which adversely affect the performance of bank.

Table-1.7: Cost Control Measures

Areas of Cost Control	No. of Respondents	% of Respondents
Training	19	36.54
Loan administration	20	38.46
Loan monitoring	27	51.92
Set-up costs of the branches	25	48.08

Source: Survey Data.

When asked about various measures to control costs, managers were of the view that more scope exists in controlling loan monitoring cost and set up cost of branches (table 2.7).

HR ISSUES

The HR issues covered under the study are compensation package; multiple reporting/controlling authorities; and HR practices like recruitment, training and appraisal.

Table-2.1: Compensation Package for Officials/Employees of RRBs

Type of Compensation Package	No. of Respondents	%
Fixed salary only	00	00
Fixed salary plus performance linked incentives	00	00
Fixed salary plus recognition through awards for good performance	52	100

Source: Survey Data.

All the respondents felt that the compensation package should have a fixed salary component and there should be recognition through awards for good performance (table 3.1).

Table-2.2: Multiple Reporting/Control Authorities (Central Government, State Government and NABARD) and its Impact on Performance

Multiple Reporting/Control authorities and its impact on Performance	No. of Respondents	%
very much	34	65.38
Somewhat	18	34.62
not at all	00	00
can't say	00	00

Source: Survey Data.

Majority (65.38%) of the respondents felt that the multiple reporting/controlling authorities very much affect the performance of RRBs.

Table-2.3: Satisfaction Level Related to HR Practices in RRBs

HR practices	very much satisfied	satisfied	Undecided	dissatisfied	very much dissatisfied	Weighted Average
Recruitment	05	19	10	13	05	3.115
Training	01	23	10	15	03	3.077
Appraisal	00	18	23	10	01	3.115

Source: Survey Data.

The respondents are neither satisfied nor dissatisfied with the recruitment, training and appraisal practices as can be seen from table 3.3

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TECHNOLOGY ADOPTION

It has been largely expressed that in order to become cost-effective and a profitable business proposition, the RRBs need to adopt appropriate low-cost technology. Such technology could then reduce transaction costs of providing banking services in the rural, unbanked and backward areas of the country.

The respondents were of the view that technology could be harnessed for improving upon operations, in product development, promotional efforts, in documentation and other areas. This has been summarized in table 5:

Table-3: Broad Areas for the Use of Technology

Broad areas for Use of Technology	Specific areas
Operations	Efficient service, fund transfer, record keeping
Product development	NET banking, ATM, National Electronic Funds Transfer, savings
Promotional efforts	Advertising, awareness creation
Documentation	Preparing reports
Other areas	Training employees to become tech savvy, speedy transactions, speedy response to information needs of customers, up gradation in software, Real Time Gross Settlement, Core Banking Solution

Source: Survey Data.

STRATEGIC ISSUES

The views of the respondents with regards to the strategies that could be adopted to compete with other microfinance delivery channels relate to product innovations, increasing accessibility, change in attitude of employees in dealing with customers, and reduction in documents required for getting loans.

Table-4: Strategies to Compete with other Microfinance Delivery Channels

Strategies	No. of Respondents	%
Product innovations	26	22.03
Increasing accessibility	25	21.19
Change in attitude of employees in dealing with clients	20	16.95
Reduction in documents required for getting loan	47	39.83
Any other	Having a marketing orientation, emphasis on training of staff	

Source: Survey Data.

RISKS MANAGEMENT

Given the nature of the banking business, the need for risk management is of crucial importance for a bank's financial health. Risk management is a reflection of the quality of the assets with a bank and its liquidity. The risks covered under the study were market, credit, counter-party, liquidity, operational and legal. Table 7, reflects the views of the respondents with regards to the nature of risks involved and the policies that could be adopted to overcome these.

Table-5: Views on Risk Management

Type of Risks	Nature of risk	Policies that could be adopted to overcome risks
Market risk	General level of interest rate	
Credit risk	Non-performance by the borrower	*By using latest technology RRBs are reducing credit risk. *Proper appraisal and extensive follow-up could be adopted.
Counterparty risk	Non-performance of trading partner due to legal or political constraints	*RRBs are making quality lending by proper documentation
Liquidity risk	Funding crisis- The state governments contribute 15% in the equity capital of RRBs, if they default on their capital contributions, the equity base of the banks is weakened	*Help of NABARD for refinance could be taken to overcome liquidity risk.
Operational risk	Record keeping, processing system failures and compliance with various regulations	*Technology could be harnessed. There could be loss increases initially but

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		economy could be achieved gradually by adoption of technology
Legal risk	New statutes, tax legislations, court decisions, contentions due to change in well established regulations	*Help of Chartered Accountants, tax consultants, legal aid, valuers and recovery agency could be taken

Source: Survey Data.

POLICY IMPLICATIONS

The objective with which the RRBs were set up was to bring progress with social justice and to provide credit to the weaker sections of the society in the rural areas. RRBs have a significant role and responsibility in the context of the emerging need for financial inclusion and expanding outreach of micro-credit in rural areas. RRBs have the potential and capability to emerge as a supplementary channel in delivering microfinance services. In order to further strengthen the performance of the RRBs certain policy initiatives could be taken in the areas like balancing the social and commercial orientations, HR, harnessing technology, measures to control costs, risk management, and generating awareness and increasing the accessibility of financial services.

BALANCING THE COMMERCIAL AND SOCIAL ORIENTATIONS

The role of the RRBs was to address the regional imbalances and functional deficiencies then prevailing in the institutional structure. The RRBs in pursuit of their objectives failed to have a commercial orientation that affected their earning capacity as they were mandated to lend only to the weaker section, charge lower rate of interest, open branches in remote rural areas and keep up a low cost profile. It was after the reforms of 1990s that the focus was also on commercial aspects. They were allowed to increase the fee based income by issuing bank guarantee, purchasing demand draft, lending to non target group and offering locker facilities. They could also invest in non –SLR securities subject to certain constraints. These could be seen as new products as also additional sources of income.

HR ISSUES

A transparent discipline framework is essential for the effective performance of the personnel and the RRB (Officers and Employees) Service Regulation 2010 is a step in this direction. The willingness of the employees, their commitment and how empowered they are affects the performance of the RRBs. Internal marketing needs to be strengthened. The recruitment, training, motivational tools employed and performance appraisal policies could be reassessed to raise the morale of the employees. Reward schemes could be framed and implemented in earnest to motivate the staff to put in their best and meet various targets.

HARNESSING TECHNOLOGY

Technology has and can play an important role in enhancing the performance of RRBs. Core Banking Solutions can be leveraged to generate MIS, facilitate data flow for regulatory purposes and help develop suitable products for customers through data mining. ICT can play an important role by increasing the accessibility and improving upon the governance in banking. Implementation of technology could also bring down operating costs. Since RRBs aim to meet the credit and savings needs of the poor and weaker section of the society whose earning patterns are different CBS can be leveraged to identify the needs of such customers and design tailor made products.

Survey data gathered from RRB officials revealed that the credit and loan products offered by RRBs are not matching the needs of unbankable and small borrowers. The Reserve Bank considers that IT-enabled services can be used to meet the challenges such as lack of adequate infrastructure, higher transaction costs and low volumes of transactions. Technology can be a very valuable tool in providing access to banking products in remote areas. ATMs, cash dispensing machines can be modified suitably to make them user friendly for people who are illiterate, less educated or do not know English. The role of technological innovations is much more important in bringing down the dependency on informal sources. Companies today outsource resources for better quality performance and/or efficiency. The RRBs could outsource the implementation of ICT based financial inclusion through initiatives like Smart Card and Business Correspondent Model, initiation of E-banking facility, integration of CBS server with Financial Inclusion server, and deployment of POS machines for online transactions.

MEASURES TO CONTROL COSTS-LOAN ADMINISTRATION AND MONITORING SET UP COST OF THE BRANCHES AND COST OF TRAINING

Each RRB needs to put in place suitable policies with the approval of the Board to contain loan administration, set up cost and training cost. Use of modern technology for monitoring of advances, fully computerized branches and introduction of alternative e-delivery channels could be an answer. Setting up of an internal training centre could be a step in the direction for controlling cost of training.

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RISK MANAGEMENT

Risk management is an important aspect that affects the performance of the RRBs. For containing the credit risk use of updated technology like ASCROM could be adopted with proper follow up. Bank staff could be given authority or incentive so that they could engage in due diligence and assess the risks before lending. Operational risk (record keeping, processing system failures and compliance with various regulations) could be overcome by recruiting technology savvy personnel, training the present staff and taking the help of the sponsor bank. Refinance from NABARD could be helpful in overcoming the liquidity risk.

GENERATING AWARENESS AND INCREASING ACCESSIBILITY

The needs of the target are: accessibility to financial services, credit, reasonable terms/condition for credit and choice. The target could be unbanked or under banked for which RRBs need to create awareness and increase the reach by taking them through the marketing funnel. For the unbanked, the benefits of microfinance (what is in for them) can be brought home by the RRBs through financial literacy camps. These camps are to be held for creating awareness about the formal financial system, opening of accounts and monitoring of the usage of accounts The facilities, rate of interest, terms and conditions related to microfinance can be stressed upon and comparison to competitors' offerings (moneylenders, co operative banks etc.) can be made.

Some of the efforts made towards new product development by the RRBs are- the introduction of the General Credit Card, Kisan Credit Card, Swarojgar Credit Card, Artisan Credit Card. The rural customers find the documentation process tedious. Many a times they need help of others to fill in the documents and avail of the benefits. The documents to be filled could be reduced and be in the local language to make them user friendly.

To further penetrate the market RRBs could motivate current clients for more usage of the current products and also cross sell products. For the conversion of the unbanked (financial inclusion) supplementary business models/channels could be thought of. RRBs can harness additional channels like the Joint Liability Groups (JLGs), Self Help Groups and Business Correspondents for bringing the unbanked under the banking fold. It is significant that as an institution they have the expertise and potential to fulfill both the requirements of SHGs - formation plus nurturing and financial service provisions (credit plus). Their dual role has special meaning in areas which face severe financial exclusion and which do not have a sufficient presence of well performing NGOs.

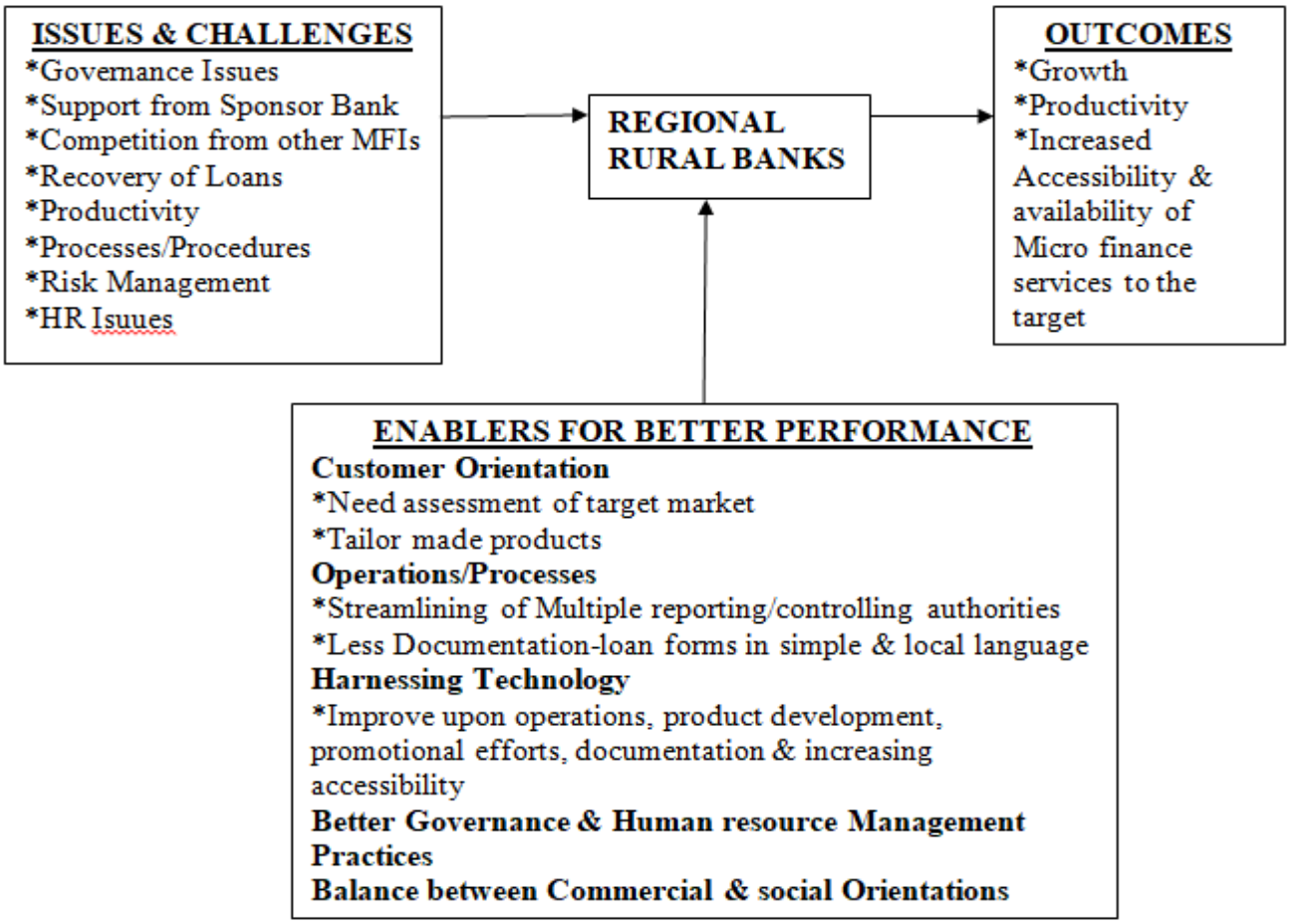

Fig.-1: Regional Rural Banks: Issues, Challenges & Enablers for better performance

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CONCLUSION

After nearly four decades of operation the major challenges and issues before the Regional Rural Banks relate to recovery of loans, cost of operation, methods of operation and procedures, technology adoption and better asset management. To meet these challenges customer orientation should be adopted to understand the needs and requirements of the target market (rural population) and offer products which meet their requirements. In order to curtail leakages, disbursements should be through proper channels. Forms to be filled up by clients for loans should be in local language and should be comprehensible to the rural masses. RRBs are required to provide similar information and reports to varied authorities like sponsor bank, RBI, and the NABARD. This in turn is a waste of resources and time of the RRBs. This overlapping reporting could be taken care of. Technology could be harnessed in areas like operations, product development, promotional efforts, and documentation.

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International Journal of Advance and Innovative Research
Volume 6, Issue 1 (XIII): January - March, 2019
ISSN 2394 - 7780

JOB SATISFACTION AMONG THE EMPLOYEES OF COOPERATIVE SOCIETIES: A STUDY WITH REFERENCE TO UDUPI TOWN

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ABSTRACT
Human resource management is the most important aspect of all organizations. The employee of an organization can make the organization or mar the organization. Hence, researchers made an attempt to highlight the main factors responsible for job satisfaction, to know the activities of cooperative societies and to project job satisfaction among the employees of cooperative societies. Cooperative society is not an exception as far as human resource management is concerned. The five-point Likert scalewas used to developthe questionnaire for determining job satisfaction in relation to factors like salary,interpersonal relationship,communication,attitude of superiors,working conditions and teamwork, training and development, rewards and compensation, nature of job,job security,morale and role clarity.The sample size of the present study is 200 and the area of the study is Udupi town.

Keywords: Job satisfaction, motivation, perception, performance, job enrichment

INTRODUCTION
In the modern competitive world, success of any organization depends on its human resources. Cooperativesocieties play a vital role in ensuring that thenation's economic progress confirms to the requirements of democratic planning. The concept of cooperative societyis not a new one. This is almost a universal concept, prevailing across all the countries. The institution of a cooperative society provides support and sustainability to rural economic activities. The importance of cooperative societies in the rural areas is mainly due to the fact that theyensure sustainable development of the agriculturists. A cooperative society is an autonomous body of people united voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise. Cooperative societies play a vital role when it comes to development goals. They not only generate income for their members but also offer a range of benefits.

OBJECTIVES
- To highlight the main factors responsible for job satisfaction
- To throw light on the activities of cooperative societies
- To project job satisfaction among the employees of cooperative societies

RESEARCH METHODOLOGY
SAMPLING
For the purpose of the study, the researchers selected the cooperative societies on the basis of random and stratified technique. The sampling units are accessible, easy to measure and cooperative. The researchers personally contacted 200 employees of cooperative societies in Udupi townon the basis of convenience. They were apprised of the purpose of the study and a request was made to them to fill up the questionnaire with correct and unbiased information.

TOOLS USED FOR THE STUDY
This study is descriptive and analytical in nature. It is based on primary and secondary data. Secondary data was collected from books, journals, magazines and internet. Primary data was collected by the researchers through a structured questionnaire provided to the employeesof the cooperative societies. The respondents were requested specifically to ignore their personal prejudices and use their best judgment on a five-point Likert Scale. For analysis and interpretation, researchers used simple statistical tools like percentage and some of the relevant and interesting data are presented in the tabular form and diagram (pie chart).Chi-square test was used for testing hypothesis.

HYPOTHESIS
H_0: There is no association between gender and level of satisfaction towards work relationship with subordinates.

H_1:-There is close association between gender and level of satisfaction towards work relationship with subordinates.

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SIGNIFICANCE OF THE STUDY

The effectiveness of cooperative societiesdepends upon the job satisfaction of its employees.Cooperative societies serve their members most effectively and strengthen the cooperative society movement by working together through local,regional,national and international structures.Cooperative societies provide training for their members so that employees contribute effectively for the development of their organization.

LITERATURE REVIEW

Fay.C.R: (1908):A cooperative society is an association for the purpose of joint trading, originating among the weak and conducted always in and unselfish spirit, on such terms that all, who are prepared to assume the duties of membership, may share in its rewards in proportion to the degree in which they make use of their association.

H. Calvert:(1915): Cooperative is a form of organisation,wherein persons voluntarily associate together as human being on the basis of equality, for the promotion of economic interests of themselves.

Mehta Committee (1959): The pattern of organization of primary societies which formed the base of the cooperative credit structure was settled on the basis of the recommendations of the Mehta Committee on credit.

Committee on Consumer Cooperatives (1961): Set up by the National Cooperative Development and Warehousing Board to examine the promotional and organizational aspects of the consumer's cooperative movement for ensuring sustainable development

Joel Edvinraj.D (2004):He has observed that the cooperatives have to face competition from private and multinational sectors on the one side and on the other side they have to rectify their losses. He has suggested the government that help and support should be continued until cooperatives can meet challenges and stand and survive by themselves.

Shoba Lal: (2017): Cooperative societies play a vital role in ensuring that the nation's economic progress confirms to the requirements of democratic planning.

FINDINGS OF THE STUDY

The study describes that the personal characteristics of the respondent employees i.e., age of the employees,gender,educational qualification and designation of the employees working in the town mostly belongs to the group of 25-60. Male employees working in the town are more than that of female employees and most of the employees are graduates and they have different designations. The objective was to highlight the main factors responsible for job satisfaction level of the employees like working environment, good relationship with other subordinates, appreciation, pay, promotion, etc.

It is observed that some of the factors are causing dissatisfaction regarding job; some are neither causing dissatisfaction nor contributing much towards job satisfaction.Factors like working environment of the employees, relationship with other employees, nature of work are contributing towards job satisfaction whereas dissatisfaction caused by these factors is almost negligible. Factors involving some amount of dissatisfaction include salary and incentives linked with the job.

On the other hand, there are some factors which cause dissatisfaction to the employees which include working hours and facilities for career growth and development of the employees. This is not a good sign. A large number of employees are suffering from dislocation and adjustment disorder which not only affects their job productivity but also reduces their job satisfaction levels.

Table-1: Age of employees

Age	No. of employees	Percentage
Below 25	32	16%
25-45	146	73%
46-60	22	11%
Total	200	100%

Source: Field survey data

Inference: The above table indicates that majority percentage (73%)of the respondents is in 25-45 years age group. The lowest percentage of respondents (11%) is 46-60 years old.

Table-2: Gender distribution of respondents

Gender	No. of employees	Percentage
Male	115	57.5%
Female	85	42.5%
Total	200	100%

Source: Field data survey

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Inference: The above table indicates that male employees working in the town,constituting 57.5%,are more than that of female employees,constituting 42.5%.

Table-3: Educational qualification of respondents

Educational qualification	No. of employees	Percentage
SSLC	14	7%
PUC	19	9.5%
Graduate	136	68%
Post graduate	26	13%
Other	5	2.5%
Total	200	100%

Source: Field data survey

Inference: As far as educational background of the respondents in concerned,7% are just SSLC passed,9.5% are PUC passed,68% are graduates,13% are postgraduates and 2.5% of the respondents have passed other exams.

Table-4: Designation of Respondents

Designation	No. of employees	Percentage
Attender	13	6.5%
Junior Clerk	30	15%
Senior Clerk	53	26.5%
Accountant	9	4.5%
Cashier	22	11%
Secretary	13	6.5%
Officer	9	4.5%
Manager	32	16%
Assistant manager	10	5%
CEO	9	4.5%
Total	200	100%

Source: Field survey data

Inference: Majority of the respondents are working as senior clerk (26.5%), Manager (16%), Secretary and Attender (6.5% each), Assistant Manager (5%), CEO, Officer and accountant (4.5% each).

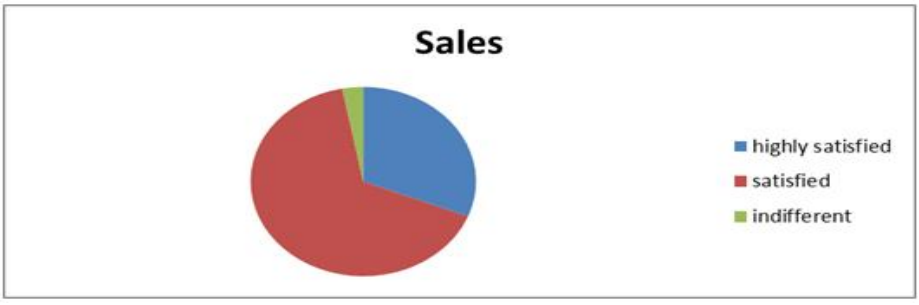
Table-5: Satisfaction with the nature of job

Satisfaction level	No. of employees	Percentage
Highly Satisfied	62	31%
Satisfied	125	62.5%
Indifferent	8	4%
Dissatisfied	1	0.5%
Highly dissatisfied	4	2%
Total	200	100%

Source: Field data survey

Inference: From Table 5 and figures,it can be inferred that 31% of the employees are highly satisfied with the nature of job,62.5% are satisfied with their job,4% are indifferent to their job,0.5% are dissatisfied and 2% are highly dissatisfied with the nature of their job.

Figure-1: Satisfaction level of work environment



Source: Field survey data

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Inference: Figure 1 shows that 62 employees are highly satisfied with their work environment, 132 employees are satisfied, and 6 employees are indifferent. Although majority of the employees are satisfied with their work environment, it does not lead to job dissatisfaction.

Table-6: Effect of relationship with colleagues and other subordinates staff on job satisfaction

Effects of relationship	No. of employees	Percentage
Strongly agree	90	45%
Agree	104	52%
Neutral	2	1%
Disagree	3	1.5%
Strongly disagree	1	0.5%
Total	200	100%

Source: Field survey data

Inference: The above table indicates that 45%strongly agree,52%are agree,1% are neither agree nor disagree,1.5% are disagree,0.5% are strongly disagree with the relationship between colleagues,subordinates,staff on job satisfaction.

TESTING HYPOTHESIS

H_0: There is no association between gender and level of satisfaction towards work relationship with subordinates.

H_1: There is close association between gender and level of satisfaction towards work relationship with subordinates.

Table-7: Association between gender and level of satisfaction towards work relationship with the subordinates

Gender/Level of satisfaction	Strongly agree	agree	Neutral	Disagree	Strongly Disagree	Total
Male	60	53	1	1	0	115
Female	32	50	2	1	0	85
Total	92	103	3	2	0	200

Source: Field survey data

Table-8: Chi-square analysis

Chi - square value	Table value	Significance
4.0364	3.84	significant

Source: Field Survey data.

There is close association between gender and level of significance towards work relationship with subordinates. Since calculated value is more than table value .Therefore null hypothesis rejected and alternative hypothesis has been accepted. Thus, researchers conclude that majority of the cooperative society employees are close relationship with subordinates.

Table-9: Effects of salary and incentives on job satisfaction

Satisfaction level	No. of employees	Percentage
Highly Satisfied	49	24.5%
Satisfied	105	52.5%
Indifferent	33	16.5%
Dissatisfied	9	4.5%
Highly dissatisfied	4	2%
Total	200	100%

Source: Field survey data

Inference: Employees were asked whether they were satisfied with the salary and incentives that they are receiving from the cooperative society about 24.5%of the respondents are highly satisfied with their salaries,52.5% are satisfied,16.5% are indifferent to it,4.5% are dissatisfied whereas the balance 2%of the respondents are highly dissatisfied with their pay packages.

Table-10: Satisfaction regarding working hours

Satisfaction	No. of employees	Percentage
Yes	150	75%
No	50	25%
Total	200	100%

Source: Field survey data

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Inference: Working hour is the most important factor contributing towards job satisfaction or job dissatisfaction. It is inferred from the above table that 75% of the employees are satisfied with the working hours while rest of the 25% of the employees are dissatisfied with their working hours, which is one of the main factorsfor job dissatisfaction.

Table-11: Effect of career growthand development on job satisfaction

Effects on career growth and development	No. of employees	Percentage
Good	53	26.5%
Average	44	22%
Very good	76	38%
Out standing	27	13.5%
Total	200	100%

Source Field survey data

Inference: Career growthand development plays a significant role in improving the efficiency of the work-force which makes the employees feel better equipped for the job at hand. 38% of the employees felt that the cooperative society lacked proper development facilities for the employees, 26.5% felt that they are good,22% felt that they are average and 13.5% felt that the facilities are outstanding.

CONCLUSION

Job satisfaction is a vast concept as it includes various factors associated with job satisfaction of the employees. Satisfaction varies from one employee to the other. The overall job satisfaction of the employees ofcooperative society is associated with different factors which includes nature of job, working environment,salary and incentives-linked job, promotional methods, relationship with other employees, management etc.,To conclude it can be said that with the change of satisfaction determinants,level of job satisfaction also varies. This study mainly investigated the relationship between job satisfaction and employee's performance and organizational commitment.Organizational commitment is likely to be strongly associated with employee retention.To ensure organizational commitment, companies must promote job satisfaction.The organizations lack on certain factors such as working conditions, career growth and development facilities. Researchers concluded that overall, the job satisfaction of the employees of cooperative societies, though not very high,is still satisfactory.But there is still considerable chance for improvement. An organization should try to take every possible step to enhance job satisfaction among its employees because if employees are satisfied then customers associated with it will also be satisfied.

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WEB RESOURCES

1. http://commerceatease.com
2. http://www.quora.com
3. http;//www.shodhganga.inflibnet.ac.in
4. www.yourarticlelibrary.com
5. http://www.collinsdictionary.com

International Journal of Advance and Innovative Research
Volume 6, Issue 1 (XIII): January - March, 2019
ISSN 2394 - 7780

AN INNOVATIVE APPROACH TO BITCOIN IDENTIFICATION OF ENTITIES USING HASH ALGORITHM

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ABSTRACT
In the digital world, the cryptocurrency has to do with the use of tokens based on the distributed ledger technology. Cryptocurrency can be a resource on a blockchain network or can be seen as a tool. This paper proposes a distributed architecture for the secure, attack-resilient and reliable bitcoin-based cryptocurrency transactions. The system primarily comprises of three application modules. Secure Bitcoin Entity Generation (SBEG) module to create secure bitcoin entities using cryptography-based hashing algorithm, Attack-resilient Nonce Generation (ANG) module includes a proposed pseudo-random based algorithm for the construction of resilient transactions against stealthy data-integrity attacks, and Application Programming Interfaces (APIs) module for the evaluation, verification and data analytics to the bitcoin entities. Privacy is one of the major interesting issues in the blockchain technology. In order to address the privacy, the project mainly focuses on an innovative approach for bitcoin identification using hashing. As it is available in the literature, SHA256 is having a unique property "Proof of Work" for a bitcoin technology based applications. In this context, the project deals with the design of an innovative procedure for proof of work of bitcoin using blockchain technology. It has been proposed to design and develop an effective security system through SHA256.

Keywords: Blockchain, Bitcoin, Cryptography algorithm and POW

I. INTRODUCTION
The blockchain is the distributed public ledger of Bitcoin entities that have ever been executed. It is continually growing as miners add new blocks to it to record the most recent transactions. The blocks are added to the blockchain in a linked list manner. Each distributed block connected to the Bitcoin network using a client that performs the task of validating/mining and relaying transactions. The blockchain genesis block has to provide the complete information about addresses and balances from the genesis block (the very first transactions ever executed) to the most recently completed block. The blockchain as a distributed public ledger means that it is easy to query any block explorer for transactions associated with a particular Bitcoin address - for example, you can look up your own block address to see the transaction in which you received your first Bitcoin. Blockchain technology has been used for the bitcoin as a digital currency. The blockchain is the name of the technology behind of Bitcoin. Technically the blockchain is similar to a database, except that interactions with them differ. A public distributed ledger of all blockchain transactions or digital events that have been executed and shared among the participating parties across peer-to-peer networks. Blockchain has two fundamental features. The blockchain is public. Anyone can view it at any time, because it resides on the network, and not within a single institution charged with maintaining and keeping the record. Blockchain also encrypted, since it uses encryption involving public and private keys to guarantee its security. The bitcoin system transactions by them in groups called blocks and then linking these blocks. The transactions in a single block are considered to have happened at the same time. These blocks are linked to each other (like a chain) in a linear, chronological order, with every block containing the hash of the previous block. Blockchain establishes the new bitcoin of the digital economy, there are seven design principles for creating software, services, business models, markets, organizations, and even governments on the blockchain.

II. RELATED WORK
Right now, companies around the world are using Blockchain technology, which is developed to the single and secure view of data transactions without referring to the third party. As it is available in the literature, a data storage method [1] by constructing a blockchain as a database instead of a general/conventional server construction method. Blockchain-based applications are including financial services and reputation system [2]. However, there are still many challenges of blockchain technology such as scalability and security problems waiting to overcome. The impact of a compromise of underlying cryptography and the way to extend the validity of block chain applying the long-term signature scheme [3] which was standardized in European Telecommunications Standards Institute (ETSI). The long-term signature scheme assumes the existence of centralized PKI(public key infrastructure) and secure time-stamp service. The paper peer-reviewed[4] bringing together academia and industry to analyze problems ranging from deploying newer cryptographic primitives on Bitcoin to enabling use cases like privacy-preserving file storage.

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III. PROPOSED SYSTEM

The work proposes to integrate the transaction and security as well as to protect from threats and disturbances by using blockchain Technology. The project focuses on adaptive featured dynamic hash algorithms for the cyber-secure data transactions in the Block-chain models[Fig.1]. It is proposed to demonstrate the efficacy of security and privacy of cryptocurrency data transactions for the Bitcoin application.

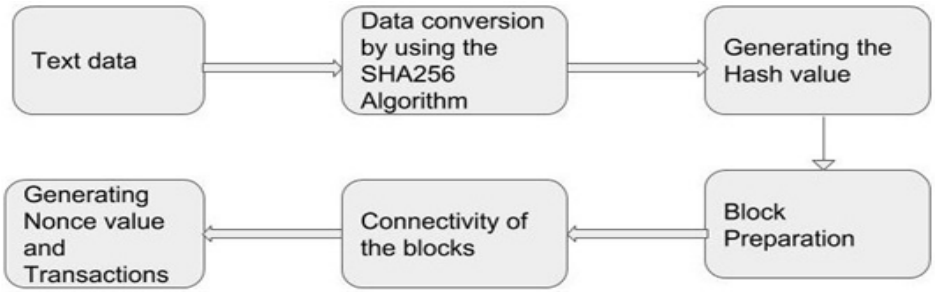

Fig-1: Blockchain Models

The blockchain comprises of the following modules

A. Data Conversion

Data to generate the hash value [Fig.2] by using the Cryptography Hash algorithm.

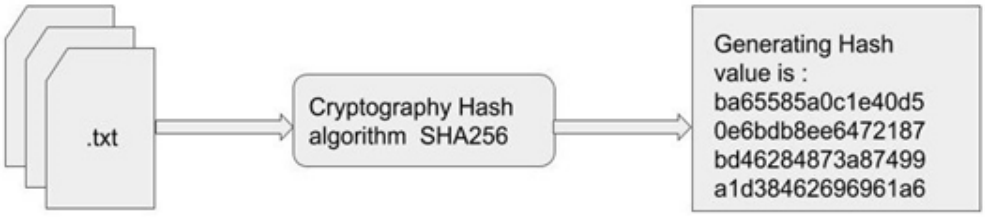

Fig-2: Generating the Hash Value

B. Block preparation

A block records some or all of the most recent Bitcoin block transactions that have not yet entered any prior blocks. Each and every block contains the Block no, Nonce, Data –Transaction, Previous Hash value and generated hash value. The blockchain facilitates a highly distributed ledger for accessing transactions, attributing them to a specific node in a network, and ordering them in time. Data is permanently recorded in the network system through files called blocks. A block is a record of some or all of the most recent transactions that have yet to be recorded in prior blocks. The ledger of previous transactions is called the blockchain, as it is a chain of blocks. A block consists of block body and block header. The block header contain of three sets of block metadata. First, there is a reference to a previous block hash value, which connects this block to the previous block in the blockchain. The second set of metadata, namely the difficulty, nonce, in the case of bitcoin, relate to the mining competition. The last piece of metadata is the Merkle tree root, a data structure used to efficiently specifies all the transactions in the block. The block [Fig.3] body includes a record of all transactions separated into input and output.

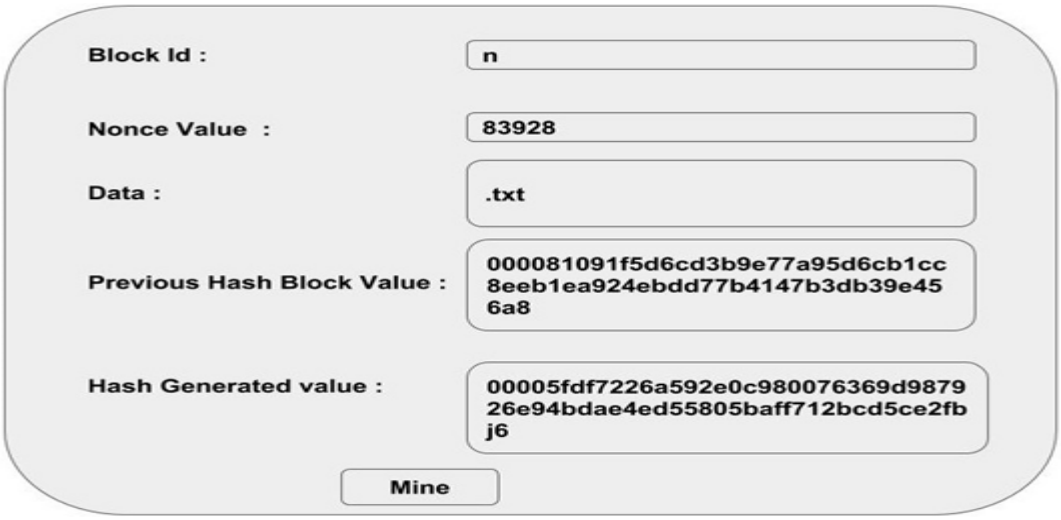

Fig-3: Creation of Block

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C. Connectivity of blocks

A blockchain is a set of records, called blocks, which are linked using cryptography. Each block connected the cryptographic hash of the previous block and transaction data (generally represented as a Merkle tree root hash). Transactions are set together in blocks and then included in the blockchain. The blockchain is a data structure containing linked blocks of transactions, and it can be stored as a simple database. Each block contains the hash of the previous block to create a chain that connects the genesis block to the current block. Each block is identified by the hash of its header, which is generated using Cryptography algorithm. Fig[4] shows how three blocks are linked by references in the previous block hash to form a chain.

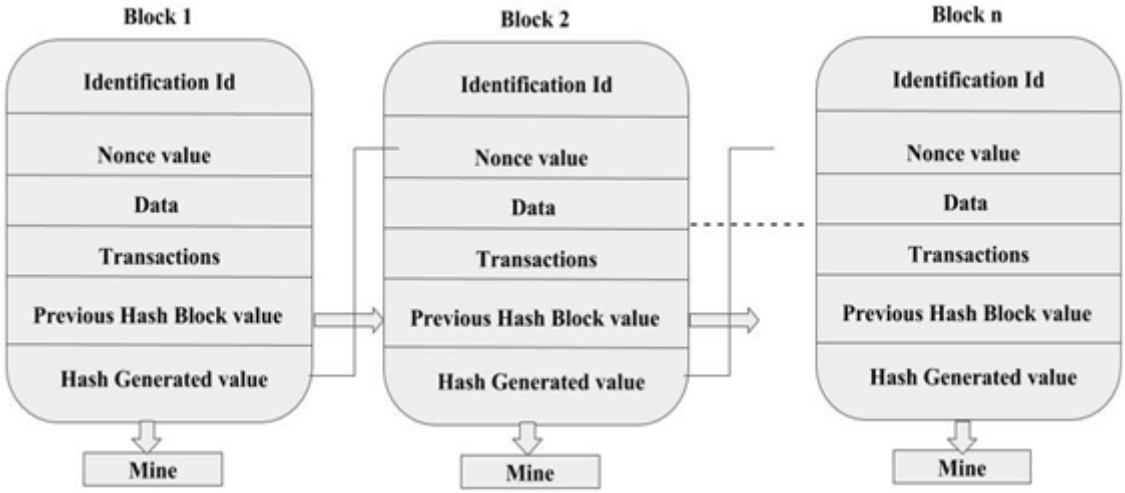

Fig-4: Connectivity of the Blocks- Blockchain

D. Generating the Nonce value

In cryptography, a nonce[Fig.5] is an arbitrary number that performed by just once. It is often a pseudo-random number issued in an authentication protocol to ensure that old communications cannot be reused in replay attacks.

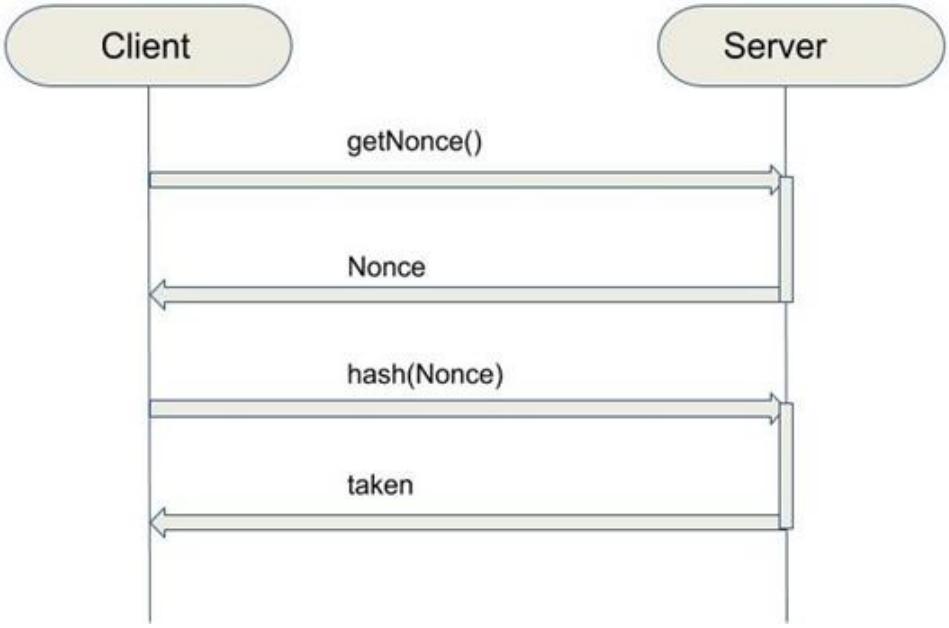

Fig-5: Nonce pseudo-random number

E. Bitcoin Transactions of blocks

A transaction is a transfer of Bitcoin value that is broadcast connectivity of the network and collected into blocks. A transaction typically accesses the previous transaction outputs as new transaction inputs and dedicates all input Bitcoin values to new outputs. Transactions are digitally signed data that represent the transfer of bitcoins from a Bitcoin address/es to another. Transactions are broadcast to the Bitcoin network and then included in a block in the blockchain. Transactions can be considered to be the most important part of Bitcoin and the other parts and protocols are used to ensure that transactions are properly created, propagated to miners, validated, and finally included in the blockchain.

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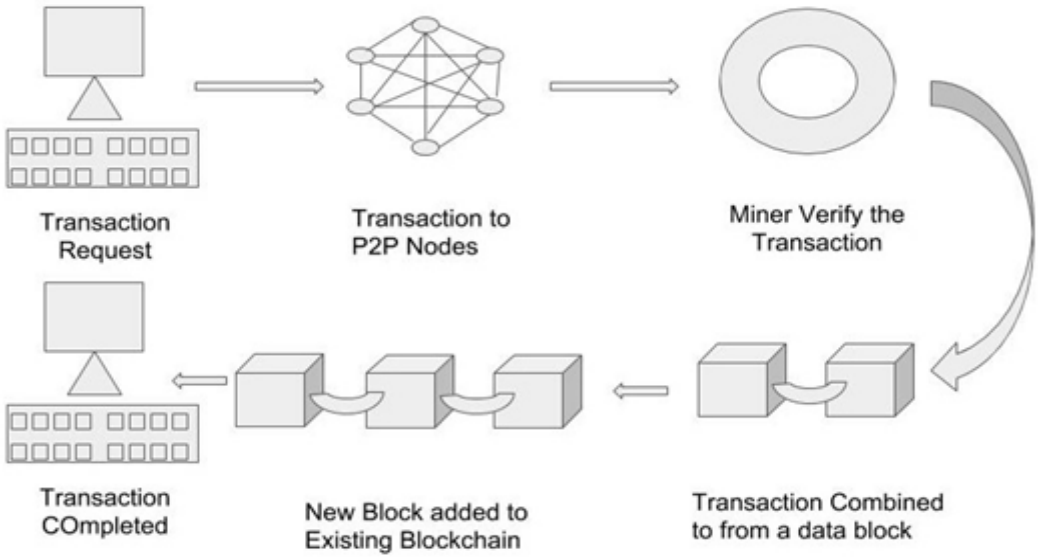

Fig-6: Transaction Implementations

F. Bitcoin - the first blockchain

The paper proposes a use of a Proof-of-Work (PoW, see Table[1]) algorithm for establishing consensus on which chain is the correct one. It establishes an incentive for users to be correct in the validation of transactions. Essentially, it makes it more expensive to fake a transaction than the potential gain. Without an appropriate algorithm for establishing consensus on the blockchain, there could be no trust in the blockchain-system of Bitcoin since anyone with access to the history of transactions (all nodes), could re-write history and publish it as the true one. In Bitcoin, users don't have accounts or account balances, but instead signs transactions using their private key. Each bitcoin is linked to a public key through an unspent transaction output (UTXO) and the user who possesses the corresponding private key is the owner and can control the usage of it.

G. Bitcoin as Infrastructure

Bitcoin, with blockchain technology as one of its most innovative solutions, has established itself as an effective online payment system. Its security and decen- tralized nature make it applicable for use other than a payment system.

- **Role-based access control (RBAC)**

This study develops a practical RBAC system that uses Bitcoin technology to realize the trans-organisational utilization of roles. The relationship between the role issued by organisations and the users will be represented by the transfer of bitcoins using the organizations' Bitcoin address/es as input and the users' Bitcoin address/es as output. We want to show that the relation of payment using bitcoins can translate or represent a relation of trust. Bitcoin's cryptography and protocol make the proposed system suitable for the trans-organizational utilization and authentication of roles, and furthermore, allow flexible role management operations, such as the endorsement and management of roles, with relatively small realization cost.

H. Bitcoin blockchains

Some properties of Bitcoin have been abstracted and rebuilt into what is now called blockchain technology or distributed ledger technology. While still maintaining the main properties of Bitcoin, new blockchains are often more flexible in their applications and what actions they allow. It is a technology very much under development where new approaches and applications are being published frequently, most often through white papers published by start-ups or a group of corporate researchers. Still the basics of blockchain remain the same, it is a distributed, time-stamped database with consensus-establishing peers.

Blockchain technology is characterised by the following traits:

- **Distributed:** Nodes are considered equal in the sense that they all have a full copy of the entire history of the database. There can also be less equal nodes, also called lightweight nodes, which only have a couple of the last blocks stored locally. Generally, communication between nodes is done over the Internet with private-key cryptography.
- **Time-stamped:** Since every block of transactions is hashed into all the subsequent blocks, it becomes increasingly difficult to change history the further away in time the current block is. The blockchain at hand becomes a provably correct auditing tool.

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- **Consensus:** Nodes establish one truth about which version of the database is the correct one through a consensus-algorithm. This serves to validate transactions as well as to discourage for example double-spending attacks. The type of consensus-algorithm being used is highly dependent on the structure and purpose of the blockchain Table [1].

IV. IMPLEMENTATION

I. Transaction Verification

After a creates a transaction, the transaction is forwarded to neighbouring nodes in the Bitcoin network until it is propagated across the entire Bitcoin network. As per protocol, each node needs to verify the correctness of a transaction before forwarding it to its neighbours, ensuring that only valid transactions are propagated and included in a block (invalid transactions are discarded by a node that encounters them). Each node verifies every transaction based on a checklist of criteria as follows:

1. The transaction ’s and data structure syntax must be correct.
2. Neither list of outputs or inputs is empty.
3. The transaction size in bytes is less than MAXIMUM BLOCKSIZE.
4. Each block output value, as well as the block total, must be within the allowed range of values.
5. None of the inputs has hash initial value=0, Number=1 (Coinbase transactions should not be relayed).
6. The number of signature operations contained in the transaction is less than the signature limited operation.
7. For each input, if the referenced output transaction is a coinbase output value, it must have at least COINBASE maturity.

Miners independently verify all transactions they receive before propagating them to other nodes. Therefore, every miner builds a pool of valid transactions as they come in. At the same time, verified transactions are added to a memory pool, which is where transactions are stored and wait until miners include and validate them into a block (mined block).

J. Proof of work Algorithm

The process of mining uses a PoW algorithm that involves performing an SHA- 256 to the block header repeatedly, changing one parameter (the nonce), until the resulting hash satisfies the difficulty target. Since SHA-256 is a one-way function, the resulting block header hash cannot be determined in advance and no pattern can be discerned as each hash is independent of each other. Therefore, the solution requires “brute force” solution; that is, miners scan and test for a nonce repeatedly, usually the nonce is incremented by one for each solution. The SHA-256 algorithm takes an input of arbitrary length and outputs a data of fixed length. The resulting hash of a specific input will always be the same, and thus, it can be easily calculated and verified by anyone by using the same hashing algorithm. On the other hand, it is almost impossible to retrieve the input given a hashed output. Moreover, in a cryptographic hashing algorithm, it is almost impossible to find two different inputs that result in the same output, also known as a collision.

Fig-6: Mining of the Blocks

In SHA-256, the output is always 256-bits long. To show the randomness of the output, Fig[6] shows the results of applying SHA-256 to the phrase “Blockchain” appended with different integer values. In the mining process, the appended integer is the nonce and is used to vary the resulting hash. An example in fig[6], SHA-256 operations were performed to find a nonce that when concatenated with “Blockchain” produced an output that starts with at least five zeros.

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K. Proof of verification and mining

```
//pseudo code for generating Nonce value and Updating the Block
var difficulty = 5;       // number of zeros required at front of hash
var maximumNonce = 999999; // limit the nonce to this so we don't mine too long
//variable initialization
var pattern = '';
for condition:var x=0; x<difficulty; x++
pattern += '0';
function sha256(block, chain)
return CryptoJS.SHA256(getText(block, chain));
function updateState(block, chain) {
ifcondition ('#block'+block+'chain'+chain+'hash').val().substr(0, difficulty) === pattern) ('#block'+block+'chain'+chain+'well').removeClass('well-error').addClass('well-success');
else ('#block'+block+'chain'+chain+'well').removeClass('well-success').addClass('well-error');
function updateHash(block, chain) {
('#block'+block+'chain'+chain+'hash').val(sha256(block, chain));
updateState(block, chain);
function updateChain(block, chain)
for (var x = block; x <=6; x++)
if (x > 1)
('#block'+x+'chain'+chain+'previous').val($('#block'+(x-1).toString()+'chain'+chain+'hash').val());
updateHash(x, chain);
//Nonce value implementation
function mine(block, chain, isChain)
for (var x = 0; x <= maximumNonce; x++)
('#block'+block+'chain'+chain+'nonce').val(x);
('#block'+block+'chain'+chain+'hash').val(sha256(block, chain));
ifcondition ('#block'+block+'chain'+chain+'hash').val().substr(0, difficulty) === pattern)
if (isChain)
updateChain(block, chain);
else
updateState(block, chain);
break;
```

L. Consensus algorithms

Consensus algorithms are of the highest relevance to blockchain technology since the purpose of Bitcoin was to transfer value in an unregulated, distrusting environment, where a sure way of validating transactions was needed. The goal of the consensus algorithm is to ensure a single of transactions exists and invalid or contradictory transactions. For example, that no account is attempting to spend more than the account contains, or to spend the same token twice, so-called double-spending. In Table 1 different important consensus algorithms are compared to each other.

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Table-1: Consensus algorithms for usage in blockchains

Consensus algorithm	Resource being used	Benefits	Drawbacks	Examples
Proof-ofWork	Computing power	Trustless, immutable, highly decentralised	Energy consumption, transaction throughput	Bitcoin
Proofof-Stake (PoS)	Ownership of fixed amount of tokens	Efficient in energy and throughput, scalable	Nothing-at-Stake problem.	NXT
Tendermint (Proof-ofValidation)	Security deposit of scarce tokens	Gives the benefits of proof-ofstake without almost any of its draw-backs	Nothing-at-stake problem still persists over long periods of tim	Monax - Blockchain explainer
Proof-ofAuthority (PoA)	Selected authorities are randomly selected to validate transactions	Efficient, doesn't require any inherent tokens or economic value	The corruption of authorities is a large possibility, relies on authorities being well-selected and controlling eachother	Parity PoA

V. CONCLUSION

In this paper, we are proposed privacy and security. The security and privacy process we implemented and generated the Nonce value. And it is accessed by generating the hash value. Nonce generated value is used to add an extra layer of security to Bitcoin transaction Data converting to the hash value. The bitcoin transaction process has been implemented by the public and private key i.e., through verified signature and mining of the process.

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International Journal of Advance and Innovative Research
Volume 6, Issue 1 (XIII): January - March, 2019
ISSN 2394 - 7780

EFFECT OF COUNSELLING ON ALCOHOL DEPENDENCE AMONG PATIENTS WITH ALCOHOLIC LIVER CIRRHOSIS

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ABSTRACT

Introduction: cirrhosis of liver disease are degenerative disease of the liver. Study was done among patient with alcohol liver cirrhosis, intervention given counselling on alcohol dependence

The Objective of the study: Effect of counselling on alcohol dependence among patients with alcoholic liver cirrhosis

Methods: Research design was adopted for this study was descriptive research design, sample size of 50 admitted in the medical ward of K. C. G general Hospital, Bangalore. The sampling technique was used Convenience sampling technique. The tool was used section – A demographic data of the patient, section –B alcohol dependence tool used. Data analyzed by using Descriptive and inferential statistics.

Results: The sample 50 was assessed alcohol dependence regarding alcohol liver cirrhosis Pretest maximum number 37(74%) had high risk Whereas after counselling majority of the subjects majority of the subjects 32 (64 %) had low risk It shows the patient and care giver counselling helps reducing the alcohol habits

Conclusion:The study conclude that counselling patient and care giver was an effective intervention in reducing alcohol dependence (p<0.001) among patient with alcohol liver cirrhosis

Keywords: cirrhosis of liver, counselling, alcohol dependence.

INTRODUCTION

Liver diseases and cirrhosis contribute to 23.59% of mortality in the world and ranks 27th as a major cause of death in the world and it is 2.74% of all the major causes of death in India **(WHO 2011)** Cirrhosis are defined by the World Health Organization (WHO) as a diffuse process characterized by fibrosis and the conversion of normal liver architecture into structurally abnormal nodules. In cirrhosis, normal liver is replaced by fibrotic tissue and regenerative nodules leading to progressive loss of liver function. (**Anthony PP, Ishak KG, Nayak NC, et al 1978)** Cirrhosis is an important cause of mortality and morbidity. (**Bellentani S, Tiribelli C 2001)** The leading causes for cirrhosis liver alcohol intake

According to the report in India around 10 lakh patients with liver cirrhosis were newly diagnosed every year in India. The liver disease is the tenth most common causes of death in India as per the WHO, liver disease affects everyone in 5 Indians. Liver cirrhosis is the 14th leading cause of death in the world and could be the 12th leading cause of death in the world by 2020. (**Dr. Amrish sahney2017)**

According to the report in Bengluru liver diseases account the top 10 causes of deaths. Most of the patients are men and the average age of liver disease patients is 40-45 years, but younger people are also affected due to lifestyle-related causes like alcoholism. Liver diseases are currently among the top 10 causes of death in the city and the country at large, a situation that is going to get worse in the coming years. But now much younger patients are also getting affected due to alcoholism, high-fat diet and a lifestyle lacking in exercise. Urban poor are the most hit, though male gender have a much higher incidence of liver diseases than female. (**Dr**. C **Vikram Belliappa 2018)**,

Alcoholism is a condition resulting from excess drinking of beverages that contain alcohol. The major health risk of alcoholism includes liver disease, heart disease, pancreatitis, central nervous system disorders and certain forms of cancer.(**B. Usharani, R. Vennila and N. Nalini 2014**) The most prevalent types of alcoholic liver disease are fatty liver, alcoholic hepatitis, and cirrhosis. Often, as people continue to drink heavily, they progress from fatty liver to hepatitis to cirrhosis. The disorders can also occur together, however, and liver biopsies can show signs of all three in some people. (**Kirsh, R.; Robson, S.; and Trey 2015)**

Various psychosocial interventions are available for treatment of alcohol use disorders and can be broadly summarised as follows. Brief interventions are short, typically a single session lasting up to 15 min, focused on

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psychosocial interventions designed to address alcohol-related problems or reduce heavy drinking in hazardous drinkers.**(Kaner EF, Dickinson HO, Beyer F, et al 2009).** The counselling is less expensive methods used to treat patient with alcohol dependence .

AIM OF THE STUDY

Effect of counselling on alcohol dependence among patients with alcoholic liver cirrhosis

METHODOLOGY

This study was Non-experimental, descriptive research design. The study carried out in KCG Hospital Bangalore. The study conducted after getting written approval from institution. Nonprobability Convenience sampling technique used and sample size was 50. The subjects selected based AUDIT score between 12-19, age between 22-65 years and study excluded High risk Almost certainly dependent patients. The tool used for the data collection of the present study have two parts section –A Demographic details consist of items on age, , education, occupation, income, locality Section B: Alcohol dependence assessed by using AUDIT alcohol screen Tool Developed by WHO Questions 1 to 8 are scored on a five-point scale from 0, 1, 2, 3, and 4 . Questions 9 & 10 are scored on a three -points scale from 0, 2 and 4. Interpretation of tool 0-7 low risk , 8-15 increasing risk , 16 -19 high risk , 20 –more possible dependence Counselling includes the one to one systematic therapy imparted by the investigator to the patient and their care giver in four sessions continuously four days in the morning with a duration of 30 minutes each session conducted to overcome alcohol dependence and every month reinforcement done through phone call and direct contact on lifestyle modification , diet absenteeism , and remission of alcohol habit . After 3 months post test conducted by using same questionnaire. Analysis data: the results presented in mean, standard deviation (SD) , Frequency and percentage . The paired 't' used to compare the mean from the pre-test and post-test . All the analysis carried out by using statistical for social sciences (SPSS) 16.0 version

RESULTS

Table-1: Description of background variables among patient with alcohol liver cirrhosis .
n=50

S. No	Demographic variables	Frequency	Percentage
1.	**Age in years**		
	a.41 to 45	12	24
	b.46 to 50	15	30
	c.51to 55	13	26
	d. 56 and above	10	20
2.	**Educational qualification**		
	a. Primary school	9	18
	b. High school	21	42
	c. Higher secondary	15	30
	d. Under graduate	5	10
	e. Post graduate	0	0
3	**Occupation status**		
	a. Government employee	2	4
	b. Private employee	25	50
	c. Daily wage	10	20
	d. Business man	10	20
	e. Unemployed	3	6
4	**Monthly income of the family**		
	a. Rs.<5000	0	0
	b. Rs.5001-10000	4	8
	c. Rs.10001-15000	25	50
	d. Rs.>15000	21	42
5.	**Locality**		
	a. Rural	0	0
	b. Urban	40	80
	c. Semi urban	10	20

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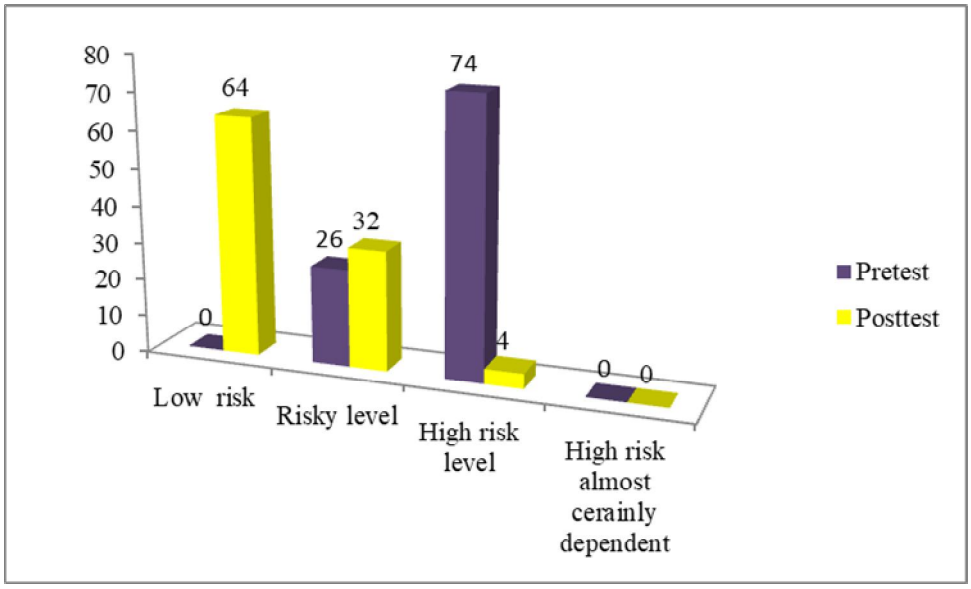
Table-2: level of alcohol dependence among patient with alcoholic liver cirrhosis in pretest and posttest n=50

Sl no	Level of alcohol dependence	Pretest		Posttest	
		Frequency	Percentage	Frequency	Percentage
1	Low risk	-	-	32	64
2	Risky or hazardous level	13	26	16	32
3	High risk or harmful level	37	74	2	4
4	High risk Almost certainly dependent	-	-	-	-
	Over all	**50**	**100**	**50**	**100**

Table-2 Depicts the level of alcohol dependence in pretest among patient with alcohol liver cirrhosis , largest number 37(74%) had high risk , 13(26%) had risky level and none of them had low risk level. Whereas after counselling majority of the subjects 32 (64 %) had low risk ,16 (32%) had risky level , 2 (4%) had high risk level . It shows that the patient and care giver counselling on overcoming alcohol dependence as impact on reducing the alcohol dependence .



Graph-1: Percentage distribution of level of alcohol dependence among patient with cirrhosis of liver in pretest and postest.

Table-3: Effect of counselling on alcohol dependence among patients with alcoholic liver cirrhosis n=50

Max score	Pretest score		Posttest score		Change Mean	Paired 't ' value and P value
	Mean	SD	Mean	SD		
40	16.67	1.870	10.01	2.60	6.6	23.353 P <0.000 ***

Based on above the table 3 shows effect of counselling among patient with cirrhosis of liver disease. pretest mean was 16.67 with SD of 1.870 whereas in after counselling mean 10.01 with SD of 2.60 change mean of 6.6 with SD 2.3 Paired 't' test value 23.353 it shows there was statistical significant at **P<0.001, So research hypothesis accepted and null hypothesis rejected**

DISCUSSION

With regards to demographic variables of the patients regards to age most of subjects were belong to 46-50 years 15(30%) , regarding education most subjects had high school education 21942%) , with respect to occupation most were Woking private employee 25(50%) , with regards to monthly income most had 10001-15000 25 (50%) , with respect to locality most were living in urban 40(80%) .

This study provide evidence on effect of counselling to patient and care giver those who had alcohol liver cirrhosis a brief counselling 4 session conducted for patient and care giver to overcome alcohol habit along with hospital routine care . The reinforcement done periodically every month though phone and direct contact on lifestyle modification, diet, abstinence and remission alcohol habit. After 3 months study had effect on

ISSN 2394 - 7780

alcohol dependence . Counselling cost effective treatment to overcome alcoholism. Study results shows the patient and care giver counselling had impact on alcohol dependence . Paired 't' test calculated to check effect of counselling Paired 't' test value 23.353 it shows there was statistical significant at **P<0.001, So research hypothesis accepted and null hypothesis rejected**

Similar study conducted Counselling for Alcohol Problems (CAP), a lay counsellor-delivered brief psychological treatment for harmful drinking in men, in primary care in India: a randomised controlled trial. Sample were 377 subjects allocated in two groups randomly (188 [50%] to the EUC plus CAP group and 190 [50%] to the EUC alone group after 3 months the parameters were measured such as proportion of remission , adjusted prevalence ratio , proportion of abstinent in the past 14 days with EUC plus CAP group and without EUC group . The study result shows CAP delivered CAP delivered by lay counsellors plus EUC was better than EUC alone was for harmful drinkers in routine primary health-care settings, and might be cost-effective. Counselling good strategy to over alcohol dependence among population

CONCLUSION

The result of the current study confirmed that counselling patient and care giver to overcome alcohol dependence treatment an effective intervention for reducing alcohol dependence among patient alcohol liver cirrhosis . This intervention is less expensive method to be used patient with alcohol habits . The study recommends that the patient with alcoholic liver cirrhosis need to done periodical reinforcement, motivation techniques for prevent alcohol remission. Counselling intervention had positive impact of patient quality of life among patient with alcoholism .

Source of Support: None Declared

Conflict of Interest: None Declared

Ethical permission: obtained from institution ethical committee and patient consent was obtained

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International Journal of Advance and Innovative Research
Volume 6, Issue 1 (XIII): January - March, 2019
ISSN 2394 - 7780

EVALUATION & COMPARATIVE ANALYSIS OF EFFICIENCY OF BANKS OPERATIONAL IN INDIA DURING 2008-17

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ABSTRACT
Banks play an important role in the economy because of the nature of their core products. As the products being offered by the banks are almost identical, the banks need to be efficient and profitable to compete. Assessing the efficiency of banks is a powerful means of evaluating performance of banks. For evaluating the performance of the banks, the paper calculated the efficiency score of Indian public sector banks, private sector banks and foreign banks operating in India for the period 2008 to 2017. Also the overall efficiency score of public, private sector and foreign sector banks operating in India has been compared for the same period. For this purpose, production approach of Data Envelopment Analysis (DEA), ANOVA with multiple comparisons and Scheffe's Post hoc test have been used. The results revealed the domestic banks to be efficient and that they have not been affected by the foreign banks. Post hoc Scheffe's test of multiple comparisons reflected significant difference between foreign and public sector banks and foreign and a private sector banks on the basis of technical and overall efficiency whereas allocative efficiency found insignificant difference between public and private sector banks.

Keywords: Banking, Data Envelopment Analysis (DEA), Efficiency, Multiple comparison

After twenty seven years of liberalization, privatization and globalization there has been a fundamental change in the banks in the Indian economic system. The opening up of the economy has uplifted the technological standards of Indian banking. Rapid developments are taking place in Indian banks. Banks have to continuously strive for the growth. They have to be efficient in their working to survive and sustain in the present scenario. The share of the banking and insurance sector has augmented to over 11.8 percent of India's Gross Domestic Product (at constant prices) in 2012-13 from about 2 percent (at constant prices) in the early 1970s *(Economic Survey 2013-14)*. As India's markets continue to develop and integrate with world markets, the current trend shows that this share is likely to rise further. The banking sector (amongst the service organizations) is perhaps the prime as it caters to the needs of people belonging to all sections of society.

EFFICIENCY

The concept of efficiency was introduced in the 1950s by Koopmans (1951). Koopmans gives the definition of an efficient point: 'A possible point … in the commodity space is called efficient whenever an increase in one of its coordinates (the net output of one good) can be achieved only at the cost of a decrease in some other coordinate (the net output of another good)'. In other words, a point is efficient if the output is maximized given the inputs. The overall bank efficiency can be decomposed into scale efficiency, pure technical efficiency, and allocative efficiency. Efficiency is the ratio of total outputs to total inputs.

LITERATURE REVIEW

The subject of measuring banking efficiency has been extensively studied. An attempt has been made to present briefly the review of select works.

Yona and Inanga (2014) critically examined the impact of financial sector reforms in bank regulations and supervision on competitiveness of commercial banks in Tanzania with respect to economic efficiency. The data was analyzed using SPSS 17.0 to estimate the mean (Standard Deviation) scores of economic efficiency variable constructs and chi-square tests in order to determine the association between reforms on bank regulations and economic efficiency. The results showed that there was negative relationship between reforms on banking regulations and economic efficiency leading to the conclusion that the level of competiveness of commercial banks has not been affected by financial sector reforms. Ayadi Ines (2013) studied the x-efficiency of Tunisian commercial banks for the period 1996-2010 using DEA (Data Envelopment Analysis) method. The results suggested that the cost efficiency of the sector was estimated at a score of 41.0%. Also, the state-owned banks were found to be more efficient than their private counterparts. Said Ali (2013) examined the correlation between risks and efficiency within Islamic banks in the MENA area for the period of 2006 to 2009. The paper used Data Envelopment Analysis, financial ratios and Pearson Correlation Coefficients. The study revealed credit risk had negative relationship to efficiency, while operational risk had found to be negatively correlated to efficiency too.

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Kumar and Charles (2012) analysed the performance of Indian banks using DEA. The performance was measured in terms of technical efficiency, returns-to-scale, and Malmquist productivity index for a sample of 33 banks, consisting of 19 public sector and 14 private sector banks during the period 1995-96 to 2009-10. The findings revealed that efficiency scores were robust in the sense that the inclusion of outlier did not affect the overall efficiency trends. The public sector banks were doing better than the private sector banks in terms of (i) technical efficiency since 2003-04 and (ii) scale efficiency from 2000-01 onwards. Mahadzir and Hasni (2009) determined the impact of mergers on efficiency and productivity of commercial banks in Malaysia for the period from 1995 until 2005. The study used DEA, a non-parametric approach to estimate the efficiency scores and to construct the Malmquist productivity index. The findings revealed that banks exhibited higher efficiency scores after the merger and that the foreign banks were more efficient than the local banks. Quang and Borger (2008) studied the efficiency and productivity change of Vietnamese commercial banks for the period 2003-2006, using a Malmquist index approach. It was found that the productivity of Vietnamese banks tended to decrease over the small sample period, except for the year 2005. Hassan (2006) investigated relative efficiency of the Islamic banking industry in the world by analyzing a panel of banks during the period of 1995-2001. Both parametric (cost and profit efficiency) and non-parametric (data envelopment analysis) techniques were used to examine efficiency of these banks. The results indicated that, on an average, the Islamic banking industry was relatively less efficient compared to their conventional counterparts in other parts of the world. The results also showed that these efficiency measures were highly correlated with ROA and ROE, suggesting that the efficiency measures could be used concurrently with conventional accounting ratios in determining Islamic bank performance.

Lim and Randhawa (2005) estimated the X-efficiency of Hong Kong and Singapore banks and discovered that bank size, leading to economies of scale, and the nature of ownership had a greater impact on X-efficiency of banks across the two countries. They used different sets of inputs and outputs under the production and intermediation stages of banking business. Molyneux (2003) investigated the efficiency of the banking system in Jordan, Egypt, Saudi Arabia and Bahrain. Their sample comprised 82 banks over the period 1992-2000. The paper evaluated whether factors such as asset quality, capital level and environmental variables such as bank size, market characteristics, geographic position, and liquidity ratios influenced banks' efficiency levels. The banks in each country were divided into four categories: commercial, investment, Islamic and other financial institutions. The results showed that larger banks seemed to be more profit efficient in general. The results showed that the efficiency scores ranged from 56% for investment banks to 75% for Islamic banks. Anaraki and Hasanzadeh (2003) assessed whether x-efficiency in the Iranian banking system was affected by the traditional variables like size, managerial performance, the level of education of the employees, type of the banks and environmental variables. Also the study investigated whether there was an increasing return to scale in the system. The study used a translog stochastic frontier function and proved that banking efficiency in Iran lied far below other developing countries. The results revealed that specialized banks performed more efficiently than commercial banks, due to different managerial performance and preferential rates and regulations imposed on them. The estimated results showed that the average level of technical efficiency was around 67% over the period 1988-97, highlighting huge amount of deficiency in the system.

OBJECTIVES OF THE STUDY

The objectives of the study have been

1. To calculate the overall efficiency score of all the public, private sector and foreign banks operating in India for the period of ten years i.e. 2008 to 2017.
2. To compare overall efficiency score of public, private sector and foreign banks operating in India for the same period.

RESEARCH DESIGN

The banking sector in India can be categorized into public, private and foreign banks. The present study taking a note of this categorization considered all the public (26), private (19) and foreign (30) sector banks (Annexure 1). Banks having negative profits were dropped from the analysis.

DATA COLLECTION

Secondary data has been collected to study the overall efficiency of the public, private and foreign banks. The secondary data was extracted from Prowess Database (CMIE) and publications of Reserve Bank of India.

HYPOTHESIS OF THE STUDY

The study tests the following hypothesis

H_1: There is significant difference between public, private and foreign sector banks on the basis of efficiency during 2008-17.

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DATA ANALYSIS AND METHODOLOGY

For studying the different kinds of efficiencies of the public, private and foreign banks, Data Envelopment Analysis (DEA) was used. DEA is a quantitative technique, which is generally used to assess the performance of decision making units. The production approach with two inputs: Net Fixed Assets and Expenses and three outputs: Profits after taxes, Deposits and Return on Assets (ROA) has been used. For the comparison of the efficiency of public, private and foreign banks ANOVA has been used. Scheffe's Post hoc test was used for multiple comparisons of banks.

RESULTS AND DISCUSSION

Data Envelopment Analysis (DEA) shows 7 out of 30 foreign banks to be efficient. These are Abu Dhabhi Commercial Bank, Bank of Ceylon, Bank of Nova Scotia, DBS Bank Ltd., DCB Bank Ltd., SBER Bank and State Bank of Mauritius Ltd. Amongst the foreign banks, Credit Suisse A G is found to be the highly inefficient bank under utilizing its resources by 88% (Table 1). As shown in Table 1 in the public sector banks category 9 banks out of 26 are found to be efficient. These are Andhra Bank, Bank of Baroda, Canara Bank, Central Bank of India, IDBI Bank Ltd., State Bank of Bikaner & Jaipur, State Bank of Patiala, Syndicate Bank and United Bank of India. Bank of Maharashtra is the most inefficient bank by 32%. 4 banks out of 19 banks are found to be efficient in the private sector banks category (Table 1). These are Axis bank, Dhanlaxmi Bank Ltd., Lakshmi Vilas Bank Ltd. and Nainital Bank Ltd. Karnataka Bank Ltd. in this category is found to be highly inefficient bank under utilizing its resources by 46%.

The results reflect that public sector banks are contributing efficiently to attain the target of growth in the economy in comparison to private and foreign banks as the spread of efficiency score of public sector banks is less. The score of the majority of the banks in public sector category was found to be more than the average score of efficiency of all the banks (public sector banks, private sector banks and foreign banks) taken together.

Table-1: Efficiency Scores of Foreign, Public and Private Sector Banks during the period 2008-17

FOREIGN BANKS					PUBLIC SECTOR BANKS				PRIVATE SECTOR BANKS			
S.No.	BANKS	TE	AE	OVERALL	BANKS	TE	AE	OVERALL	BANKS	TE	AE	OVERALL
1	P1	0.70	0.88	0.62	P3	0.79	0.91	0.72	P6	1.00	1.00	1.00
2	P2	1.00	1.00	1.00	P4	1.00	1.00	1.00	P17	0.97	0.68	0.66
3	P5	0.48	0.81	0.39	P9	1.00	1.00	1.00	P20	0.99	0.98	0.97
4	P7	0.75	0.87	0.65	P11	0.86	0.92	0.79	P29	1.00	1.00	1.00
5	P8	0.91	0.96	0.87	P12	0.76	0.89	0.68	P30	0.82	0.73	0.60
6	P10	1.00	1.00	1.00	P16	1.00	1.00	1.00	P32	0.82	0.76	0.62
7	P13	1.00	1.00	1.00	P18	1.00	1.00	1.00	P35	0.99	1.00	0.99
8	P14	0.74	0.85	0.63	P22	0.84	0.88	0.74	P37	0.87	0.83	0.72
9	P15	0.59	0.81	0.48	P27	0.86	0.88	0.76	P40	0.93	0.88	0.82
10	P19	0.61	0.83	0.51	P36	1.00	1.00	1.00	P42	0.77	0.73	0.56
11	P21	0.48	0.80	0.38	P38	0.88	0.89	0.78	P43	0.80	0.67	0.54
12	P23	0.78	0.86	0.67	P39	0.99	0.99	0.98	P44	0.93	0.84	0.78
13	P24	0.18	0.68	0.12	P51	0.90	0.88	0.79	P45	0.72	0.90	0.65
14	P25	1.00	1.00	1.00	P52	0.92	0.90	0.83	P46	1.00	1.00	1.00
15	P26	1.00	1.00	1.00	P53	0.85	0.89	0.76	P49	1.00	1.00	1.00
16	P28	0.56	0.82	0.46	P61	1.00	1.00	1.00	P54	0.88	0.87	0.77
17	P31	0.27	0.71	0.19	P62	0.90	0.91	0.82	P59	0.99	0.96	0.95
18	P33	0.57	0.79	0.45	P63	0.93	0.96	0.89	P69	0.96	0.92	0.88
19	P34	0.55	0.81	0.45	P65	0.94	0.94	0.88	P75	0.66	0.85	0.56
20	P41	0.33	0.74	0.24	P66	1.00	1.00	1.00				
21	P47	0.49	0.78	0.38	P67	0.91	0.93	0.85				
22	P48	0.46	0.79	0.36	P68	1.00	1.00	1.00				
23	P50	0.71	0.84	0.60	P71	0.95	0.92	0.87				
24	P55	0.85	0.95	0.81	P72	0.92	0.92	0.85				
25	P56	1.00	1.00	1.00	P73	1.00	1.00	1.00				

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26	P57	0.93	0.93	0.86	P74	0.91	0.88	0.80				
27	P58	0.77	0.92	0.71								
28	P60	0.81	0.86	0.70								
29	P64	1.00	1.00	1.00								
30	P70	0.24	0.76	0.29								

Table 2 elaborates the mean score of technical efficiency, allocative efficiency and overall efficiency of foreign, public and private sector banks. Mean of technical efficiency of all the banks is 0.84. It is evident from the mean value that public sector banks (0.93) and private (0.90) sector banks are performing better than foreign banks (0.69).

Table-2: Descriptive Statistics: Technical Efficiency, Allocative Efficiency and Overall Efficiency during the period of 2008-17.

Descriptive Statistics				
Dependent Variable: EFFICIENCY SCORE				
EFFICIENCY	**BANK**	**Mean**	**Std. Deviation**	**N**
TECHNICAL EFFICIENCY	FOREIGN BANKS	0.69	0.25	30
	PUBLIC BANKS	0.93	0.07	26
	PRIVATE BANKS	0.90	0.11	19
	AVERAGE (ALL BANKS)	0.84		75
ALLOCATIVE EFFICIENCY	FOREIGN BANKS	0.87	0.10	30
	PUBLIC BANKS	0.94	0.05	26
	PRIVATE BANKS	0.87	0.12	19
	AVERAGE (ALL BANKS)	0.89		75
OVERALL EFFICIENCY	FOREIGN BANKS	0.63	0.28	30
	PUBLIC BANKS	0.88	0.11	26
	PRIVATE BANKS	0.79	0.18	19
	AVERAGE (ALL BANKS)	0.77		75

Similarly, mean of allocative and overall efficiency is 0.89 and 0.77 respectively. In this descriptive statistics, public sector banks outperformed with mean scores 0.94 and 0.88 respectively as compared to private sector banks (0.87 and 0.79) and foreign banks (0.87 and 0.63). Foreign banks, public and private sector banks are relatively inefficient (overall) by 37%, 12% and 21% respectively.

For the comparison of the efficiency of public, private and foreign sector banks ANOVA has been used. ANOVA test (Table 3 Panel A) shows significant difference between foreign, public and private sector banks during the period of 2008-17 with p value (0.000) significant at 5% level of significant. Thus the hypothesis (H_1) stands accepted. Post hoc Scheffes' test of multiple comparison on the basis of technical efficiency score between foreign, public and private sector banks reflects that there is significant difference between foreign and public sector banks (p-value 0.000) and there is significant difference between foreign and private sector banks (p-value 0.001) but there is insignificant difference between public and private sector banks (p-value 0.874) at 5% level of significance (Panel B). Further by using allocative score, significant difference between foreign and public sector banks (p-value 0.012), insignificant difference between foreign and private sector banks (p-value 0.979) and significant difference between public and private sector banks (p-value 0.046) at 5% level of significance has been found. On the basis of Overall efficiency score, using Post hoc Scheffes' test significant difference between foreign and public sector banks (p-value 0.000), significant difference between foreign and private sector banks (p-value 0.028) and insignificant difference between public and private sector banks (p-value 0.414) at 5% level of significance has been found.

Table-3: Analysis of Variance and Multiple Comparison of Foreign, Public and Private Sector banks during the period of 2008-17

	PANEL A: ANOVA					
Foreign, Public and Private Sector Banks Comparison on the basis of Technical Efficiency, Allocative Efficiency and Overall Efficiency						
		Sum of Squares	df	Mean Square	F	p-value
TECHNICAL EFFICIENCY	Between Groups	0.910	2	0.455	14.963	0.000
	Within Groups	2.188	72	0.030		
	Total	3.098	74			
ALLOCATIVE	Between Groups	0.087	2	0.044	5.490	0.006

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EFFICIENCY	Within Groups	0.572	72	0.008		
	Total	0.659	74			
OVERALL EFFICIENCY	Between Groups	0.901	2	0.450	10.544	0.000
	Within Groups	3.075	72	0.043		
	Total	3.976	74			

PANEL B: Scheffe's Multiple Comparisons

Dependent Variable: Technical Efficiency, Allocative Efficiency and Overall Efficiency

Dependent Variable	(I) Banks	(J) Banks	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
TECHNICAL EFFICIENCY	Foreign Banks	Public Banks	-.23531*	.04671	.000	-.3521	-.1185
		Private Banks	-.20800*	.05112	.001	-.3358	-.0802
	Public Banks	Foreign Banks	.23531*	.04671	.000	.1185	.3521
		Private Banks	.02731	.05262	.874	-.1042	.1588
	Private Banks	Foreign Banks	.20800*	.05112	.001	.0802	.3358
		Public Banks	-.02731	.05262	.874	-.1588	.1042
ALLOCATIVE EFFICIENCY	Foreign Banks	Public Banks	-.07359*	.02388	.012	-.1333	-.0139
		Private Banks	-.00535	.02613	.979	-.0707	.0600
	Public Banks	Foreign Banks	.07359*	.02388	.012	.0139	.1333
		Private Banks	.06824*	.02690	.046	.0010	.1355
	Private Banks	Foreign Banks	.00535	.02613	.979	-.0600	.0707
		Public Banks	-.06824*	.02690	.046	-.1355	-.0010
OVERALL EFFICIENCY	Foreign Banks	Public Banks	-.24921*	.05538	.000	-.3876	-.1108
		Private Banks	-.16582*	.06059	.028	-.3173	-.0144
	Public Banks	Foreign Banks	.24921*	.05538	.000	.1108	.3876
		Private Banks	.08338	.06238	.414	-.0725	.2393
	Private Banks	Foreign Banks	.16582*	.06059	.028	.0144	.3173
		Public Banks	-.08338	.06238	.414	-.2393	.0725

*. The mean difference is significant at the 0.05 level.

CONCLUSIONS AND IMPLICATIONS

The analysis shows that the domestic banks are efficient and that the entry of foreign players has not affected their efficiency.

- ✓ Data Envelopment Analysis (DEA) shows 7 out of 30 foreign banks to be efficient. Credit Suisse A G is found to be the highly inefficient bank.
- ✓ In the public sector banks category 9 banks out of 26 are found to be efficient. Bank of Maharashtra is the most inefficient bank.
- ✓ 4 banks out of 19 banks are found to be efficient in the private sector banks category. Karnataka Bank Ltd. is found to be highly inefficient private sector bank.
- ✓ Public sector banks outperformed with mean overall efficiency scores 0.88 as compared to private sector banks (0.79) and foreign banks (0.63).
- ✓ Foreign banks, public and private sector banks are relatively inefficient (overall) by 37%, 12% and 21% respectively.
- ✓ Post hoc Scheffe's test of multiple comparisons results revealed significant difference between foreign and public sector banks and between foreign and a private sector banks on the basis of technical efficiency.
- ✓ On the basis of allocative efficiency, significant difference between foreign and public sector banks and between public and private sector banks has been found.
- ✓ There is significant difference between foreign and public sector banks and between foreign and private sector banks on the basis of overall efficiency.

As the banking sector functions under the control of Reserve Bank of India and its standards are broadly in conformity with international standards, the domestic banks (public and private sector banks) are able to compete with the foreign banks.

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ANNEXURE -1
List of Foreign, Public and Private sector bank

NAME OF BANKS	BANK CODE	NAME OF BANKS	BANK CODE
A B Bank Ltd.	P1	Indian Overseas Bank	P39
Abu Dhabi Commercial Bank	P2	Indusind Bank Ltd.	P40
Allahabad Bank	P3	J P Morgan Chase Bank	P41
Andhra Bank	P4	Jammu & Kashmir Bank Ltd.	P42
Antwerp Diamond Bank N V	P5	Karnataka Bank Ltd.	P43
Axis Bank Ltd.	P6	Karur Vysya Bank Ltd.	P44
B N P Paribas	P7	Kotak Mahindra Bank Ltd.	P45
Bank Of Bahrain & Kuwait Bsc	P8	Lakshmi Vilas Bank Ltd.	P46
Bank Of Baroda	P9	Mashreqbank P S C	P47
Bank Of Ceylon	P10	Mizuho Bank Ltd.	P48
Bank Of India	P11	Nainital Bank Ltd.	P49
Bank Of Maharashtra	P12	National Australia Bank Ltd.	P50
Bank Of Nova Scotia	P13	Oriental Bank Of Commerce	P51
Bank Of Tokyo-Mitsubishi U F J Ltd.	P14	Punjab & Sind Bank	P52
Barclays Bank Plc	P15	Punjab National Bank	P53
Canara Bank	P16	Ratnakar Bank Ltd.	P54
Catholic Syrian Bank Ltd.	P17	Royal Bank Of Scotland N V	P55
Central Bank Of India	P18	SBER Bank	P56
Citibank N A	P19	Shinhan Bank	P57
City Union Bank Ltd.	P20	Societe Generale	P58
Commonwealth Bank Of Australia	P21	South Indian Bank Ltd.	P59
Corporation Bank	P22	Standard Chartered Bank	P60
Credit Agricole Corporate & Invst. Bank	P23	State Bank Of Bikaner & Jaipur	P61
Credit Suisse A G	P24	State Bank Of Hyderabad	P62
DBS Bank Ltd.	P25	State Bank Of India	P63
DCB Bank Ltd.	P26	State Bank Of Mauritius Ltd.	P64
Dena Bank	P27	State Bank Of Mysore	P65
Deutsche Bank A G	P28	State Bank Of Patiala	P66
Dhanlaxmi Bank Ltd.	P29	State Bank Of Travancore	P67
Federal Bank Ltd.	P30	Syndicate Bank	P68
Firstrand Bank Ltd.	P31	Tamilnad Mercantile Bank Ltd.	P69
HDFC Bank Ltd.	P32	UBS Ag	P70
HSBC Bank Oman S A O G	P33	UCO Bank	P71
Hongkong & Shanghai Banking Corpn. Ltd.	P34	Union Bank Of India	P72
ICICI Bank Ltd.	P35	United Bank Of India	P73
IDBI Bank Ltd.	P36	Vijaya Bank	P74
ING Vysya Bank Ltd.	P37	Yes Bank Ltd.	P75
Indian Bank	P38		

International Journal of Advance and Innovative Research
Volume 6, Issue 1 (XIII): January - March, 2019
ISSN 2394 - 7780

GAMIFICATION IN HR FOR ORGANIZATIONAL SUSTAINABILITY

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ABSTRACT
Organizational sustainability requires engaged, committed and happy employees and are therefore required to adopt new innovative ways of doing things. Gamification helps in creating emotions like fun, excitement and engagement associated with games in real world situations. It is about use of game elements and game thinking in non-game environments, and thus helps in developing creativity and in building relationships inside organizations. This paper suggests that Gamification in HR may help in increasing the employees' job involvement, loyalty and commitment along with problem-solving abilities. Gamification also helps to attract, motivate, induct, train, reward and engage employees and to retain the employees, and can be used to improve organizational sustainability.

Keywords: Gamification, Human resource management, Organizational sustainability

I. INTRODUCTION
With the advent of dynamic technologies, strategic HR has to consider the demands of the workforce. Gamification uses the gaming elements for non-game settings such as business environment and processes. Also, gamification in HR may be used to attract new talent, training and development, engagement, performance management and in retaining employees. Employer branding can be increased by Gamification.

Gamification in HR is a new concept which is applied to the employees in an organization. The term gamification was initially coined by Nick Pelling in 2002, but has gained popularity since 2010. Incorporating gamification in the workplace helps to motivate the employees (Fitz-Walter, 2011) and thereby makes them more innovative with their tasks. Gamification may be used to hire new talents, engagement of the employees, training and development, performance management, retaining the employees and building corporate culture.

It may even help in team building, stronger network ties with all the stakeholders thereby increasing the collaborative work. It may help in the alignment of the employment goals to the business goals. It assists employees to become more competitive and attractive in along with their fun side which gets rewarded.

Thus, Gamification of HR helps in the sustainability of the organization. In this paper, we highlight that gamification in HR can help achieve organizational sustainability.

II. THE CONCEPT OF GAMIFICATION
The main function of gamification is to induce positive behavior in people (Darejeh, A., & Salim, S. S. (2016). Fitz-Walter et al. (2011,) define gamification as "adding game elements to an application to motivate definitions include "the use of game design elements (e.g., points, leaderboards and badges) in non-game contexts … to promote user engagement" (Mekler et al. 2013)

It uses challenge, competition, thrill, excitement and enjoyment to reward the employees and make their mundane tasks more engaging and fun-filled (DomíNguez, A., Saenz-De-Navarrete, J., De-Marcos, L., FernáNdez-Sanz, L., PagéS, C., & MartíNez-HerráIz, J. J. (2013). Gamification helps in bringing the rewards, fun and social network on a single dias. Thus, gamification involves the application of elements of games in non-game-like settings (Deterding, Dixon, Khaled, & Nacke, 2011).

Earlier gamification was used by organizations to gain customer loyalty and commitment especially in the industries such as Hotel and Airlines. Customers were motivated to invest more or get more reward points.

III. BENEFITS OF GAMIFICATION IN ORGANISATIONS
The young workforce is tech savvy. Also games change people's behavior. Human minds learn more while playing. Gamification directs a person towards enjoyments and pleasure. (Baxter, R. J., Holderness Jr, D. K., & Wood, D. A., 2015). Companies like Mariott, Cognizant, Deloitte, Whirlpool, PWc, Facebook etc have been using HR Gamification to increase their employee engagement.

Although gamification has been in use for marketing, the HR Professionals need to understand its importance by using gamification for creation of strategic tools for alignment of the goals of employees and the organization.

Kavaliova, M., Virjee, F., Maehle, N., & Kleppe, I. A. (2016) suggest that gamification can help in achieving greater levels of employee engagement through intrinsic rewards and extrinsic ones. Also they feel more

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recognized. Gamifications uses principles of games like explicit goals, rules, feedback system and voluntary participation (McGonigal, 2011). Also employees can increase their social intelligence increases along with their efficiency in the work.

IV. GAMIFICATION IN HR

The gamification in HR can be applied across different human resource functions, as discussed below:

i. Recruitment and Selection

In order to hire innovative employees, gamification in recruitment and selection should include challenges in the design of tests wherein the potential talents could identify themselves and get attracted to their desired companies. Also such recruitment tools would help in employer brand as well as add value in terms of fitment of the potential candidates.

Saeed, H. A. M., Younis, S. Y., & Hossan, C. G. (2015) suggest that recruitment should be attractive enough to employ right candidates for the right jobs. Recruitment strategies which include gamification would help the candidates in their career decisions. Also, it would make companies select diverse candidates thereby bridging the skills-gap.

ii. Induction

Once the employees are onboard, games would encourage them by developing mastery and competence needed. Thus people who have induction based gamification would enjoy their work more. They would be more productive and more open to learn.

iii. Training and Development

Using gamification in training and development helps the employees to become more competent, more risk takers. It also assists them in enhancing leadership skills.

Baxter, R. J., Holderness Jr, D. K., & Wood, D. A. (2015) say that story based approach works well in gamification. Also, gamers are more satisfied in their work than non-gamers.

iv. Employee Engagement

Gamification creates emotions and employees' interest thereby arousing their curiosity. Also, the employees who are engaged are more committed and loyal to their jobs. It even helps in team-building activities.

Suh, A., Cheung, C. M., Ahuja, M., & Wagner, C. (2017) observe that aesthetics in engaging the employees plays a vital role as games are short-lived. Dubey, M., Chavan, V., & Patil, D. Y. (2016) find that gamification helps in employee engagement by motivating them to learn advancements in technology.

v. Performance Management

Performance Management gamification leads to extrinsic factors and motivation.

Darejeh, A., & Salim, S. S. (2016) suggest that rewards should be attached with gamification so as to increase the efficiency of the employees.

vi. Corporate Culture

Gamification of the corporate culture increases the employer branding and thus may help to retain the employees as per Lawande, N., Mohile, R., & Datta, S.(2016).

Hence, from the above discussion, we propose the framework of HR Gamification as below (Fig 1):

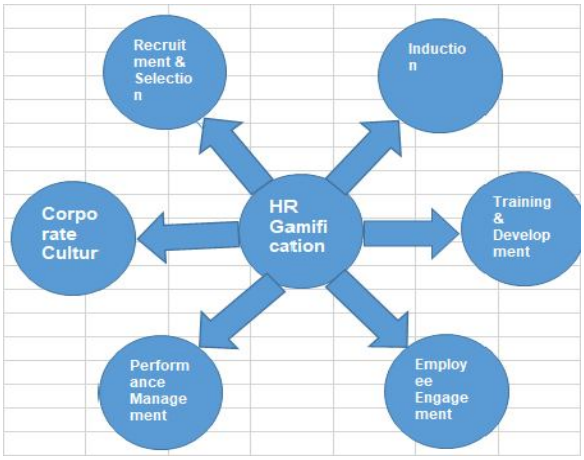

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Fig-1: Framework of Gamification in HR

V. GAMIFICATION AND ORGANISATIONAL SUSTAINABILITY

Sustainability is defined as an ability or capacity to maintain or to sustain itself. Sustainable organizations are self–reliant, committed and in a continuously evolving process. Sustainability is defined as the transformation of human consciousness to a state which believes that human beings and the ecosystems are interconnected (Dunphy, 2010). According to Foley (2005), the aim of organizational sustainability will be accomplished if organizations act to maximise the utility of their products to customers, subject to meeting the wants and expectations of non-customer stakeholders.

Organizational Sustainability has three distinct parts, popularized as the Triple Bottom Line (TBL) by Elikington, 2004. It is an Accounting and Reporting system which consists of Social, Environmental and Economical outcomes.

Gamification can help organizations retain and motivate employees and enhance their loyalty. Such employees are more likely to think and act beyond narrow interests and work towards larger goals of the organizations, thus contributing to organizational sustainability.

Based on above discussions, we propose our conceptual model as below (Fig 2).

Fig-2: Conceptual Model of Gamification in HR and Organizational Sustainability

VI. CONCLUSIONS

Gamification in HR when it is used tactfully, can assist in increasing the performance of organization by becoming one of the most important strategic tool. HR would become employee champion by creating new people experiences in the organization.

This in turn would foster innovation and creativity among the employees (Raghavendran and Kumar, 2015). Thus it would increase employee engagement, commitment and loyalty among the employees.

Thus, we can conclude that Gamification of HR is the future of the organization when used strategically.

VII.IMPLICATIONS FOR FUTURE RESEARCH

Companies should build games in a way so as to capture the psychometric assessment according to Saeed (2015). As per Darejeh, A., & Salim, S. S. (2016) say that more amount of games mechanics should be used.

Also, organisations should making gaming as a way of life for their sustainability as gamification leads to more virtual knowledge based database.

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International Journal of Advance and Innovative Research
Volume 6, Issue 1 (XIII): January - March, 2019
ISSN 2394 - 7780

MONITORING THE DECLINATION OF INLAND WATER BODIES OF BHUBANESWAR CITY: A GEOSPATIAL APPROACH

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ABSTRACT
In recent two decades, the development in the field of remote sensing satellites helps in monitoring the earth's natural features. Due to the variability of available sensor characteristics such as spatial, spectral, and temporal resolution the different approaches were used in monitoring earth surface feature. Likely for monitoring the surface water body many water indices used in recent past. Among the used indices, the modified NDWI (MNDWI) is considered to be more suitable and hence it was applied in the current study to extracting water information for a water region of the study area. The present study illustrates the spatio-temporal variations of inland water bodies of Bhubaneswar city of district Khurda, Odisha, India. Landsat satellite imageries of three different time periods, i.e., Landsat Thematic Mapper (TM) of 1995 and 2005 and Landsat Operational Land Imager (OLI) of 2016 were acquired by USGS Earth Explorer, a public domain of NASA and quantify the changes in the inland surface water of Bhubaneswar city from 1995 to 2016 over a period of 21 years. The modified NDWI was applied to all the satellite images to delineate the inland surface water body. Raster calculator of spatial analysis tool in ArcGIS 10.2.2 software has been employed to reclassify the different time period MNDWI. It classified the brightest part of the study area to one class which is water body and others are in different class. Finally, the inland surface water body of the study area was delineated and extracted by the conversion tool. The changes in areas of inland surface water bodies were computed and analyzed. It was found that the total area covered by inland surface water body for the year 1995 was 16.0390Km^2. The area coverage of inland surface water body successively decreased and it was 13.9578Km^2 for 2005 and 11.6975 Km^2 for 2016. The results indicate that during the last two decades, inland surface water has been decreased by 27.06% (4.3415 km^2). The paper highlights the importance of digital modified NDWI for change in inland surface water.

Keywords: Inland surface water, modified NDWI, GIS, Remote sensing

1. INTRODUCTION
Water is one of the major natural resources available on the earth surface. It is very crucial for human and ecosystem processes. Since starting of human civilization mankind prefers to settle near water sources as it helps them in many ways as a supply of water for drinking, navigation and agricultural. Many major cities of the world were located near the water body. In these cities the water consumed by various sector such as economic sector, industrial sector, agricultural sectors and as well as domestic purposes. Population explosion recognized as a major threat to the environment and as well as water resources available on earth surface. Population size and growth which has a large impact on the demand for water demand for water (Vorosmarty et al., 2000). As the population of the world is rising, it proportionately increases the demand for the water in the 21st century. The water occurred on earth surface in various form such as solid, liquid and gas. The spatial distribution of water varies spatially over the earth surface. Of all the fresh water available on the earth, only 0.3% of surface water while the rest is in form of ice caps and glaciers (Gleick, 1996). This surface water was stored in inland water bodies such as river, streams and lakes. These water bodies are in a position of threat due to a fast-growing global population explosion. So there is a need and a major concern for the sustainable water management of these inland water bodies over the globe. The program such as soil conservation, land use planning, forest management, protecting wetland and aquatic ecosystems are crucial for sustainable water management. Hence mapping of the spatial distribution of water is crucial for scientific research and sustainable ecosystem management (Cole et al., 2007; Carroll et al., 2011; Craglia et al., 2012). Technological advancement and achievement show the path to solve water related issues. Since the inception of geospatial technology such as remote sensing and geographical information system and global positioning system, these help in the monitoring and management of natural resources more precisely. Remotely sensed images are plays a crucial in monitoring inland water body very easily because of its availability in it varies both spatially and temporally.

Various researchers have been used different satellite images with varied spatial temporal characteristics for monitoring of both earth surface's quantitative and qualitative parameters. Researchers also have used the

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available satellite images to generate various thematic maps of earth surface features or maps related to particular land use land cover type such as water (Dekker et al., 1992; Zhang et al., 2003; He. Z et al., 2004; Xie. C et al., 2008; Yang. C et al., 2008). Different approaches have been applied to map the surface water body by giving emphasis on different satellite image characteristics. By taking consideration of spatial resolution Carroll et al., 2009 have used coarse resolution satellite (Moderate Resolution Imaging Spectroradiometer-MODIS) data to map spatial distribution inland surface water body[12]. Comparatively Landsat series like Landsat Thematic Mapper (TM), Enhanced Thematic Mapper Plus (ETM+) and recent Operational Land Imager (OLI) imagery have long term record of satellite images with 30 m spatial resolution helps to map even very inland surface water precisely. Researchers like Townshend and Justice 1988; Wulder et al., 2003; Homer et al., 2004; Townshend et al., 2012; Liao et al., 2014 have used Landsat images to map the inland surface water body. Apart from Inland surface water body many researchers also attempted remote sensing techniques derive quantitative and qualitative information on the status of wetland (Murthy et al., 1988; Polria et al., 1994; Wani et al., 1996; Chopra et al., 1999). Different researchers rely on different approaches to classifying water body in a particular area. Visual image interpretation of the satellite image considered to be best to a mapping of surface water body when the images have a high spatial resolution but this technique is very time consuming due to high spatial resolution (Qin. Q et al., 2008; Kupidura. P 2013). The modest and most common technique used to extract the water body is classification techniques. Researcher McCarthy et al., 2003 applied unsupervised classification method to classifying water body of Okavango wetland in Bostwana. Similarly Abbasi et al., 2015 applied supervised classification method to classifying water body. Unsupervised classification approach used an interactive self-organizing image analysis technique. But the unsupervised classification approached gives very low accuracy and spectral overlapping between the water body and land cover classes. Apart from this researcher like Fuller et al., 2006 applied combination supervised and unsupervised classification to wetland delineation. Though supervised classification having more accuracy than the unsupervised classification (Kingsford. R.T et al., 1997), it also gives variation if sensor resolution changed (Rego and Koch 2003; Blaschke. T et al., 2001). Also supervised classification required an exclusively large number of spectral training data sets for classifying the satellite data (Xiang. M et al., 2005; Richards J.A 1999; Jensen J. A 1996). Another technique to delineate the surface water body is taking spectral band ratios such as normalized difference water index (NDWI), modified normalized difference water index (MNDWI). The NDWI approach enhances the reflectance of surface water by diminishing the low reflectance properties of near infrared (NIR) and maximizing the reflectance in green wavelength (Mcfeeters 1996; Xu 2006). Researchers like McFeeters 1996; Jain et al., 2005; Sethre et al., 2005; Xu 2006 applied NDWI technique to delineate the surface water bodies by using Landsat MSS, TM, and ETM+ imageries. The researcher like McFeeters 1996 applied NDWI to identify the lakes and pond and he also McFeeters 1996 applied threshold value 0 for delineating surface water body. The positive value in the data classified as water and negative values were classified as land use land cover types. Xu, 2006 shows that the NDWI approach has the limitation of delineating water body in shallow water region and using the threshold of 0 does not able to distinguish built-up land from the water body. Researchers like Xu 2006 and Ji et al., 2009 suggested MNDWI identify the water body. The NDWI was modified by replacing NIR-band with SWIR-band. As it is very efficient in distinguishing the water body from other land surface feature. Hence MNDWI is considered to be one of most widely used spectral indices for delineating surface water body, land use land cover analysis and other environmental research (Davranche et al., 2010; Hui et al., 2008; Duan and Bastiaanssen 2013). Yang and Du 2017 applied the integrated approach of Principal component analysis(PCA) and MNDWI to extract the water bodies from Landsat TM imagery. In current the spectral band ratio of green and middle infrared (MNDWI) has been used to extract water body and monitoring the changes of inland surface water body in the study area in the period of 1995 to 2016.

2. STUDY AREA

The study area (Fig. 1), viz., Bhubaneswar, the capital city of Odisha is a very rich in inland surface water resources but the kind of rapid urbanization results in the encroachment of surface water bodies. The decreased surface water bodies have induced water stagnation and urban flood. This makes it very important to study the surface water body degradation so that the corrective actions may be taken to sort out the issues. The current study selected the 10 km buffer zone of Bhubaneswar municipality area as the study area. It is situated between 20°7'25.62" to 20°27'05.14"N latitude and 85°39'25.28"E to 86°00'04.13"E longitudes is located in Khurda district of Odisha. It is situated in the eastern coastal plains, along with the axis of the Eastern Ghats Mountains. The city has an average altitude of 45 m (148 ft) above sea level. Present study area located on the southwest direction of Mahanadi River which is demarcated as the northern boundary of Bhubaneswar metropolitan area, within its delta. The city is surrounded by the Kuakhai River in east, the Daya River in south, the Chandaka Wildlife Sanctuary in western part and Nandankanan Zoo lie in the northern parts of Bhubaneswar.

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Bhubaneswar is topographically divided into western uplands and eastern lowlands, with hillocks in the western and northern parts.

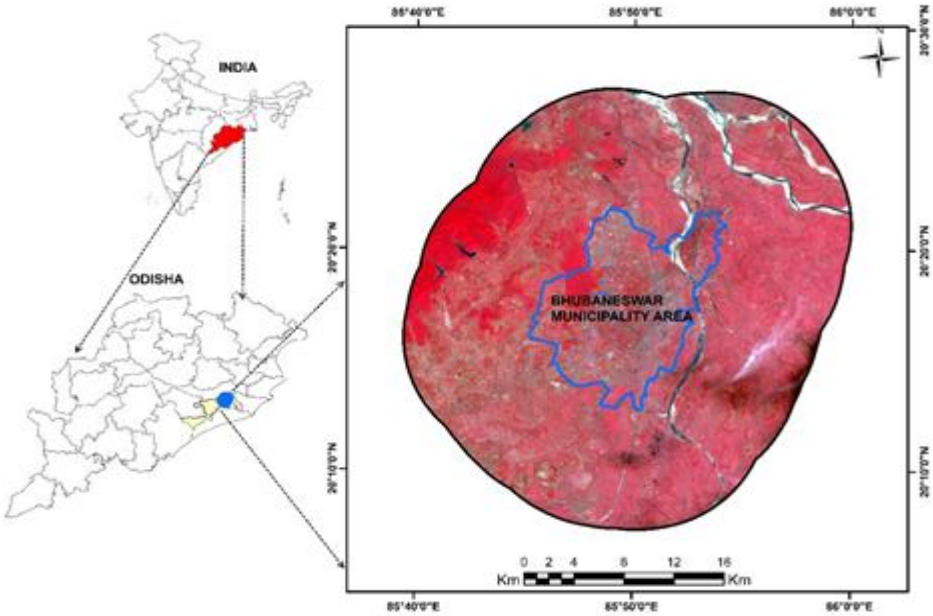

Fig-1: Location map of Study area

3. DATABASE AND METHODOLOGY

Three cloud free satellite data from Landsat achieved on the USGS server (http://earthexplorer.usgs.gov/) were used in the current study. The selected satellite imageries of Landsat Thematic Mapper (TM) sensor images acquired on 26th November 1995(path/row 140/46) and 5th November 2005(path/row 140/46) and Landsat Operational Land Imager (OLI) sensor image acquired on 19th November 2016(path/row 140/46). The Landsat TM data have seven spectral bands from which first five spectral bands (band1-band5) used in current study. Similarly, in Landsat OLI sensor have twelve spectral ranges and among them, five spectral bands (band2 - band 6) were used in the current study to extract inland surface water body in the study area. The band characteristics of both the sensor were given Table.1. All the satellite data used in the current study were level 1 product and referenced in the world geodetic system (WGS84) datum and all images were registered to Universal Transverse Mercator projection (UTM- Zone 45 North).

Table-1: Band characteristics of Satellite Images used in the study

Bands	Spectral region(µm)	
	Landsat TM	Landsat OLI
Blue	0.45 -0.52	0.45 – 0.515
Green	0.52 – 0.6	0.525- 0.6
Red	0.63 – 0.69	0.63 - 0.68
Near-IR	0.76 – 0.9	0.845 – 0.885
Mid-IR	1.55 – 1.75	1.56 – 1.66

3.1. Data Pre-processing

To derive the MNDWI the parameter required surface reflectance rather than DN values. All the raw images were converted to the top of atmosphere (TOA) reflectance. The calibration of Landsat TM was done followed Chander. G et al., 2009. Similarly, the calibration of Landsat OLI was done as per Landsat 8 user manual.

3.2 Method of extracting inland surface water body

The water has absorbed near-infrared and the mid-infrared portion of spectral region hence shows the least reflectance as compared to visible bands where it shows a strong reflectance. Based on the spectral properties water indices which were a ratio of bands was used in current study. In order to delineate and detect the changes in inland surface water bodies in the period of 1995 to 2016, the current study uses the modified version of NDWI (MNDWI) (Xu 2006). It is a band ratio index of green and mid infrared spectral band. The original version NDWI enhances the water features and depresses the vegetation, bare lands (Xu 2006) but it has a limitation that it cannot able to extract shallow water body and also unable to separate the built-up structure from the water body. Hence the current study applies the MNDWI in extracting the water body to minimize the problem of NDWI.

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We have used spectral index developed by Xu's NDWI which is named as MNDWI. The current study uses the ERDAS Imagine model builder to model the MNDWI for each year satellite data, the equation for the MNDWI was given in the following equation. After creation of MNDWI of all the year, the different year MNDWI were brought to ArcGIS environment for spatial analysis. The rater calculator of spatial analysis tool was used to delineate the surface water body of different temporal data. Finally, raster calculator of spatial analyst tools of ArcGIS was used to extract the water body of different temporal data of study area. Flow chart for methodology is given in Fig. 2. The MNDWI equation associated with different sensors were given in Table.2.

$$MNDWI = \frac{Green - MIR}{Green + MIR} \quad \text{.....eq. (1)}$$

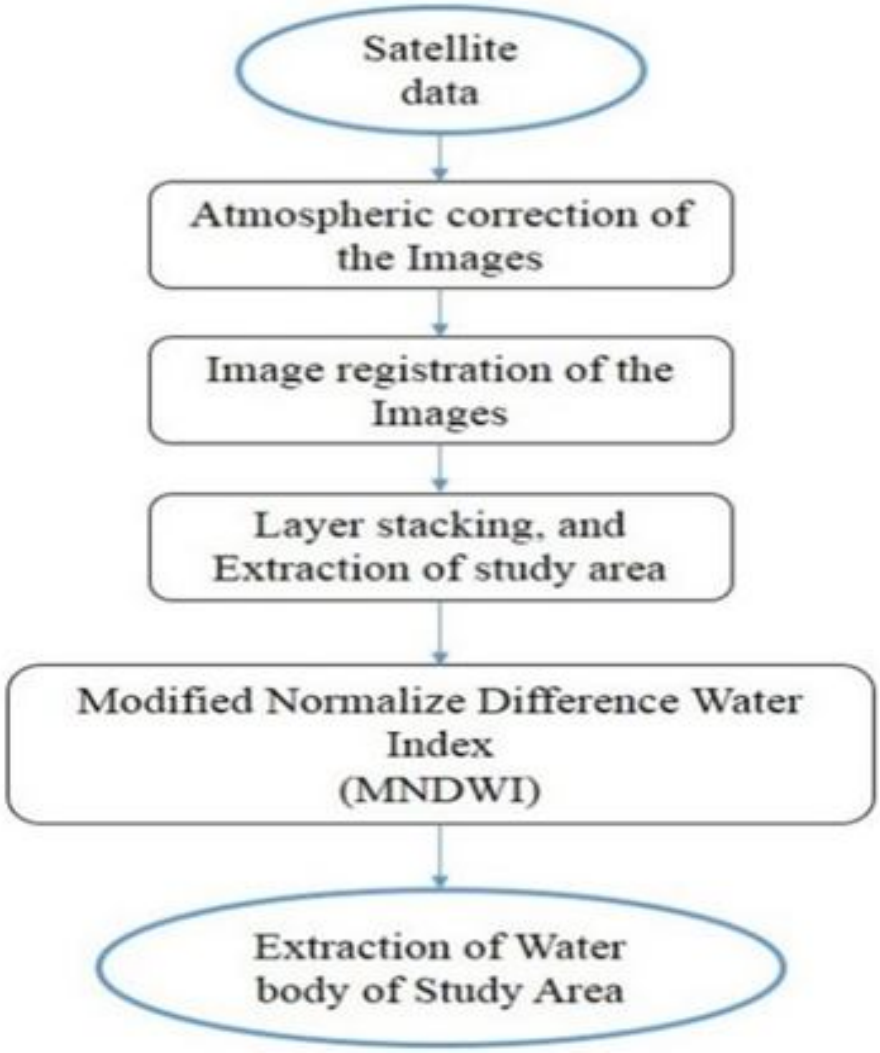

Fig-2: Flow chart for Methodology

Table-2: MNDWI equation for associated sensor

Sensor	MNDWI equation
Landsat TM	$MNDWI_{TM} = \frac{\rho 2 - \rho 5}{\rho 2 + \rho 5}$
Landsat OLI	$MNDWI_{OLI} = \frac{\rho 3 - \rho 6}{\rho 3 + \rho 6}$

4. RESULTS

The image pre-processing operation was carried out on each year satellite images to prepare for further analysis. The subset of Landsat Time series study area shows the variation of inland water body from 1995 to 2016 after pre-processing given in Fig. 3. To delineate the inland surface water body MNDWI applied to the all the satellite image. The MNDWI of the different time period was given in Fig. 4. When these images are compared with the original FCC images, a clear distinction between them can be made out. In MNDWI images, a clear spectral enhancement of the water bodies can be seen, which is not so in the original image.

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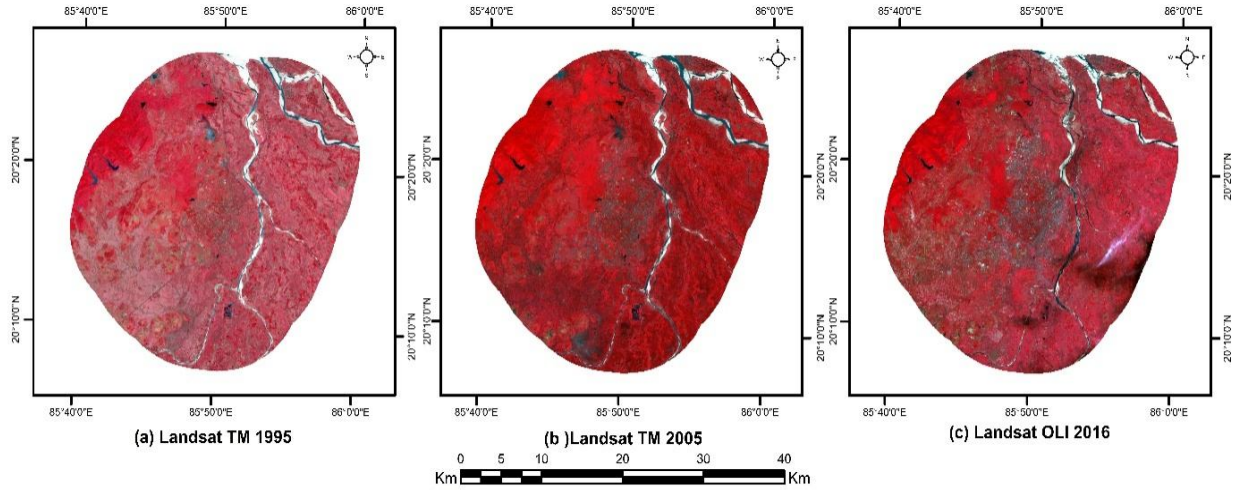

Fig-3: Different time period image of study area (a) Year 1995, (b) Year 2005and (c) Year 2016

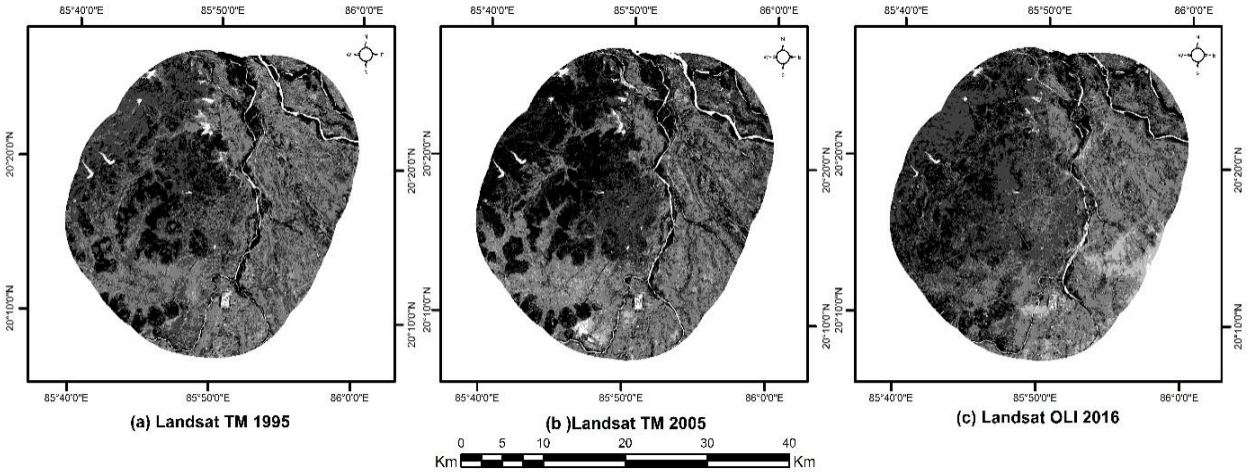

Fig-4: MNDWI image of different time period (a) Year 1995, (b) Year 2005and (c) Year 2016

The current study used the raster calculator of spatial analysis tool in ArcGIS to reclassify the different time period MNDWI. It classified the brightest part of the study area to one class which is water body and others are in different class. Finally, the inland surface water body of the study area was delineated and extracted by conversion tool of ArcGIS (Fig. 5). The changes in areas of inland surface water bodies were computed and analyzed. It was found that the total area covered by inland surface water body for the year 1995 was 16.0390Km^2. The area coverage of inland surface water body successively decreased and it was 13.9578Km^2 for 2005 and 11.6975 Km^2 for 2016.

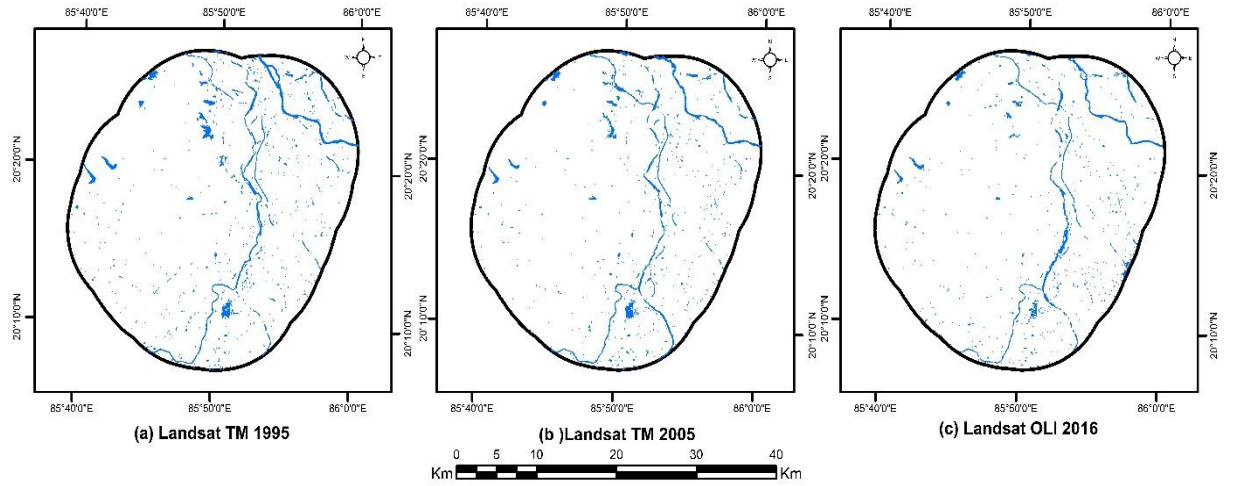

Fig-5: Extracted inland surface water body of study area (a) Year 1995, (b) Year 2005 and (c) Year 2016

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5. DISCUSSION

The water index MNDWI used in current study successfully delineated the inland surface water body in the study area and it revealed that the area of water body dropped down 11.6975 km^2 in 2016. In the year of 1995, the area of water body was 16.0390 km^2 and it was declined 13.9578 Km2 in 2005 and which further decline in 2016. Temporal analysis indicates that 12% decline in water body during the period of 1995 to 2005, and 27.06% during 1995 to 2016. This can be attributed to increase in built-up land and encroachment of open spaces. The decline of inland surface water body was mainly due to the rapid urbanization and urban sprawl. Many inland surface water was encroached by the building illegally. Many of inland surface water body inside the urban area was filled with solid waste which was created by city dweller and surrounding slums. Hence water body loosed its catchment area. In many places it was seen that the open shallow water body was filled with the soil and Multi- storied buildings were made on that water body. As intense urbanization happening in the study area many industries and population were started moving out of an urban area and started encroaching the open spaces and water body in urban periphery area. And also during the course of time, it was also seen that siltation occurred in many water body as the soil of surrounding area eroded and entered to the inland surface water body and subsequently declined its catchment area.

6. CONCLUSION

The study conducted in Bhubaneswar, one of the selected Smart Cities in the country by a bold new initiative by the Government of India to drive economic growth and improve the quality of life of people of Odisha state (India) advocates that multi temporal satellite imagery plays a vital role in quantifying spatial and temporal phenomena. The area under inland surface water of the study area has decreased to 27.06% (4.3415 km^2) due to rapid urbanization, urban sprawl and inadequate solid waste management from 1995 to 2016. Thus, the present study illustrates that remote sensing and GIS are important technologies for temporal analysis and quantification of water phenomena which is otherwise not possible through conventional mapping techniques. This application of Remote Sensing and GIS in Hydrology is useful in many hydrological related studies. Apart from the current study, this tool can be used in many other applications as well. As the model deals with spectral band combinations and not the elevation profile of the area, it will map any area containing water. Any hydrological feature like a lake, river, drainage, etc., can be mapped using this tool. Urban planning, Groundwater Prospects, Natural Resource Management, etc., are the few applications of this tool.

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International Journal of Advance and Innovative Research
Volume 6, Issue 1 (XIII): January - March, 2019
ISSN 2394 - 7780

PHYTOTOXIC EFFECT OF MONOCROTOPHOS ON MORPHOLOGICAL PARAMETERS OF AFRICAN MARIGOLD (*TAGETES ERECTA* L.) AND COCKSCOMB (*CELOSIA CRISTATA* L.)

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ABSTRACT
To assess the response of African marigold (Tagetes erecta L.) and Cockscomb (Celosia cristata L.) exposed on different concentration of monocrotophos by evaluating seed germination, morphology (root and shoot length), biomass (fresh weight and dry weight). The obtained results revealed that the tested pesticide reduced the growth, biomass of African marigold and cockscomb when applied at higher concentration than the optimum dosage. But the lower the pesticide had some stimulatory effect of analyzed parameters. The application of monocrotophos above the recommended dose should be discouraged. Since these studies are carried-out under controlled pot experiment, including the current study. Thus, future study directed towards by studying the phytoremediation of theses contaminated site.

Keywords: Monocrotophos, African marigold, Cockscomb, seed germination, biomass.

INTRODUCTION
Pesticide is specifically planned for the control of pests, weeds, or diseases in modern agricultural practices. Application of pesticide is conceived the most effective and accepted means for the protection of plants from pest attack and has significantly brought to enhance agricultural productivity (Dubey *et al.*, 2015). Annually 4.6 million tons of chemical pesticide and about 500 types of pesticide were used across the world (Zhang *et al.*, 2011). Pesticides has become contaminated the soil, surface areas, ground water by the way of spills, accidents, misapplication, and /or runoff and soil erosion (Karthikayen *et al.*, 2004 ;Henderson *et al.*, 2006). The indiscriminate and unskillful use of pesticides affects the growth of plant and animal, increases pest resistant to pesticides, accumulates residue in fruits and vegetables, causes biodiversity losses, and declines natural habitats (Baig *et al.*, 2012). In the experiment of Stevens et al., 2008, studied that higher dose of imidacloprid significantly affect the germination of rice seedling. The study accounted that pesticide can reduce the germination percentage and seedling height in barley (Srivastava and Singh, 2009). The aim of the present study is to investigate to effect of monocrotophos on two different plant species of *Celosia cristata* and *Tagetes erecta* to evaluate phytotoxic potential of selected plants.

MATERIALS AND METHODS
Pesticide and Plant material
The monocrotophos was purchased from authorized agro agencies. Treatment concentrations were prepared from this solution as 0.5, 1,1.5 and 2%. The certified seeds of *Celosia cristata* and *Tagetes erecta* were collected from the Tamilnadu Agriculture University, Coimbatore, India Seeds were surface sterilized with 0.5% sodium hypochloride for 10 min, followed by extensive washing with sterile distilled water. The seeds were placed on two layered moist filter paper in petriplates and placed in an incubator to germinate at 25°C for 7 days. The emrgence of radicle was considered for seed germination. The total germination percentage was calculated by using the formula.

$$\text{Germination percentage} = \frac{\text{Total number of seeds germinated}}{\text{Total number of seeds sown}} \times 100.$$

Morphological parameters
The morphological parameters including shoot length, fresh weight and dry weight were analaysed at the periods of seventh day. For the measurement of shoot and root length, twenty plants were randomly selected from each treatment to record the seedling growth. The growth was measured using a centimeter scale and the values were recorded. For the measure of fresh weight and dry weight the plants sample were kept in an hot air oven at 80^{o}C for 24 h. Then, the samples were kept in desiccators and their dry weight was recorded by using an electrical single pan balance. The average was expressed in g^{-1} plant.

RESULTS
Effect on seed germination
The effect of various (control, 0.5, 1, 1.5 and 2%) concnetrations of monocrotophos on seed germination of *Tagetes erecta* and *Celosia cristata* are shown in Fig-1. Germination rate was decreased by 91,81,68,55,48 and 95,88,75,68, 55% respectively. The most destructive effect was observed in 2% concentration in both tested plants.

ISSN 2394 - 7780

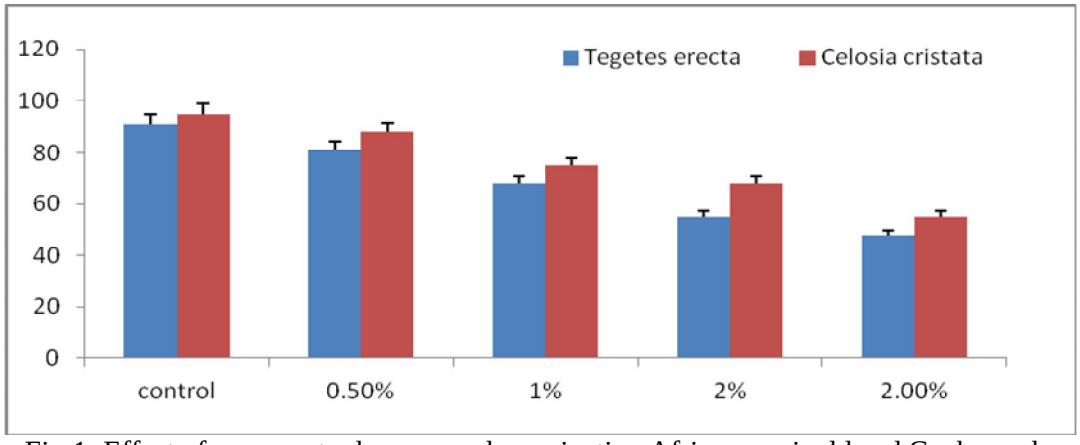

Fig-1: Effect of monocrotophos on seed germination African marigold and Cockscomb.

Effect of pesticide on root and shoot length

The response of root and shoot length of *Tagetes erecta* and *Celosia cristata* are shown in Figures 2 and 3. In case of root, the highest reduction in length was observed at 2.5% concentration control. At the lowest concentration 0.5%, almost all the treatments days the root length was improved when comparing with control.

In case of shoot, the growth was adversely affected with increasing concentrations of pesticide (Figure 3). The most significant inhibition in shoot length was observed when the plant at subjected to 2.5% of pesticide as compared to control plant. The lowest concentrations 0.5% of the shoot length were significantly increased.

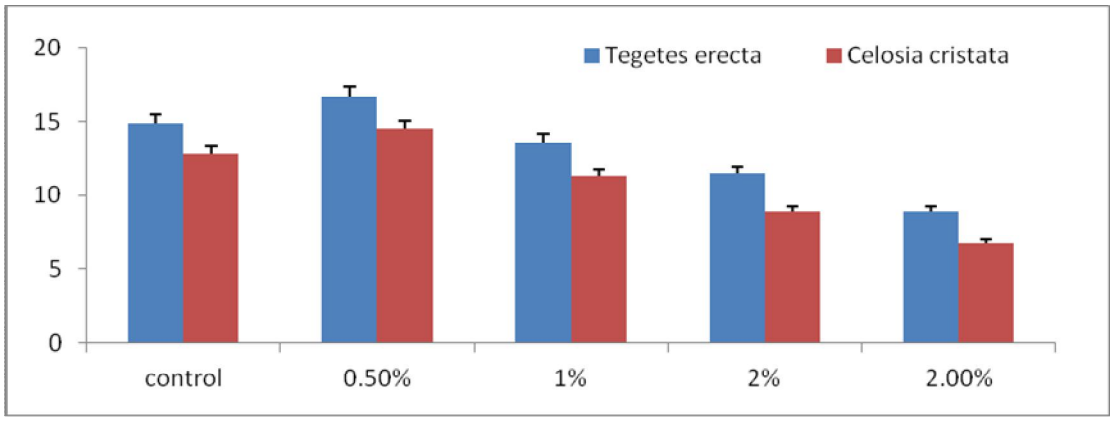

Fig-2: Effect of monocrotophos on shoot length (cm/plant) of African marigold and Cockscomb

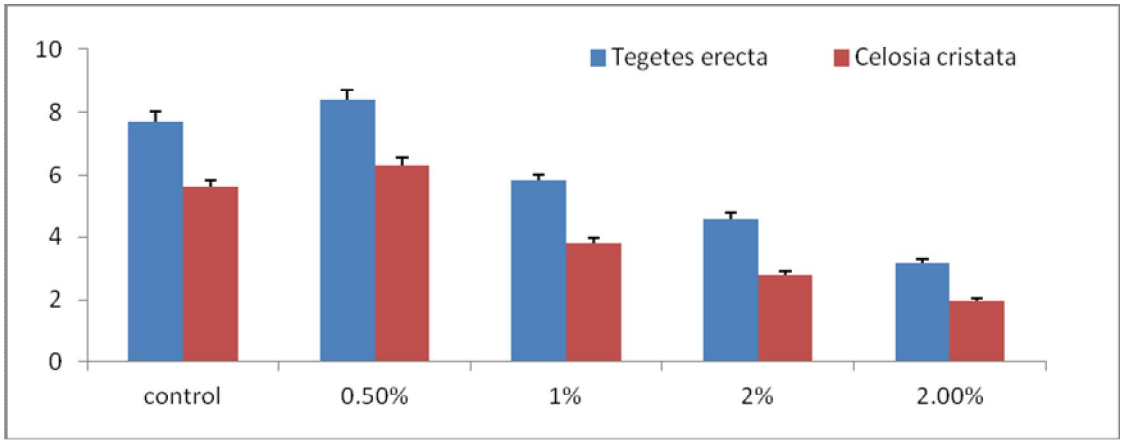

Fig-3:Effect of monocrotophos on root length (cm/plant) of African marigold and Cockscomb

Effect of pesticide on fresh weight and dry weight

The effect pesticides on fresh and dry weight of *Tagetes erecta* and *Celosia cristata* are depicted in Figures 4 and 5. A significant reduction in fresh weight was observed at higher concentration of pesticide 2.5% treatments as compared to control plant, respectively. At lower concentration 0.5% the fresh and dry weight was gradually increased. In case of dry weight was negatively affected with increasing concentrations of pesticide. The most significant reduction in dry weight was observed when the plant at subjected to 2.5% of pesticide as compared to control plant.

ISSN 2394 - 7780

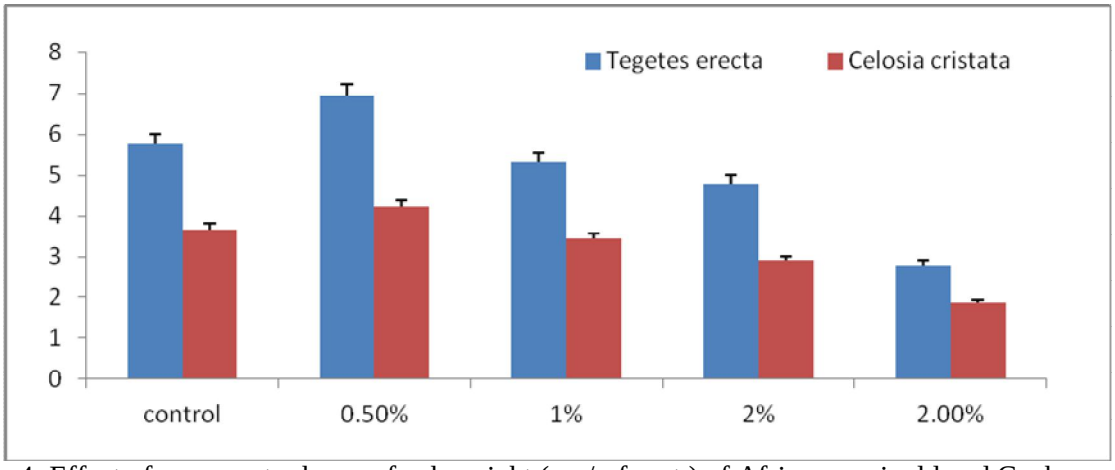

Fig-4: Effect of monocrotophos on fresh weight (mg/g fr. wt.) of African marigold and Cockscomb.

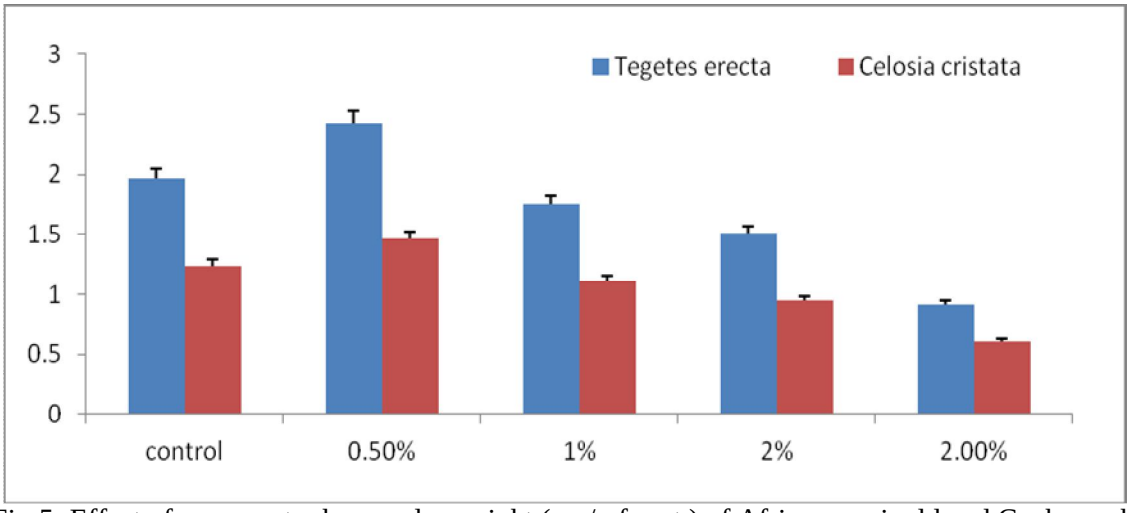

Fig-5: Effect of monocrotophos on dry weight (mg/g fr. wt.) of African marigold and Cockscomb

DISCUSSION

The result revealed that the pesticide treatments declined the seed germination percentage with increasing level of treatment as compare to control. The most negative effect was observed in higher concentration of treatment. Similar, findings were observed by Santhoshkumar *et al.*, 2016. Seedling growth prohibition might be due to the inhibition of hydrolytic enzyme synthesis or blocking of enzyme pathway in seed during germination (Gange *et al.*, 1992). However, (Mishra and Mohanty, 2008) overall inhibition in seedling and morphological parameters was observed in Vigna mungo with the application endosulfan. The presence of pesticide residue in soil could inhibit the uptake of micro nutrients and create nutrient deficiency, this may reflect in abnormality in plant growth parameter (Wahengbam *et al.*, 2013).

The present study showed that the lower concentration of monocrotophos (0.5%) significantly increased the growth parameters such as root length and root length. Nevertheless, at higher concentration, the growth parameters such as shoot length and shoot length are remarkably reduced in all the growth phase under study. Our result accordance with Santhoshkumar *et al.*, 2016. Similar result was observed (Prasertsup and Ariyakanon, 2011) that plant biomass was increased in lowest concentration of chlorpyrifos, but higher concentration decreased in plant biomass in both *Pistia stratiotes* and *L. minor*. As the increase of deltamethrin inhibit the radical length of root is likely relation to the abnormality of chromosome (Duran et al., 2015).

Liu et al., 2009 observed that the root elongation was decreased with the increasing concentration of pesticide of cypermerthrin in Chinese cabbage (pakchoi) seed. Decrease of root and shoot length with the treatment of dimethoate may be due to arrest of physiological and biochemical process (Mishra et al., 2009). Santhoshkumar et al., 2016; Santhoshkumar et al., 2017 concluded that biomass increased at lower concentration, in contrast higher concentration reduced in biomass. It can be concluded that pesticides above the certain dosage level adversely affect the growth of African marigold and cockscomb. At higher doses, all other studied parameters are caused toxic effect. The application of monocrotophos above the recommended dose should be discouraged. Since these studies are carried out under controlled pot experiment, including the current study. Thus, future study directed towards by studying the phytoremediation of theses contaminated site.

ISSN 2394 - 7780

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International Journal of Advance and Innovative Research
Volume 6, Issue 1 (XIII): January - March, 2019
ISSN 2394 - 7780

REVISITING MISOGYNY, MASCULINITY, AND ANTIFEMINISM IN THE VICTORIAN LITERATURE

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ABSTRACT
The Victorian Age found itself confronted by women's issues like gender discrimination, economic slavery, mothering, marriage, patriarchy, suffrage, sexual exploitation, prostitution, objectification of their bodies, and rape. These serious issues along with the massive opposition, vied attention of the feminist critics, intellectuals, and the literary writers. Consequently, the subservient roles of women within the four walls of the house like cooking, washing utensils, mopping floors, bearing and rearing of children, serving their husbands, managing the house and looking after the family were loci of discussion. The literary writers depicted subservient roles of women as meek, graceful, passive, obedient, submissive and secondary to men, in different forms of literature like poetry, drama and fiction. The paper is an attempt to discuss misogyny, masculinity, and antifeminism which found their signification subtly in woman's image as "Angel in the House' in the Victorian literature.

Keywords: Femininity, Gender, Masculinity, New Woman, and Patriarchy.

The feminist critic Simone de Beauvoir writes, "One is not born but rather becomes, a woman" (295). Beauvoir avers the biological determinism, and refutes socio-cultural construct of women's identity. She is averse to the binary terms like man and woman, male and female and masculine and feminine because she thinks that these terms are socio-cultural constructs of male dominated society where patriarchy is a rigid regulatory frame to reconstruct or transform sexes into gendered bodies. Like Beauvoir, Judith Butler also considers patriarchy as a regulatory frame that reconstructs sexes into gender performatives: "Gender is the repeated stylization of the body, a set of repeated acts within a highly rigid regulatory frame that congeal over time to produce the appearance of substance, of a natural sort of being" (Butler 43-44). The binary oppositions between sexes, like man and woman, male and female, masculine and feminine, active and passive, strong and weak, aggressive and submissive, and reasonable and emotional constitute gendered body and treat women inferior to men. The Victorian biological theories celebrated female inferiority, and described stereotypes of femininity in various ways. John Harrison writes, "Female inferiority and the stereotypes of the womanly woman were reinforced by Victorian biological, anthropological and medical theories" (158). Further, girls were taught to be submissive to be meek, graceful, obedient, and subservient to boys. The masculinity was thus projected against women through socio-cultural practices that framed gendered bodies into femaleness/femininity and maleness/masculinity: "The subordination of women by men is part of a larger social practice that creates gendered bodies—feminine women and masculine men" (Franke 762). Furthermore, misogyny, masculinity, and antifeminism found manifestation in the gendered body that emerged from psychological differences between man and woman. Therefore, man was viewed physically strong, aggressive, brave, reasonable hardworking, intellectually sound and breadwinner. Contrarily, woman was seen as physically weaker sex, emotional, obedient, meek, graceful, submissive and passive. The girls and the boys realized differences in their sexual organs which were symbol of femininity and masculinity respectively. In her book *Desire and Domestic Fiction: A Political History of the Novel*, Nancy Armstrong describes discriminations between sexes which were projected against women's emancipation:

Husband	**Wife**
Get goods	Gather them together and save them
Travel, seek a living	Keep the house
Get money and provisions	Do not vainly spend it
Deal with many men	Talk with few
Be 'entertaining'	Be solitary and withdrawn
Be skilful in talk	Boast of silence
Be a giver	Be a saver
Apparel yourself as you may	Appeal yourself as it becomes you
Dispatch all thing outdoors	Oversee and give order within. (110)

ISSN 2394 - 7780

In the Victorian England, the queen Victoria herself was considered the symbol of femininity. She considered women as queens of the domestic spheres, therefore, she advocated domestication of women. She had staunch faith in male supremacy. The famous critic G. T. Houston considers the queen as a deviant model of womanhood and femininity who believed in her submission to rules constituted by male dominated society. He writes, "Tutored in the dominant gender ideology that all domestic 'queens' of the household submissive to male rule, Victorian women were faced, in their queen, with a deviant model of femininity that complicated the concepts of womanhood and sovereignty. Viewed as explicitly informing the subjectivity of every Victorian female, Victoria's womanhood was both engendered and engendering because she was queen" (33). The queen Victoria was famous among the Victorian women as the 'ideal woman' and the "ideal woman did not have to work outside the home but was supported by her husband. Her role was to manage the household economy in an efficient way and sanctify the home by her loving tenderness and chaste discipline" (Harrison 158).

In the Victorian Age, one of the offshoots of antifeminism was the concept of ideal woman which was centred on the function of mothering. While the function of mothering was a significant issue of debate among the intellectuals, particularly, the feminist scholars. The feminist critics rejected ideology of mothering, and conflated it with rape. In *Women's Lives, Men's Laws,* C. Mackinnon portrays gendered ideology of the function of mothering in the Victorians. She writes,

> Reproduction is socially gendered. Women are raped and coerced into sex. When conception results from rape or incest, it is a girl or woman who was violated, shamed and defiled in a way distinctively regarded as female. When a teenager gets pregnant because of ignorance or the negative social connotations of contraception, it is a young woman whose life is on the line. When miscarriage results from physical assault, it was a woman who was beaten. (137)

In addition, function of mothering was considered to be women's chief vocation during the Victorian Age and women's sexual fulfillment was considered only after motherhood: "Woman's sexual fulfillment was to be found only in her role as wife and mother; and a woman indulged in sexual gratification for its own sake rather than for procreation degraded her womanhood" (Harrison 158). She was treated as a childbearing machine as ordained in the *Bible*: "I will surely multiply your pain in childbearing; in pain you shall bring forth children. Your desire shall be for your husband, and he shall rule over you" (Genesis 3:16). Moreover, women had to take risk of their lives due to contraceptive pills, and the reproductive technologies which were dangerous to their health.

The representative poet of the Victorian England, Lord Alfred Tennyson depicts ideology of gendered body in his poem. He makes discrimination between sexes. He places man to the public sphere and relegates woman to the threshold: "Man for the field and woman for the hearth: / Man for the sword and for the needle she: / Man with the head and woman with the heart: / Man to command and woman to obey" (*The Princess* 182). Tennyson's dichotomy about sexes, and the division of labor in the Victorian society is experienced by the readers into two ways. Firstly, the paid work was given importance. It was shifted from home and farm to mills, factories, shops and offices merely for advantages of men workers. Hence; women's work was not considered as significant and valuable as men's. Secondly, men's work around the threshold was industrialized, and they were kept free from the household duties, including rearing of their children. Thus, women were further burdened with men's household responsibilities. Consequently, home was considered as haven for the Victorian women: "She [the housewife] is the architect of home, and it depends on her skill, her foresight, her soft arranging touches whether it shall be the "lodestar to all hearts", or whether it shall be a house from which husband and children are glad to escape either to the street, the theatre, or the tavern" (http://www.bbc.co.uk/history/trail/victorian_britain/women_home/ideals_womanhood_01.shtml). Women were considered as the weaker sex hence; they were not given permission to work in the fields, consequently, masculinity was at the forefront of public attention while women were viewed secondary to men. Elizabeth Jameson describes the division of labor based on the gendered body. Jameson writes,

> Women as civilizers were presumed to be dependent on male labor and submissive, therefore, to male authority. . . . Work was divided, as in most cultures, along gender lines. Men plowed, planted, and cared for the sheep, horses, and pigs. Women raised and processed vegetables, kept the dairy and the poultry, made clothing, cared for the sick and did housework. . . . women's wage work consisted mostly of domestic work—cooking, sewing, keeping boarders, waitressing doing laundry, and prostitution. (150)

Woman was further burdened with familial duties like rearing of children, cooking food, washing clothes and utensils, mopping floor, looking after her husband and family members. Michael Kimmel rightly recognizes

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discrimination between sexes and acknowledges the rift between men and women emerged due to gender oriented roles. He writes, "Though men's and women's spheres were symmetrical and complementary, they were not equal" (114). Woman's mission of life was simply different from man. She was taught that she was made for household duties: "Woman's mission in life was to the guardian of moral, spiritual and domestic values. In the words of Coventry Patmore's apotheosis of love, she was, 'The Angel in the House'. Before marriage, girls were to be kept sexually ignorant and quite innocent or 'pure-minded'" (Harrison 157).

In the poem "The Song of the Shirt", Thomas Hood depicts gendered division of labour between man and woman, in the private and the public spheres. Prima facie, the poem reveals that waged work was mainly for men and women were not permitted to enter waged profession in the public walk of life. Women's job was to cook food, wash utensils, give birth to children, serve her husband, stich and mend the clothes, and look after the family:

> With fingers weary and worn,
>
> With eyelids heavy and red,
>
> A woman sat, in unwomanly rags,
>
> Plying her needle and thread —
>
> Stitch! stitch! stitch!
>
> In poverty, hunger, and dirt,
>
> And still with a voice of dolorous pitch
>
> She sang the "Song of the Shirt". (147)

In Thomas Hood's poem, "Bridge of Sighs" identity of the seamstress and the prostitute is cemented into the symbols of clothing to depict their exploitations and sufferings. The poet shows that the seamstress is confined within the four walls of the house and her work is undermined in male dominated society while a prostitute has to put on the expensive clothes and to sell her body instead of selling clothes. On the one hand, the commodification of a prostitute's personality makes her a powerful figure of charming sexuality, on the other, she is treated as an object by the visitors, consequently, her life is considered sinful. Moreover, she is socially excommunicated by the people of her own society, culture, and community:

> Touch her not scornfully;
>
> Think of her mournfully,
>
> Gently and humanly;
>
> . . . . . .
>
> Who was her father?
>
> Who was her mother?
>
> Had she a sister?
>
> Had she a brother?
>
> Or was there a dearer one
>
> Still, and a nearer one
>
> Yet, than all other? (144)

During the nineteenth century, the Victorian ideals became offshoots of misogyny, masculinity, and antifeminism. For example, Robert Browning's "Porphyria's Lover" is a social representation of men's dominance over women, and their sexually abusive behaviour. The dramatic monologue, "Porphyria's Lover," delves into the psychology of a patriarchal mindset, illustrating the power struggle of a woman and her lover. Through manifestation of the speaker's mentality and motivation, Browning reveals the gross injustice of patriarchal society, and male supremacy projected against women's liberation that results in antifeminism, and presents woman as commodity. Therefore, woman was expected to be attractive, and pleasing to men. Her fashion became more sexual--the hips, buttocks, and breasts were exaggerated with crinolines, hoopskirts and corsets which nipped in the waist and thrust out the breasts. The female body was dressed up in a different manner from man to emphasize her separation from the world of work. By wearing dresses that resembled her

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interior furnishings, woman was considered to be a walking symbol of her social functions – wife-mother-sister, and domestic manager all-in-one. In *The Princess* Lord Alfred Tennyson projects Ida for her desires for the prince. It celebrates man/woman binary, and their spheres respectively. On the contrary, the prince's masculinity and male supremacy on her, is exposed deliberately. He consumes her body and declares:

> Man is the hunter; woman is the game.
>
> The sleek and shining creatures of the chase,
>
> We hunt them for the beauty of their skins;
>
> They love us for it and we ride them down. (182)

The staunch faith in the religious scriptures constituted gendered body. For example, the Church played a significant role in the construction of the gendered body by propagating the biblical ideology of creation of man and woman ordained in the Genesis: "The Lord created him, she was created out of man's rib" (Genesis 2:22). One of the feminist scholars of the nineteenth century, Susan Anthony deplored the *Bible* for its gender discrimination and anti-feminist practices: "Thy wife shall be as a fruitful vine by the sides of thine house" (Psalm 128:3). The Church did not permit women to enter with bonnet. The feminist scholar o Elizabeth Cady Stanton identified a woman whom the Bishop did not allow to enter the Church and perform the religious duties without her bonnet. In *The Woman's Bible*, she writes,

A Lady in England made the experiment of going to the established church without her bonnet, but it created such an agitation in the congregation that the Bishop wrote her a letter on the impropriety and requested her to come with her covered. She refused. He then called and labored with her as to the sinfulness of the proceedings, and at parting commanded her either to cover her bead or stay away from church together" (Numbers vi).

In Bernard Shaw's *Mrs Warren's Profession*, Mrs Warren tells her daughter that she sells her body to pimps and madam for keeping her body and soul together. For her, there is no other way for women to support their livelihood except conforming herself to a man who can provide her with bread. She proclaims: "The only way for a woman to provide for herself decently is for her to be good to some man that can afford to be good to her: (3: 69). Describing the situation of women's sexual exploitation in prostitution, Kathleen Barry writes, "Prostitution [was] not the economic alternative for women that may have believed it to be. The money a woman makes is usually not her own. The pimp takes most or all of it. He tells her where to work, how many hours a day, and what quota she must make before coming home" (*The Prostitution of Sexuality* 212).

The identity of the Victorian woman was associated with the femme fatale. She was considered to be a sexual prowess that attracted men in order to control her sexuality. She was associated with the image of the fallen woman who was not permitted to participate in the rituals hence; she was banished from the society. In Thackeray's *Vanity Fair*, Becky Sharp is an example of a femme fatale who uses her charm to fascinate and seduce men. Jennifer Hedgecock's opines that the woman's image as a femme fatale has been present throughout centuries of art, poetry, and literature—from biblical Lilith and Shakespeare's Cleopatra to Pater's Mona Lisa. In her opinion, the femme fatale of the mid-nineteenth century was reconstructed image of the women who were advancing their social status: ". . . the mid-Victorian femme fatale is a literary signpost of the changing roles of women in the nineteenth century, a period when middle-class women begin organizing more radical feminist movements, and that she foreshadows later protests against society's treatment of women" (2-3). Further, marriage was seen to be another offshoot of the gendered body in the Victorian Era. The only way for a woman to support her livelihood was to get married in the early years of her life, and play subservient roles to her husband: "Traditionally in the nineteenth century . . . women are denied equality, to which femme fatale responds by playing conventionalized roles subservient roles to serve her purpose of economic survival. Marriage holds out the promise of security and affection, and the fictional femme fatale understands this" (Hedgecock 206). The marriage was a lot for women to secure their livelihood. John Harrison writes, "The Victorian ideal of womanhood centered on marriage and the home. . . . Before marriage, girls were to be kept sexually ignorant and quite innocent and 'pure-minded'. Tennyson, Ruskin and other Victorian writers habitually likened maidens to flowers" (157).

The Victorian fiction writers were conscious of the emerging issues about the radical change in women's social status. They dealt with femininity and sexuality in their writings. Nancy Armstrong opines, "If eighteenth-century fiction invented 'femininity', then it is fair to say that Victorian fiction invented 'femaleness" (109). The Victorian fiction highlighted sexuality, particularly women's sexual exploitation. According to William Cohen, "Through specifiable narrative techniques, the Victorian novel . . . encrypted representations of sexuality and demonstrated a frantic need for managing and redeeming sexual practices" (27). Charles Dickens' *David*

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Copperfield depicts gender discrimination directed against middle-class women. Emily represents the middle-class fallen woman while Rosa, the threatening upper class woman; both are examples of femme fatale of the Victorian society. Thomas Hardy's *Tess of the D' Urbervilles* is other example in which Tess suffers from sexual exploitation, struggles for her identity, feels incomplete and ceases to realize her body as her own due to gender discrimination. Henc; the territory of "otherness" makes Tess realize that she does not belong to herself but a man, therefore, her existence is incomplete without him. Throughout the novel, Tess remains subordinate, passive and submissive to her male counterparts. The novel also describes nature/culture dichotomy, and dominance of male characters, Angel and Alec. These two male characters treat her as an object of their sexual pleasure.

The ideology of 'New Woman' was another offshoot of representation of misogyny, masculinity, and antifeminism. The New Woman was depicted in the fiction of the period by the writers like Sarah Grand, Brontë sisters, George Eliot, George Meredith, and Thomas Hardy. According to Carolyn Christensen Nelson, "The term 'New Woman' was coined in England in March 1894 when Sarah Grand . . . published 'The New Aspects of the Woman Question' in the *North American Review*. In the essay she uses the phrase 'the new woman' to point out the woman who had finally 'solved the problem and proclaimed for herself what was wrong with Home--is-the-Woman's--Sphere, and prescribed the remedy'" (Introduction ix). Valerie Sanders reiterates Nelson's description of the New Woman: ". . . the popular novelist Sarah Grand had coined the phrase 'New Woman' to describe the new generation of women who sought independence and refused the traditional confines of marriage" (26). Further, *The Oxford Companion to English Literature* gives the different details about the New Woman. It describes that the novelist Quida coined the phrase 'New Woman' in her response to Sarah Grand's article 'The Aspects of the Woman Question' (723). However, Sarah Grand first uses the term 'New Woman' in the article 'The Aspects of the Woman Question' in *North American Review* in March, 1894 (Nelson 140) while Quida uses the term in 'New Woman' in an essay 'The New Woman' in *North American Review* in May, 1894 (Nelson 153-54). It is, therefore, clear that Sarah Grand first used the term 'New Woman' to describe the women activists who were trying to break the shackles of their confinement within the four walls of the house. They were claiming equality in every walk of life: "The woman who avails herself of these advantages [freedom to work, to educate self, to be healthy, to remain single without stigma if she chooses] is the New Woman" (*Feminist Dictionary* 300). Charlotte Perkins Gilman describes New Woman in different way, "Here she comes, running, out of prison and off the pedestal; chains off, crown off, halo off, just alive woman" (<http//www.library.csi.cuny.edu./dept./history/lavender/386/newowman.html>).

The controversy about New Woman in the later part of the Victorian was flourishing to construct new female identity based on the gendered body by the intellectuals of the period. It gave woman a new face, a new look, decorated her body with cosmetics, enriched her beauty through fashionable clothes and made her a role model for women of the time. Angelika Köhler states, ". . . the multivalent participation of the magazines played an important role in the discursive construction and reconstruction of the image of the New Woman at the turn of the twentieth century" (158). The literary authors of the time presented her on the stage in veil, and tried to expose her sexuality, passivity, and femininity. She was an iconic figure for the literary writers, artists, painters, photographers, journalists, theatres, cinema, media, newspapers, magazines, and periodicals. Further, she was seen as an object of hatred because she was campaigning for her equal rights. *Feminist Dictionary* describes New Woman as "a creation of newspapers, fashion papers, and other media. 'Members of literary clubs write papers about her; debating societies discuss her; conservative men and women rail against her; easygoing people accept her with a smile; collectively she is everywhere, and individually she is nowhere to be found" (300). Women could not gain equality despite the fact that the New Woman challenged male authority, and the feminist scholars companioned for their freedom. Piers Compton argues: "Some of the warnings against the growing demands for women's rights came from their own sex. Emily Tennyson insisted that woman was meant to the complement and helpmate of man" (64).

Besides, New Woman was not only a prey for misogynists, and antifeminist thinkers but feminists, non-feminists, men and women also unfairly caricatured as weaker sex. Terry Lovell states, "But the new woman as she was constructed in fiction by both men and women, feminists and antifeminist, moved within a common set of constraints, faced similar dilemmas" (119). The authors' periodicals and newspapers of the late nineteenth century focused on her glamorous look. They were reconstructing new femininities by making her glamorous and different from earlier one. New Woman was both the producer and consumer of this glamour because she was engaged in producing handmade fashionable clothes, cosmetics, and materials used by women themselves, in their daily life for their makeup. Her body was being advertised by the male-chauvinists. Hilary Fawcett avers, "Developing areas such as cosmetics and hairdressing and the massive expansion in the process by which

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women might be transformed from their humdrum selves in to the figures of fantasy that gazed from posters, illustrations and magazines . . .” (150).

The women who were advocating for their emancipation like suffragist enfranchise, students, and professional women, were not kept out of the category of New Women. The sexual politicians silenced such women by giving them title of New Woman. Hilary Fawcett holds: “The category of the New Woman in this period [1890-1914] is generally attached to the radical and politicized. The feminist, the suffragette, the student and professional woman were part of that body alluded to in the press and literature as the New Woman . . .” (145). The antifeminist thinkers treated New Women amicably in order to maintain their subservient roles, “[T]he medium may be more sophisticated, but the message is the same. Women are dangerous. Women are weak. Women are imbued with sexuality and as such must be controlled and contained. The pedestal, represented today in the image of the ‘perfect woman’, to which the majority of us cannot aspire, serves well” (Ussher 268). Ussher’s argument reveals that the concept of New Woman was another myth concocted by woman haters to support their beliefs, concoctions, images and arguments. She was the same during this period as she was while being described in the *Bible* and imbibed by the following generations. Françoise Le Jeune argues: “New Woman was in fact as old as Eve, like her seeking ‘the knowledge of good and evil’” (86). New Woman was thus the result of antifeminist thinkers who were not in the favour of women’s emancipation. Somehow, they were deviating women’s attention from those issues which were concerned with women’s freedom. Even today, women have not been freed from their slavery. In *Women’s Madness*: *Misogyny or Mental Illness?* (1992), Jane Ussher argues: “The Victorian ‘angel in the house’, the Madonna or the whore, the castrating sexual monster, the sex object, the submissive wife, the pedestalled princess, all are present in today’s prolific images” (268).

Thus, the discussion about revisiting misogyny, masculinity, and antifeminism envisions gendered body in the Victorian literature. It shows how women were marginalized and considered as inferior to men through poetic creations, dramatization, and fictional representations. The formation of gender was based on the biological determinism. The cultural practices foreground the reality that there are physiological differences between man and woman by birth but the discriminations based on gender roles were constituted by men for their own benefits. On the contrary, cultural acts about women like housekeeping, nursing, bearing and rearing of children, cooking, looking after their husband and family were framed by men for women’s subordination. In the Victorian age, the gender discriminations were also imbued inequality in marriage, mothering and women’s economic dependence.

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International Journal of Advance and Innovative Research
Volume 6, Issue 1 (XIII): January - March, 2019
ISSN 2394 - 7780

CARE AND PROTECTION OF SEXUALLY ABUSED GIRLS: AN OVERVIEW OF INTEGRATED CHILD PROTECTION SCHEME

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ABSTRACT
Girl child is an important demographic segment of any country and at the same time, they constitute the most vulnerable group as well. Agirl's right to survival begins before a girl is born. According to Census 2011 out of a population of 1.2 billion in India, 472 million (39 per cent) are under 18 years of age. According to Women and Child Ministry's, National Plan of Action for Children 2016, approximately 27.5 percent of children belong to marginalized and disadvantaged communities. Major problems affecting the children are child labours, being abandoned, being forced to live in street or child care institutions, having no identity, family becoming unable to protect their children, child trafficking and conflict with law, despite the fact that laws and treaties at the policy level are innumerable for the protection of girls.

Knowing the challenges of child rights monitoring system and governance is a vital role in present situation. Integrated child Protection system is implemented in India in 2009 under the Ministry of Women & Child.With the implementation of all the programmes and schemes, while there are gainful achievements in some areas, in a large country with diversity in economic attainment the quality of services is not consistent. So researcher explores how the Child Protection systems functions and how they governed by various statutory bodies with shared responsibility for girl's protection. The paper draws from the monitoring and governance of the Integrated Child Protection system, and identifies the challenges and responses for ensuring care and protection for sexually abused girlsin a nutshell.

Keywords: Child Rights, Integrated Child Protection Scheme, Care and Protection, challenges, sexually abused girls.

INTRODUCTION
According to the UNCRC Child Rights are minimum entitlements and freedoms that shouldbe afforded to all persons below the age of 18 regardless of race, colour, gender, language, religion, opinions, origins, wealth, birth status or ability and therefore apply to all people everywhere. The UN finds these rights interdependent and indivisible, meaning that a right cannot be fulfilled at the expense of another right.

UNICEF considers child protection as the prevention of or responding to the incidence of abuse, exploitation, violence and neglect of children.According to the Integrated Child Protection Scheme, 2009 (ICPS) child Protection is about keeping children safe from a risk or perceived risk to their lives or childhood. It is about recognizing that children are vulnerable and hence reducing their vulnerability by protecting them from harm and harmful situations. Child protection is about ensuring that children have a security net to depend on, and if they happen to fall through the holes in the system, the system has the responsibility to provide the child with the necessary care and rehabilitation to bring them back into the safety net.

RESEARCH METHODOLOGY
The present study is primarily based on the exploratory research method and the researcher tries to explain the practical issues related to the care and protection of sexually abused girlsin general and researcher explores how the Child Protection systems functions and how they governed by various statutory board with shared responsibility for girl's protection. The paper draws from the monitoring and governance of the Integrated Child Protection system, and identifies the challenges and responses for ensuring care and protection for sexually abused girls in a nutshell. Secondary data has been collected from books, articles and Government reports.

OBJECTIVES
- To analyze the role of Integrated Child Protection System for ensuring girl's right.
- To highlight the challenges for ensuring care and protection of sexually abused girls.
- To analyze the various types of care and protection provisions under Integrated Child Protection Scheme(ICPS).

CHILD PROTECTION AND CHILD RIGHTS
It is important to understand the difference between these two concepts. Child rights are a set of principles or ideals. They are entitlements and some of them are justifiable in a court of law, but they are not tangible.

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Protection is one of these rights. But Child Protection is more than a right. It is a framework or system by which the rights of a child can come to be. The framework consists of various duty bearers such as the departments of the government, police, school, civil society, who all have roles to play to ensure that a child's rights are met, and in the case that a child's rights are violated that the violator be brought to justice and care be provided to the child. Child protection is not only treatment, but should also be preventive. Risk management needs to take place to reduce the risk of violation of child rights in any given circumstance or space.

MONITORING -A CHALLENGE

Worldwide, the field of child protection in humanitarian settings is undergoing an historic shift toward strengthening child protection systems on a national scale (African Child Policy Forum., 2013; Wulczyn et al., 2010). This approach aims to provide comprehensive child protection supports and promises to invigorate efforts to prevent problems of abuse, violence, exploitation, and neglect regarding children. This systemic approach is important and encouraging, but many challenges have arisen in implementing it. Manyefforts at mapping and strengthening child protection systems have been top-down and failed to listen deeply to familiesand communities or to recognize adequately their contributions to children's protection and well-being. A more comprehensive approach to child protection system strengthening is needed to intermix and balance top-down, bottom-up, and middle-out approaches. Top-down approaches help to ensure that governments have the laws, policies, and capacities that are essential in protecting vulnerable girls. Bottom-up approaches work from grassroots level upward, feature community action, build on existing community strengths, and stimulate community-government collaboration.

CHILDREN'S RIGHT

The United Nations Convention on the Rights of the Child (UNCRC) is an **international child rights treaty** that protects the rights of children. Adopted on 20th November 1989 by the UN assembly, the Convention's objective is to **protect the rights of all children** in the world. The Convention is the first legally binding international instrument of Child Rights protection. The States that ratified the Convention are obligated to respect and to ensure that all rights it establishes in the name of both girl & boy children are respected. India is a signatory to the Convention. India ratified the United Nations Convention on Rights of the Child on 12th November 1992.

The rights of a child are those as enumerated under the United Nations Convention on the Rights of the Child (UNCRC) including:

i. Protection against all forms of discrimination or punishment
ii. Right to life
iii. Right from birth to a name, identity and the right to acquire a nationality
iv. The right not to be separated from their parents against their will
v. The Right to freedom of expression
vi. Right of the child to freedom of thought, conscience and religion
vii. Right of the child to freedom of association and to freedom of peaceful assembly
viii. The Right to be protected from all forms of physical or mental violence, injury or abuse, neglect or negligent treatment, maltreatment or exploitation, including sexual abuse, while in the care of parent(s), legal guardian(s) or any other person who has the care of the child.
ix. The Right to appropriate protection and humanitarian assistance if the child is a refugee
x. The Right for mentally or physically disabled children to enjoy a full and decent life, in conditions which ensure dignity, promote self-reliance and facilitate the child's active participation in the community
xi. The Right to the enjoyment of the highest attainable standard of health and to facilities for the treatment of illness and rehabilitation of health
xii. The Right of every child to a standard of living adequate for the child's physical, mental, spiritual, moral and social development
xiii. The Right to Education
xiv. Right to be protected from economic exploitation and hazardous work
xv. Right to protection from all forms of sexual exploitation and sexual abuse

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THE MONITORING AND GOVERNANCE OF THE INTEGRATED CHILD PROTECTION SYSTEM IN INDIA

Child Protection System

Child protection is the prevention of or responding to the incidence of abuse, exploitation, violence and neglect of children. This includes commercial sexual exploitation, trafficking, child labour and harmful traditional practices, such as female genital mutilation/cutting and child marriage.

Integrated Child Protection Scheme (ICPS) further explains child protection as keeping children safe from a risk or perceived risk to their lives or childhood, recognizing that children are vulnerable and hence reducing their vulnerability by protecting them from harm and harmful situations.

STRUCTURES AT THE CENTRAL, STATE AND DISTRICT LEVELS UNDER ICPS

At Central level

Central Adoption Resource Authority (CARA) is the Central Authority and advisory body in all matters concerning adoption and implementing various provisions of the Hague Convention on Inter-country Adoption 1993.

Central Project Support Unit (CPSU) under MWCD will function as a Mission Directorate to ensure effective implementation of ICPS throughout the country.

At State level

State Child Protection Society (SCPS) is a fundamental unit in every State/UT for the implementation of ICPS.State Adoption Resource Agency (SARA) aims at supporting CARA in promoting in-country adoption and regulating inter-country adoption

At District Level

District Child Protection Unit (DCPU) is a fundamental unit at the District level for the implementation of ICPS.Child Welfare Committee (CWC) is the final authority to dispose of cases for the care, protection, treatment, development and rehabilitation of children in need of care and protection and to provide for their basic needs and protection of human rights in each district.Juvenile Justice Board (JJB) is a statutory body at the district level to deal with matters relating to children in conflict with law.Special Juvenile Police Unit (SJPU) will coordinate and upgrade the police interface with children in every district and city.

CHILD PROTECTION SYSTEMS: AN OVERVIEW

(1)Integrated Child Development Scheme (ICPS)

Integrated Child Protection Scheme (ICPS) is a centrally sponsored scheme aimed at building a protective environment for children in difficult circumstances, as well as other vulnerable children, through Government-Civil Society Partnership.

(1.1.) District Child Protection Unit (DCPU)

District Child Protection Unit (DCPU) is a fundamental unit at the District level for the implementation of ICPS.

(1.2.) State Child Protection Scheme (SCPS)

State Child Protection Society (SCPS) is a fundamental unit in every State/UT for the implementation of ICPS.

THE JUVENILE JUSTICE (CARE AND PROTECTION OF CHILDREN) ACT, 2015

As per the Preamble to the Act, the JJ Act is an act to consolidate and amend the law relating to children alleged and found to be in conflict with law and children in need of care and protection, by catering to their basic needs through proper care, protection and treatment, social re-integration, by adopting a child friendly approach in the adjudication and disposal of matters in the best interest of children and for their rehabilitation through processes provided, and institutions and bodies established, here in under and for matters connected therewith or incidental thereto(JJ Act,2015).

THE CHILD WELFARE COMMITTEE (CWC)

Child Welfare Committee is the **sole authority** to deal with matters concerning children in need of care and protection. One or more Committees have to be constituted for each district, and consist of a chairperson and 4 other persons, at least one of whom should be a woman. The Committee has the final authority to dispose of cases for the care, protection, treatment, development and rehabilitation of the children as well as to provide for their basic needs and human rights but does not have the authority to give a child up for adoption. Any police officer, any public servant, Child Line, voluntary organization, any social worker or a public spirited citizen or the child himself, can contact the CWC and produce the child before it.

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THE SERVICES AVAILABLE FOR GIRLS IN THE HOME

There are various services provided for the overall development of the girls in the Home. These are:

- Clothing and bedding
- Sanitation and hygiene
- Nutritional diet
- Medical care
- Mental health services
- Education
- Vocational training
- Recreational facilities

NON-INSTITUTIONAL APPROACHES IN INTEGRATED CHILD PROTECTION SCHEME

(i) Adoption

Adoption is a process through which a child who is permanently separated from biological parents because his/her parents have died or have abandoned or surrendered her/him because a legitimate child of a new set of parents(s) referred to as adoptive parents with all the rights, privileges and responsibilities that are attached to this relationship.

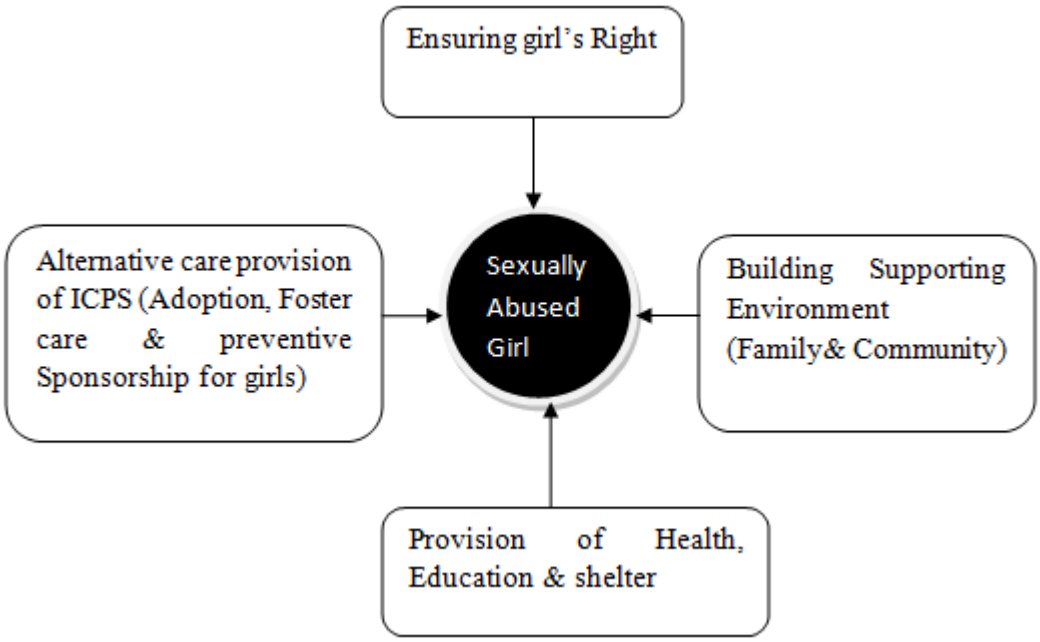
(ii) Foster Care

Foster care is an arrangement whereby a child lives, usually on a temporary basis, with an extended or unrelated family member.

(iii) Sponsorship

Sponsorship is a programme that provides supplementary support to families, to children's homes and to special homes to meet medical, nutritional, educational and other needs of the children with a view to improving their quality of life.

THE CARE AND PROTECTION FRAME WORK FOR SEXUALLY ABUSED GIRLS



Girl child protection is hence the means through which all other rights of a girl can be upheld. For example the sexually abused girl's has a right to live a normal childhood in a family environment. The child protection framework need to first take steps to ensure families are able to survive by providing them when health, education, and food for free or at minimal cost. The next step is to address the needs of the abused girls who have fallen through the cracks such as destitute, abandoned, and orphan. The framework includes the mechanisms to relocate these girls into caring families either through adoption or foster care and provide these girls with access to health and education services. Hence the framework is not a single government body it is the interlinking functions of all other departments and sectors for ensuring the care and protection for girls.

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ICPS PUT INTO PRACTICE: ITS RESPONSES AND CHALLENGES

An investigation into social care by the children's home in Kerala**(2017)** revealed that committees are struggling to cope with the rising number of girls referred into the system, while the cost of accommodating them soars**.**The government hoped the private sector would compensate for cuts to local services, but unprecedented levels of vulnerability, rising violent crime and the growing social care crisis have proved those hopes to be fantasy.

Children in care are six times more likely to be cautioned or victimized of a crime than other young people;the research has found(Berliner, L., & Conte, J. R., 1995). The report recommends that social services and criminal justice agencies work together better and the police improve practices regarding prosecution of children and young people in care.A review by Lord Laming for the Prison Reform Trust also found half the children in youth custody came from foster or residential care.

While the safety of girls is always a reason for worry, things are proving to be far worse. About 2,692 cases of child sexual abuse were registered in Kerala from March 2017 to March 2018. Of this 1,282 cases were registered via Child line, an NGO active in securing the rights of children.Child rights violations have happened in a big way, through girl child trafficking and sexual violence.In a shocking revelation, a government commissioned survey has found that more than 53% of children in India are subjected to sexual abuse,but most don't report the assault to anyone.

CONCLUSION

Parents and relatives, persons known to the girl or in a position of trust and responsibility were mostly found to be the perpetrators of girl sexual abuse in the country. Improving these shameful social outcomes will save the country's billion girls, but it demands serious long-term investment in local services. The Ministry of Women and Child Development and Statutory bodies of Child Rights & Child Protection system have to work on it. Considering the incidence of sexual abuse and right violations large numbers of girls who have been in India, the child protection system and all the stakeholders have to be work together to build an effective sustainable care plan for ensuring the rights of sexually abused girls and prevention of violence.

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International Journal of Advance and Innovative Research
Volume 6, Issue 1 (XIII): January - March, 2019
ISSN 2394 - 7780

EFFECT OF EMOTIONAL INTELLIGENCE AND PERSONALITY TRAITS ON ACADEMIC ACHIEVEMENT OF UNDERGRADUATE MANAGEMENT STUDENTS: AN EMPIRICAL STUDY

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ABSTRACT
The undergraduate and graduate students are experiencing mounting pressure to perform due to excessive competition and lack of employment opportunities in the country. It is therefore, imperative to understand the cognitive and ability based factors that lead to higher academic achievement. This paper is an attempt to explore whether the relationship between Emotional Intelligence (EI) & personality traits leads to higher academic achievement and professional success amongst graduate management students. The paper assesses the influence of Trait Emotional Intelligence and the personality traits on academic achievement of management graduates. The data was collected from 118 management students who were administered the questionnaire pack containing Big Five Inventory and the TEIQue-SF. For the academic achievement the GPA/percentage of previous academic year was taken into consideration. Correlations was computed for the factors of Emotional Intelligence out of which well-being, emotionality and self-control were found to be positively correlated with Academic Achievement whereas sociability was found to be negatively correlated. The personality traits extraversion, agreeableness, conscientiousness and openness were negatively correlated whereas neuroticism was found to be positively correlated with academic achievement. The linear regression results indicated that EI & Personality do not have a significant effect on Academic Achievement.

Keywords: Emotional Intelligence, personality traits, academic achievement, management graduates

INTRODUCTION
The institutes offering higher education, public and private sector organizations are influenced by the changes in stakeholder's expectations, globalization, rapid development, constant innovation and instability associated with these. Students in higher educational institutions especially management institutes are expected to perform multiple roles and wear many hats with efficacy. The management graduates are viewed as leaders of tomorrow who can bring a paradigm shift in the way businesses are operated and run throughout the globe. They are therefore, required to develop the right attitude and stability in behaviour to handle the stressful jobs and lives. Significant differences have been observed in human behaviour, as indicated by various studies, due to change in environment and surroundings (Piderit, 2000). The changes most of the times are related to personality, emotional intelligence (EI), job satisfaction, occupational stress, etc. Empirical researches indicate that personality and EI are essential keys to succeed in changing environment and to achieve organizational goals (Beer & Nohria, 2000). The studies conducted so far have focussed on the academic achievement of undergraduate students spanning variety of courses. The rationale behind this study is to explore whether EI & personality traits have an impact on the academic achievements of graduate management students.

STATEMENT OF THE PROBLEM
Organizations worldwide have to face a lot of changes in their modus operandi due to social, political, legal, environmental and technological changes thereby putting a lot of stress and pressure on the students to adapt to these changes. The student community at present is facing lot of problems in terms of inadequate quality of education, insufficient placement opportunities and not enough scope for pursuing vocational occupation in India. The proposed study focuses on the factors like emotional state and personality type which might play a role in employees adapting to the organizational changes.

REVIEW OF LITERATURE
Emotional Intelligence and Academic Achievement
Mohzan et.al (2012) in their study on students of education faculty studied the effect of Emotional Intelligence on Academic achievement using the Wong & Law (2002) scale. The analysis indicated that Self-Emotion Appraisal and Understanding of Emotion, the two domains of Emotional Intelligence were found to be positively and significantly correlated with academic achievement of the students. Overall the Emotional Intelligence score of the students was found to be high, positively correlated but not significant.

Nwadinigwe, I.P and Azuka-Obieke, U. (2012) in their research on senior secondary students established a positive relationship between academic achievement and emotional intelligence skills. The results iterated that development of emotional intelligence skills will result in escalation of academic achievement of a student.

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Sania Zahra Malik and Sehrish Shahid (2016) in their research on business students analyzed the influence cast by emotional intelligence on academic achievement. They used the TEIQUE-SF to measure Emotional Intelligence and GPA for academic performance. The analysis established a weak relationship between academic performance and Emotional Intelligence. It was also established that the relationship between the two can considerably improve over a period of time.

Zahyah Hanafi & Farukh Noor (2016) in their systematic literature review have established that a significant positive relationship exists between academic achievement and emotional intelligence. A high level of EI is advantageous in educational and career pursuits of individuals. Some studies have revealed that there is no significant impact of EI on academic performance. Some studies reveal indirect influence of EI on academic achievement.

K.V. Petrides et al. (2004) examined the role of Trait Emotional Intelligence in Academic Achievement and deviant behaviour of students from a sample of 650 students. On analysis it was established that Trait EI had a moderating effect between academic performance and cognitive ability. It was also established that students with high Trait EI did not have a record of unauthorized absenteeism and were less likely to have been expelled from school for deviant behaviour.

PERSONALITY TRAITS AND ACADEMIC ACHIEVEMENT

Soraya hakimi et al. (2011) carried out a survey on 285 students to analyse the academic achievement using NOE Big Five Personality Factors. From the analysis it was established that personality traits were significantly correlated to academic achievements. A total of 48% variance in academic achievement was explained by the personality traits. Out of the five traits, conscientiousness accounted for 39% of variance in academic achievement. MANOVA and T-test indicated that gender doesn't play any significant difference in the personality characteristics and academic achievement.

Asghar Hazrati-Viari et al. (2012) in their research on college students studied the impact of personality on academic performance and academic motivation using a questionnaire on academic motivation (AMS-C 28) and personality questionnaire (NEO-FFI). Demographic data and GPA were also included in the study. On analysis both extrinsic and intrinsic motivation was predicted by conscientiousness whereas, only intrinsic motivation was predicted by openness to experience. Academic motivation turned out to be the mediating factor between conscientiousness and openness to experience with academic performance.

Iulia Ciorbeaa, Florentina Pasaricaa (2013) in their research on 80 university graduates tried to establish the relationship between academic performance and personality using EPQ, MBTI and Self-esteem scale. Academic Performance was evaluated on the basis of project grade and overall grade obtained in previous academic year. Neuroticism was found to be negatively correlated with academic performance and so was psychoticism. Judgement-Perception dimension of MBTI was found to be correlated with academic performance. High Self-esteem established better academic performance whereas low self-esteem exhibited poor academic performance.

Suman Nehra (2014) in her research on secondary school students in Delhi used the Eysenck Personality inventory and overall percentage in previous academic year to measure the influence of personality on academic performance. The findings were suggestive of significant relation between academic achievement and personality; relationship between academic score of extroverts and introverts was found to be insignificant; relationship of academic performance with Emotionally stable and tendency towards Neuroticism is insignificant: relationship of Achievement scores of Neurotics and Emotionally stable is significant; relationship of Achievement scores of tendency towards Neuroticism and neurotics is significant

Eyong, Emmanuel Ikpi et al. (2014) studied the influence cast by personality traits on academic performance of students of secondary schools using BFI (McCrea & Costa, 1999). The analysis established a significant relationship between academic achievement of students with high levels of agreeableness and conscientiousness.

EMOTIONAL INTELLIGENCE, PERSONALITY AND ACADEMIC ACHIEVEMENT

Yoke Theing Chen, Chooi Seong Lai (2015) in their study investigated the influence of personality traits and emotional intelligence among 160 university students in Malaysia. They used BFI to measure personality and the Schutte Emotional Intelligence Scale (SEIS) for measuring EI and CGPA was taken into consideration for academic achievement. Emotional Intelligence was not significantly related to academic achievement. Among the personality traits neuroticism was found to be insignificant and negatively correlated to academic achievement. Openness to experience, extraversion, agreeableness and conscientiousness were found to be positively correlated and significant.

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The following hypotheses were formulated based on the above review of literature

H01: There is significantly high correlation between Emotional Intelligence, Personality Traits and Academic Achievement.

H02: There is a significant effect of Emotional Intelligence Traits on Academic Achievement.

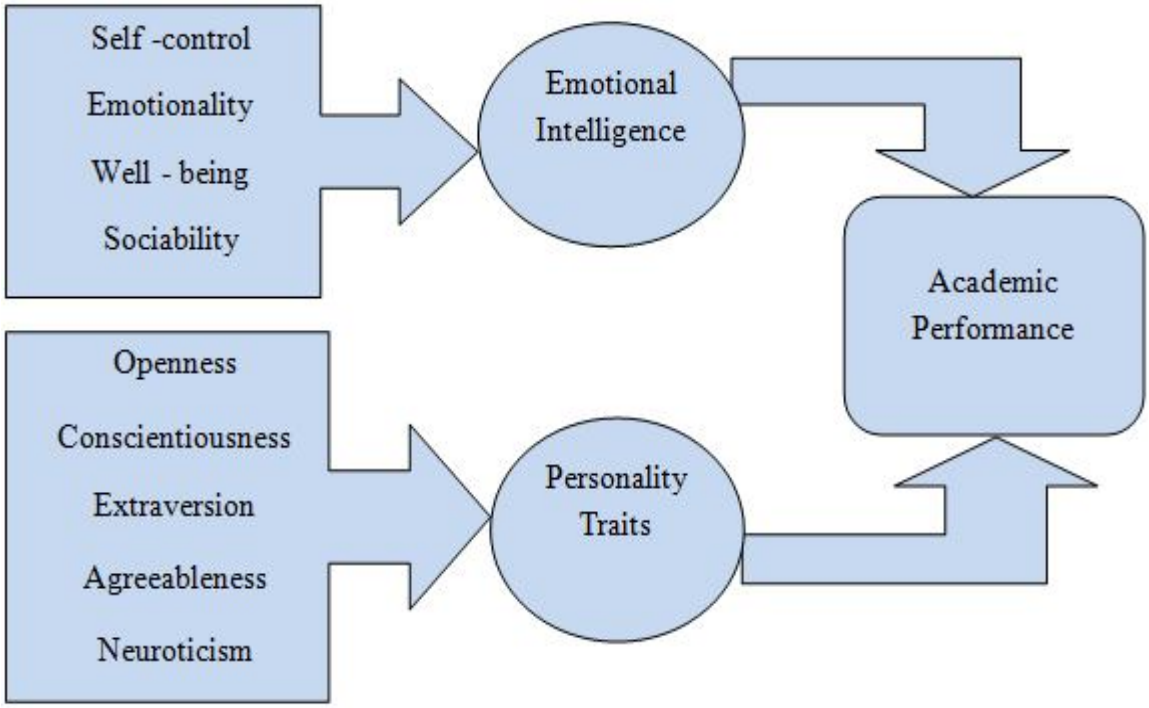
H03: There is a significant effect of Personality Traits on Academic Achievement.

H04: There is a significant effect of Emotional Intelligence and Personality Traits on Academic Achievement.

OBJECTIVES OF THE STUDY

1. To analyse the extent of relationship between EI & factors of personality viz, extraversion, agreeableness, openness to experience, conscientiousness and neuroticism with academic performance.
2. To predict the effect of emotional intelligence on academic achievement of graduate management students.
3. To predict the effect of personality traits (extraversion, agreeableness, openness to experience, conscientiousness & neuroticism) on academic achievement of graduate management students.
4. To predict the combined effect of EI & Personality on academic achievement of graduate management students.

A framework of the model of the constructs being used for the proposed study has been illustrated as follows:



RESEARCH METHODOLOGY

The study being conducted is an exploratory research to predict the effect of Emotional Intelligence and Personality Traits on Academic Achievement of graduate management students.

Sampling Design: The sampling technique used is random sampling. The sample size comprised of 118 management graduates randomly selected from management institutes in NCR region. The study was carried out on the students who were in the final year of the UG program by administering a self-report questionnaire structured into 3 sections.

Measures: For the study standardized questionnaires on Emotional Intelligence and Personality Traits were used. In order to measure Emotional Intelligence TEIQUE-SF developed by KV Petrides was used which consists of 30 items on a 7 point Likert Scale. The scale was used to deduce 4 EI dimensions self-control, emotionality, well-being and sociability. For the personality traits BFI (John, O. P., & Srivastava, S. (1999) was used which comprises of 44 items on 5 point Likert Scale. The five personality traits Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism were derived from the scale. For the Academic Achievement the aggregate percentage obtained were taken into consideration.

Data Analysis: The data was statistically analysed using SPSS 21 and Microsoft Excel.

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FINDINGS

The study has made use of standardized instruments to measure EI & Personality Traits. The reliability statistics (Table 1.1) of the TEIQUE-SF instrument was found to be adequate (Cronbach's Alpha = 0.823, no. of items = 30).

Reliability Statistics for TEIQUE-SF	
Cronbach's Alpha	N of Items
.823	30

Table 1.1

The reliability of BFI used to measure the personality traits (Table 2.1) was also found to be adequate (Cronbach's Alpha = 0.870, no. of items = 44).

Reliability Statistics for Personality	
Cronbach's Alpha	**N of Items**
.870	44

Table 2.1

Descriptive Statistics: Descriptive statistics were carried out on the data set to check for missing values and outliers. Table 3 depicts the mean values and standard deviations for each sub-variable of the Emotional Intelligence Scale viz self-control, emotionality, well-being and sociability; the Personality Traits viz., openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism; the mean value for overall EI score and the personality. The table was also used for checking the missing values, if any.

Descriptive Statistics					
	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Well-being	118	11	32	20.22	4.024
Self-Control	118	9	30	19.79	4.921
Emotionality	118	15	48	31.98	6.613
Sociability	118	9	32	22.08	4.516
Extraversion	118	18	39	26.94	5.211
Agreeableness	118	23	42	33.68	4.887
Conscientiousness	118	22	45	32.80	5.795
Neuroticism	118	11	32	22.33	4.848
Openness	118	21	44	34.11	4.646
Z	118	52.00	79.00	67.6298	5.35516
Emo. Intell.	118	62.00	123.00	94.0678	13.66306
Personality	118	127.00	175.00	149.8559	12.05846
Valid N (listwise)	118				

Table 3

To analyse the extent of relationship among the variables i.e, EI, Personality Traits and academic achievement, Pearson's correlation coefficients were calculated with level of significance 0.5 percent (2-tailed). The analysis established a low but positive relationship between the EI Factor well-being, self-control and emotionality with academic performance. The factor sociability was found to have a negative relationship with academic performance. We can infer that sociability does not have an impact on the academic performance of an individual.

The factors of personality extraversion, conscientiousness, openness to experience and agreeableness had a low negative correlation with academic performance whereas neuroticism was found to be positively correlated to academic performance. We can infer from the findings that neuroticism has a positive impact on academic performance. From the table it can be seen that the factors are not correlated with each other so there is no multi-collinearity within the factors. The null hypotheses H_{01} that there is a significant correlation between the IDV's and the DV is rejected.

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Correlations											
		xwb	xsc	xemo	xsoc	yex	yag	ycons	yneuro	yopen	Z
xwb	Pearson Correlation	1	.280**	.208*	.209*	.014	.007	-.026	.074	-.140	.047
	Sig. (2-tailed)		.002	.024	.023	.880	.943	.781	.427	.131	.611
	N	118	118	118	118	118	118	118	118	118	118
xsc	Pearson Correlation	.280**	1	.378**	.267**	.164	.068	.062	-.121	.049	.149
	Sig. (2-tailed)	.002		.000	.003	.075	.463	.507	.193	.596	.108
	N	118	118	118	118	118	118	118	118	118	118
xemo	Pearson Correlation	.208*	.378**	1	.266**	.085	.128	.049	-.011	-.036	.069
	Sig. (2-tailed)	.024	.000		.004	.363	.168	.602	.906	.696	.459
	N	118	118	118	118	118	118	118	118	118	118
xsoc	Pearson Correlation	.209*	.267**	.266**	1	.104	.003	.081	-.048	.053	-.063
	Sig. (2-tailed)	.023	.003	.004		.264	.970	.382	.609	.572	.495
	N	118	118	118	118	118	118	118	118	118	118
yex	Pearson Correlation	.014	.164	.085	.104	1	.248**	.434**	-.630**	.406**	-.026
	Sig. (2-tailed)	.880	.075	.363	.264		.007	.000	.000	.000	.783
	N	118	118	118	118	118	118	118	118	118	118
yag	Pearson Correlation	.007	.068	.128	.003	.248**	1	.458**	-.512**	.432**	-.058
	Sig. (2-tailed)	.943	.463	.168	.970	.007		.000	.000	.000	.532
	N	118	118	118	118	118	118	118	118	118	118
ycons	Pearson Correlation	-.026	.062	.049	.081	.434**	.458**	1	-.725**	.650**	-.111
	Sig. (2-tailed)	.781	.507	.602	.382	.000	.000		.000	.000	.230
	N	118	118	118	118	118	118	118	118	118	118
yneuro	Pearson Correlation	.074	-.121	-.011	-.048	-.630**	-.512**	-.725**	1	-.589**	.088
	Sig. (2-tailed)	.427	.193	.906	.609	.000	.000	.000		.000	.343
	N	118	118	118	118	118	118	118	118	118	118
yopen	Pearson Correlation	-.140	.049	-.036	.053	.406**	.432**	.650**	-.589**	1	-.070
	Sig. (2-tailed)	.131	.596	.696	.572	.000	.000	.000	.000		.448
	N	118	118	118	118	118	118	118	118	118	118
Z	Pearson Correlation	.047	.149	.069	-.063	-.026	-.058	-.111	.088	-.070	1
	Sig. (2-tailed)	.611	.108	.459	.495	.783	.532	.230	.343	.448	
	N	118	118	118	118	118	118	118	118	118	118
**. Correlation is significant at the 0.01 level (2-tailed).											
*. Correlation is significant at the 0.05 level (2-tailed).											

Table-4: Pearson Correlation Coefficients

Linear Regression Analysis: EI & Academic Performance

On performing Linear Regression Analysis taking EI as independent variable and Academic performance as the dependent variable it can be inferred that 18.7 percent variation in academic performance is explained by emotional intelligence (Table 5.1). From the ANOVA Table 5.2 we can see that the value is not significant (p= 0.397) hence our hypotheses H02 is rejected.

Model Summary (Table 5.1)				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.187[a]	.035	.001	5.35270
a. Predictors: (Constant), xsoc, xwb, xemo, xsc				

ANOVA[a] (Table 5.2)						
Model		**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
1	Regression	117.689	4	29.422	1.027	.397[b]
	Residual	3237.604	113	28.651		
	Total	3355.293	117			
a. Dependent Variable: acad_performance						
b. Predictors: (Constant), soc., wb, emo, s.c.						

Coefficients[a] (Table 5.3)					
Model	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**

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		B	Std. Error	Beta		
1	(Constant)	65.839	3.567		18.459	.000
	Well-being	.026	.130	.020	.202	.841
	Self-control	.176	.113	.162	1.562	.121
	Emotionality	.029	.083	.036	.348	.728
	Sociability	-.142	.117	-.120	-1.221	.224
a. Dependent Variable: acad_performance						

Linear Regression Analysis: Personality Traits & Academic Performance

Further regression analysis was done using the independent variable, Personality Traits to analyze its influence on the dependent variable, Academic Performance.

Model Summary (Table 6.1)				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.117[a]	.014	-.030	5.43559
a. Predictors: (Constant), yopen, yex, yag, ycons, yneuro				

ANOVA[a] (Table 6.2)						
Model		**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
1	Regression	46.182	5	9.236	.313	.905[b]
	Residual	3309.111	112	29.546		
	Total	3355.293	117			
a. Dependent Variable: acad_performance						
b. Predictors: (Constant), yopen, yex, yag, ycons, yneuro						

Coefficients[a] (Table 6.3)						
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	68.178	10.629		6.414	.000
	Extraversion	.047	.126	.045	.371	.711
	Agreeableness	-.002	.123	-.002	-.018	.986
	Conscientiousness	-.091	.138	-.099	-.661	.510
	Neuroticism	.051	.185	.046	.275	.784
	Openness	.004	.148	.003	.025	.980
a. Dependent Variable: acad_performance						

From the above analysis we can infer that 11.7 percent variation in academic performance is explained by personality traits (Table 6.1). From the ANOVA Table 6.2 we can see that the value is not significant (p= 0.905) hence our hypotheses H03 is rejected.

Linear Regression Analysis: EI, Personality Traits and Academic Performance

A linear regression analysis was done using the independent variables, Personality Traits and emotional intelligence to analyze its influence on the dependent variable Academic Performance.

Model Summary (Table 7.1)				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.223[a]	.050	-.030	5.43363
a. Predictors: (Constant), xsoc, yag, xwb, yex, xemo, xsc, yopen, ycons, yneuro				

ANOVA[a] (Table 7.2)						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	166.667	9	18.519	.627	.772[b]
	Residual	3188.626	108	29.524		
	Total	3355.293	117			

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a. Dependent Variable: acad_performance
b. Predictors: (Constant), xsoc, yag, xwb, yex, xemo, xsc, yopen, ycons, yneuro

Coefficients[a] (Table 7.3)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	66.222	10.936		6.056	.000
	Extraversion	.026	.127	.026	.208	.836
	Agreeableness	-.022	.126	-.020	-.173	.863
	Conscientiousness	-.080	.140	-.087	-.574	.567
	Neuroticism	.062	.187	.056	.333	.740
	Openness	.021	.151	.018	.137	.891
	Well-being	.015	.135	.012	.115	.909
	Self-control	.185	.116	.170	1.590	.115
	Emotionality	.031	.086	.039	.366	.715
	Sociability	-.137	.119	-.115	-1.146	.254

a. Dependent Variable: acad_performance

From the above analysis we can infer that 22.3 percent variation in academic performance is explained by personality traits and emotional intelligence put together (Table 7.1). From the ANOVA Table 7.2 we can see that the value is not significant (p= 0.772) hence our hypotheses H04 is also rejected.

CONCLUSION

The analysis and findings suggest a weak relationship between Emotional Intelligence and academic performance (Malik. SZ & Shahid. S, 2016; Yoke Theing Chen, Chooi Seong Lai, 2015). The relationship between Personality Traits and academic performance was also found to be weak. There was an increase in the variance explained by EI & Personality, taken together, on Academic achievement. Emotional Intelligence may have a crucial role in future professional role of an individual and so does the personality factors but for better academic performance other than EI & Personality probably other factors like Intelligence Quotient, learning-reading abilities, anxiety, stress, time management, family income, diligence, etc may contribute to better academic achievement. This leads to further scope for research to analyze the impact of IQ and other factors on academic performance.

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International Journal of Advance and Innovative Research
Volume 6, Issue 1 (XIII): January - March, 2019
ISSN 2394 - 7780

EXPLOITATION OF LINSEED OIL IN THE DEVELOPMENT OF ECO- FRIENDLY PRODUCTS: AN OVERVIEW

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ABSTRACT
Exploitation of natural renewable resources for the formulation of useful technical materials has been receiving the attention of academicians and scientific researchers now-a-days. Renewable resources especially those are obtained from the agricultural origin have ability to grow again and again. This ultimately cut down the dependency on petrochemicals, a finite resource which is going to deplete day by day. Vegetable oils especially those obtained from different seeds have attracted the attention of researchers, due to their unique properties and environment friendly characteristics. Linseed oil, abundantly available throughout the world and its production can enhance enormously by easy cultivation. It has been largely used in the different forms such as in cooking food, as a raw material for chemical industries and medicinal component for the ancient time. In present communication efforts have been made to overview the significant utilization of linseed oil in different arena of practicable utility.

Keywords: Linseed oil, Polyester, Polyesteramide, Urethane, Renewable resource

INTRODUCTION
Utilization of renewable resources especially those are derived from agricultural resources in the development of various practicable materials has received significant attention now-a-days [1-3]. Such developments not only provide an alternative to petrochemicals going to deplete day by day but also reduce the emission of green house gasses. The biotransformation from the petrochemical based economy to bio-based green economy necessitates a novel exploitation of natural materials that are transformable into high value added product [4, 5]. Numerous renewable resources bestowed by the nature like starch, cellulose, lignin, protein, wool fibers, cashew nut, vegetable oil and many others have been utilized for the syntheses of various useful materials of viable applications in the daily life [6,7]. Vegetable oils, structurally triglycerides composed of saturated and unsaturated fatty acids, represent a promising class of raw materials for polymer industries owing their abundant availability, sustainability and biodegradability. The presence of various reactive sites, like esters, double bonds, allylic, vinylic carbons provides ample opportunities to tailor numerous materials with small efforts [8].

Linseed oil generally obtained from the dried and ripe seeds of flax plants (*linum usitatissimum*) is a small herbaceous annual plant of family *Linaceae* [9]. Chief constituting fatty acid of the linseed oil is linolenic acid (more than 50% of total fatty acids). Furthermore, it contains tocopherol (antioxidant), sterols, phosphotides [10, 11]. The iodine value of the oil is high, hence categorized as drying oil in literature [12]. Due to this character, linseed oil has been used to protect the metals and woods from the ancient time. In view to improve the properties of end-products to make them more versatile numerous modifications were carried out in additions to their use as starting materials in many polymeric recipes. In present communication efforts have been made to overview the advancement and modifications of linseed oil as useful starting material for different useful industrials recipes.

COMPOSITION AND CHARACTERISTICS
Linseed contain about 26-455 % triglyceride oil. Physicochemical properties and fatty acid compositions of the oil slightly vary according to nature of soil, extraction and purification methods, climatic conditions etc. Linolenic acid containing three isolated double bonds is the major constituting fatty acid (44-60 %) [11, 13]. General structure of linseed oil and major constituting fatty acids are depicted in Figure 1. Iodine value of oil is directly proportional to its unsaturation and largely governing property and can be determine volumetrically by measuring the amount of gram iodine reacted with double bonds of 100 gram of oil sample under standard condition [12,14]. The iodine value of linseed oil reported to about 180 [11, 12, 14]. On the basis of iodine value it is classified as drying oil in the literature. Balanuca *et.al.* analyzed the fatty acid composition and other functionalities by FT-IR, ^{1}H-NMR and Gas Chromatography-Mass spectroscopy (GC-MS) analyses. With the help of the various types of signals for different types of protons, area of the singles caused by them and the peaks for the terminal methyl groups of the different fatty acids, fatty acid composition of the linseed oil was established [11]. The same was also analyzed with the help of GC-MS using standard fatty acid as the reference. It has been reported that methyl group of linolenic acid appears at $\delta = 0.97$ ppm, where as methyl groups of other fatty acids appears at $\delta = 0.88$ ppm [11].

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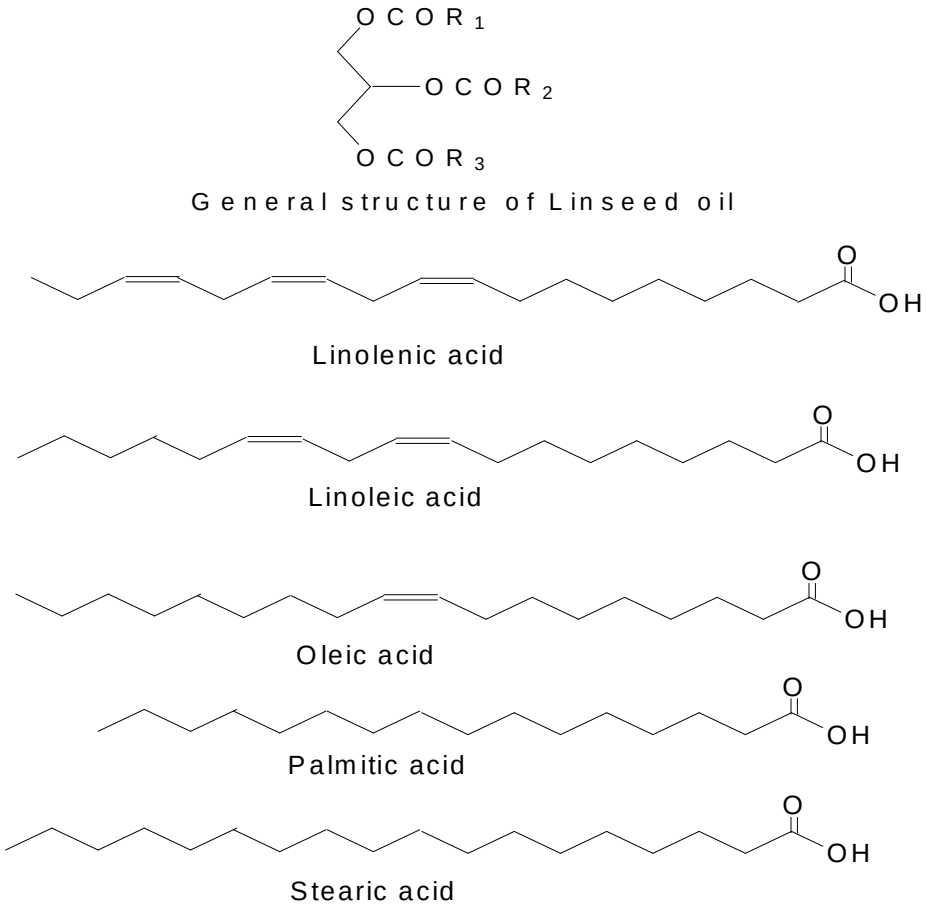

Figure-1: General structure of linseed oil and common fatty acids

EPOXIDATION

Linseed oil is largely used as film forming materials for the ancient time. Due to high unsaturation it forms film by auto oxidation process. In order to make more practicable, linseed oil was epoxidized using different techniques. Oxirane groups incorporated at unsaturations of the fatty acid chain. Hydrogen peroxide and acetic acid *insitu* in presence of sulfuric acid has been successfully deployed for the epoxidation of linseed oil [11,15]. The progress of reaction was monitored by taking the epoxy equivalent at regular intervals volumetrically [11,16]. Epoxidaion of linseed oil without catalyst is largely governed by many factors like concentration and type of per acid used, reaction time and temperature. It has been reported on increasing the concentration of per acid to oil the epoxy content and hydroxyl value increased. Furthermore, per benzoic acid is reported to more effective for epoxidation of linseed oil than per acetic acid for the same concentration, reasonably due to withdrawing effect of the phenyl group in the former case, which facilitates the formation of hydroxyonium ion. Epoxy content increases with the time upto the optimum level and then start to decrease due to conversion of oxirane to hydroxyl groups [17,18]. It reveals that while epoxidation, it is required to determine the epoxy equivalent at regular intervals.

Epoxidised oil can be used for the formulation of numerous polymers by taking the advantage of the reacting sites facilitates by the strained three membered heterocyclic rings through the ring opening reactions. Synthesis of polyurethane has been reported from the hydroxylated linseed oil, which obtained through the epoxidation, Figure 2 [19].

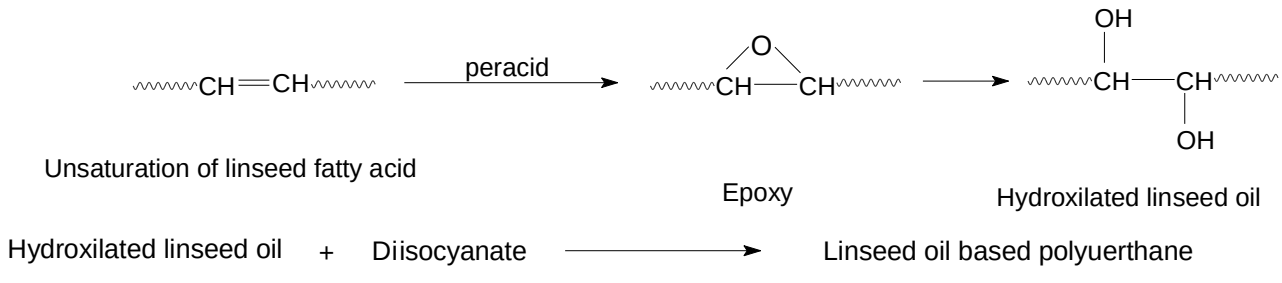

Figure-2: Linseed oil based polyurethane via hydroxylation at unsaturation

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Synthesis and photopolymerization of norbornyl epoxidised linseed oil has been carried out in the view to improve the curing and other physico-mechanical properties. The UV curing kinetics of the norbornyl epoxidised linseed oil was investigated [20]. To improve the properties especially mechanical, it was blended with polystyrene (PS) and poly(methyl methacrylate) (PMMA) in different ratios. The formation of polyblend systems and homogeneity were characterized by FTIR spectroscopy and differential scanning calrorimetry (DSC) analyses. Shifting of bands for hydroxyl group and oxirane group towards the lower frequency and single glass transition temperatures (*Tg*) were reported. It has been claimed that only small amount of PMMA and PS about 16.6 wt % in LOE turn it into a rigid mass. Furthermore it has been reported that polyblends of LOE with poly(methyl methacrylate) is superior in terms of conferring rigidness and toughness [16]. High performance paints from linseed oil epoxy-Polystyrene and linseed oil epoxy-poly(methylmethacrylte) polyblend systems cured with melamine formaldehyde (MF) with LOE as high as 85% with respect to acrylic monomers have been reported. It has been claimed that developed paint systems provide an avenue to cut down the use of petrochemicals as well as improved the physicochemical properties on lower cost. Furthermore, paints of LOE-PMMA-MF system show better performance than LOE-PS-MF system [17].

Epoxidation of linseed oil with per acetic acid followed by reaction with acrylic acid to incorporate the acrylates into triglyceride has been reported. The developed resins were characterized by physicochemical properties and spectral analyses. The novel cross-linked biopolymer was prepared by using acrylated epoxidised resin with triethyleneglycol trimethacrylate. The mechanical properties of the developed cross-linked biopolymer were improved by adding wood-flour as the filler. SEM micrograph of the polymer films were taken before and after the soil burial test, for the analysis of biodegradation. It has been claimed that newly prepared cross-linked biopolymers are potential biodegradable material for numerous consumer applications such as horticulture containers, packaging materials, sporting goods, floor mats, bio-degradable agricultural films [21].

POLYESTER, POLY (ESTER-AMIDE) S AND THEIR MODIFICATION

Among the oldest polymers derived from vegetable oils is polyester resin and commercially known as alkyd resin. Alkyd resins are largely used as a coating material and binder for paints due to several advantages. Furthermore, it is reported to have bio-degradable characteristics owing to have repeating ester linkages [6]. Alkyd resins are obtained by the poly (condensation) reaction between polyalcohols, polycarboxylic acids or their anhydrides and fatty acids or vegetable oils.

Linseed oil based alkyd resin (chemically polyester based on vegetable oil) obtained by using pentaerythritol (a polyol) and phthalic anhydride (a dibasic acid anhydride) blended with ketonic (cyclohexanone formaldehyde) resin in different ratios in view to improve the physico-mechanical and chemical resistance properties. To unique solvent system of toluene (60wt %), cyclohexanone (20-wt %) and butanol (20-wt %) was used, which produce a one phase clear solution and clear coat of binder system. It has been reported that blending of 30% w/w concentration of cyclohexanone formaldehyde resin with the alkyd resin is the optimal with respect to adhesion, hardness, gloss, storage stability, acid resistance. These enhancements in properties correlated to compatibility of these polymeric resins [22].

Vegetable oil based polyesteramide resins are amide modified alkyds have synergistic advantage of both amide and ester linkages known for improved performance in many respect such as ease of drying, scratch hardness, low water absorption, chemical and corrosion resistance performances [23,24]. Hydroxy terminated polyesteramides were synthesized by the reaction of N,N-bis(2-hydroxyethyl) linseed amide (HELA) obtained by aminolysis of linseed oil with dibasic acids or anhydrides. The resulting polymers were treated with aliphatic and aromatic diisocyanates to obtained diisocyanate-modified linseed polyesteramides and were found to suitable for protective coatings [25]. In view to improve the performances and to make them more and more practicable, several modifications were carried out on linseed oil based polyesteramides. Modification of polyesteramide obtained from hydroxyl ethyl linseed oil fatty amide (a diol), phthalic anhydride by partial replacement of phthalic anhydride by N-phthaloyl glutamic acid has been reported. The synthesized resin was characterized by physicochemical and spectral analyses. Physico-mechanical and chemical resistance properties of the N-phthaloylglutamic acid modified resin reported to enhanced appreciably [26].

Ambient cured polyesteramide resin was synthesized from dihydroxy fatty amide a precursor of linseed oil and poly (styrene-co-maleic anhydride), an acrylic copolymer of bi-functional acid component in different ratios. The resulting polymer was characterized by FTIR, ^{1}HNMR, ^{13}CNMR spectroscopies in addition to other physicochemical characterizations. Thermal stability of the polymer was investigated by thermo-gravimetric analysis and reported to safe for use upto the 280 ^{o}C. The developed poly (styrene-co-maleic anhydride) based polyesteramide of linseed oil claimed for remarkable improvement in drying properties in addition to improved

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physico-mechanical and anticorrosive properties than the normal polyesteramide developed by the polycondensation of dihydroxy fatty amide of linseed oil with dibasic acid, phthalic acid [27].

Synthesis of zinc containing linseed oil based polyesteramide resins with variable loading of zinc acetate, using *in-situ* poly(condensation) polymerization technique in the absence of solvents has been reported. The byproducts like water and acetic acid were removed using vacuum technique. This approach is suitable to omit the use of harmful organic solvents during processing, causes several environmental problems. Presence of zinc in the polymeric chain was characterized by physicochemical and spectral analyses. A systematic scheme for the synthesis of metal containing polyesteramide illustrated in Figure 3. Thermal behavior of the developed resin was investigated by thermo gravimetric analysis and differential scanning calorimetry. It has reported that on adding zinc, thermal stability of the polymer improved. Furthermore, it has been claimed that minor incorporation of metal in the linseed oil based polyesteramide exhibited improved antibacterial activities against *E. collie and S.aureus* [28].

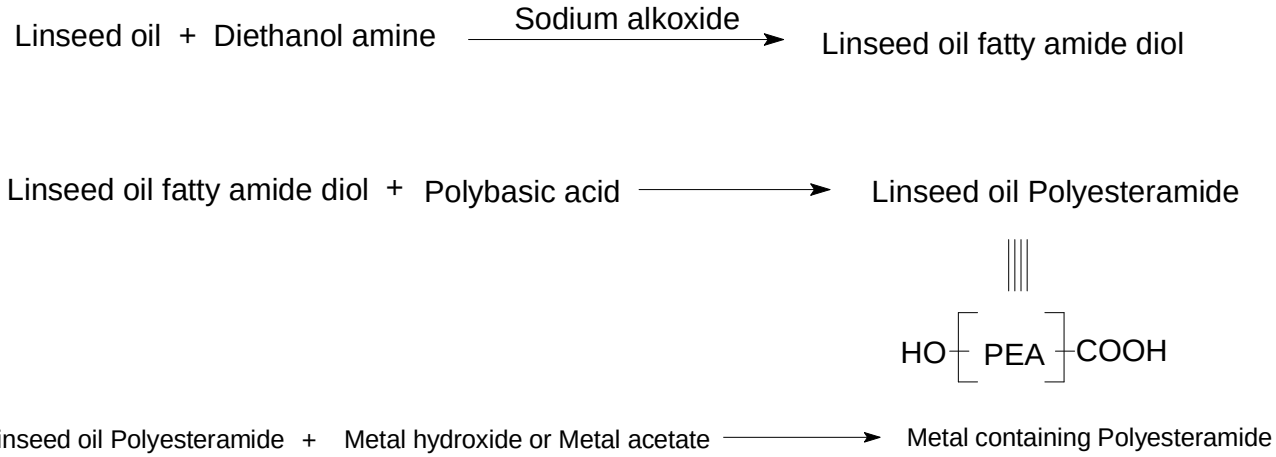

Figure-3: systematic scheme for the formation of metal containing polyesteramide

Melamine modified poly(ester-amide) was developed by the reaction of linseed oil fatty amide. Fatty amide diol of linseed oil react with melamine to yield fatty-amide diol (MFA). MFA further react with polystyrene-co-maleic anhydride (SMA) in different wt-% to obtained room temperature cured melamine modified polyesteramide. Physico-chemical and spectral analyses were performed to ascertain the structure. The melamine modified polyesteramide claimed for good combination of properties of amine, ester, melamine, and amide linkage and reported show better performances especially against alkali than the poly(ester-amide)s of fatty amide diol and dibasic acids [29].

Waterborne linseed oil polyesteramide/organically modified-montmorillonite [WBPEA]/OMMT clay bio-nanocomposites by microwave-assisted facile route have developed in view to increase the applications of bio-based renewable materials. The water solubility of the developed nano-composite was investigated. The shifting of characteristic absorption bands of different groups like carbonyls of amide and ester, hydroxyl groups and also the presence of bands for OMMT clay were accounted for formation composite material. The presence of OMMT in WBPEA matrix in nanometer range was investigated by morphological studies. It has been reported that on increasing the loading of OMMT thermal stability of the composite increases as compared to virgin polymer. It has been claimed that developed nanocomposite can be used as novel, environment friendly, cost effective green material for versatile applications like as in biomedical, packaging materials, adhesives and coatings safely upto 290 ^{o}C [30].

CONCLUSION AND PROSPECTS

In present communication attempts have been made overview the physicochemical properties and utilization of linseed oil in different industrial arena and as a starting material for different polymer recipes. The article enlightens the polymeric materials of industrial significance derived from linseed oil. Polymeric materials derived from linseed oil have potential substitute the polymers synthesis from petrochemicals. The exploitation of linseed oil in the development of different value added materials with less hazardous impact on environment can also mitigate the demand of petrochemicals.

ACKNOWLEDGMENTS

The authors are thankful to the authorities of Gandhi Faiz-e-Aam College, Shahjahanpur, U.P., India for providing necessary facilities and encouragement to carry out this study.

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