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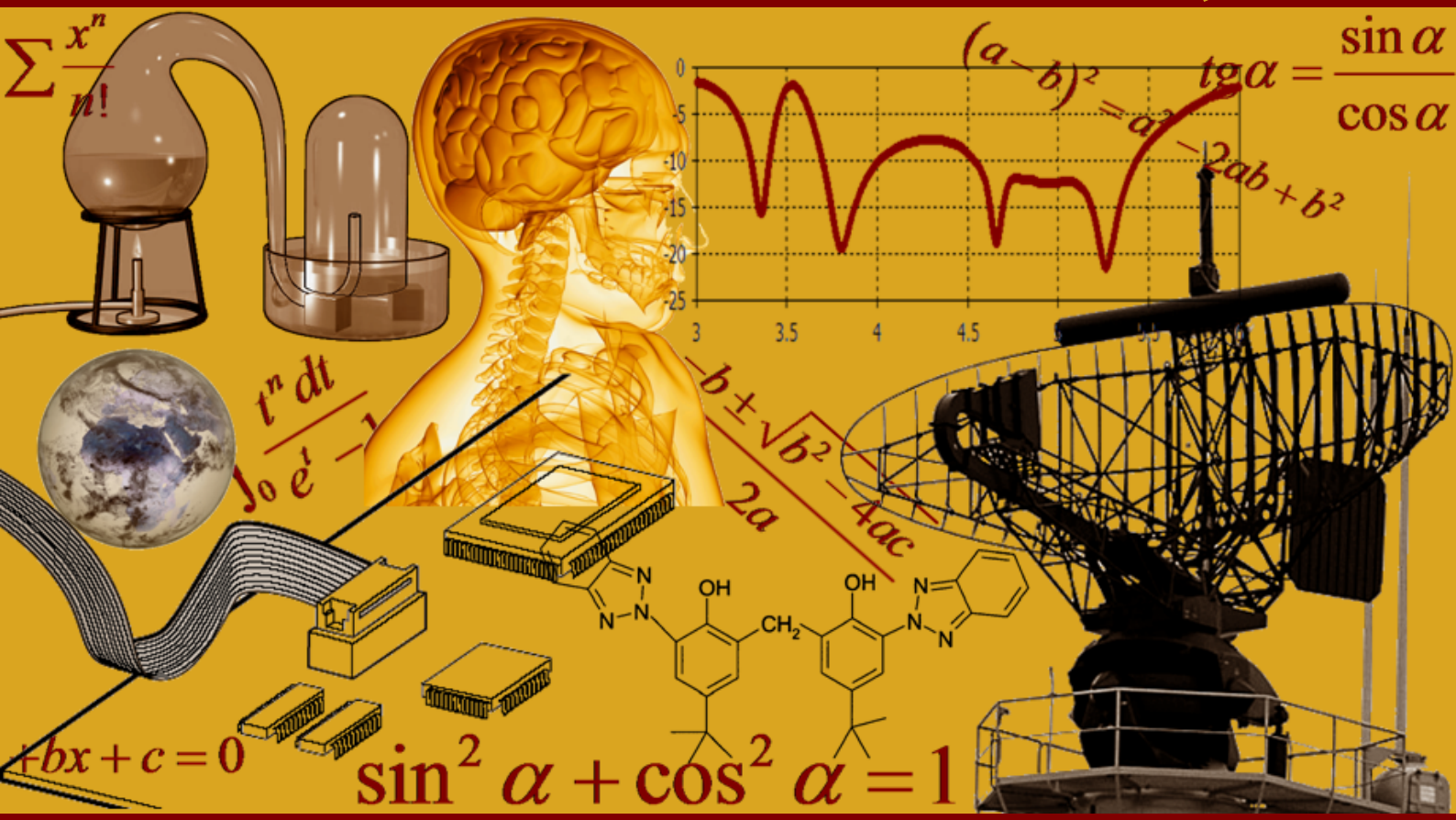

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Blog as a Medium of Freedom of Expression

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"Give me the liberty to know, to utter, and to argue freely according to conscience, above all liberties"
John Milton

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ABSTRACT: In the context of this article, the term 'blog' bears the sense of 'personal news journalism'. Blogging has become global phenomenon and has exploded in popularity to the point where are now more than 20 million blogs being tracked around the world. They have risen in prominence as well as in numbers, with some leading blogs challenging the established order of the mainstream press. Indeed, at times the mainstream media has been put in the unusual position of reacting to news that bloggers generate. Blogs have become a communicative alternative for society. As blogs have become a fixture in today's media environment, growing in number and influence in political communication and (mass) media discourse, research on the subject has proliferated, often emphasizing the high-profile conflicts and controversies at the intersection of blogging and journalism. The growing influence of blogs on users has sparked a controversy regarding the role of journalism in the new media landscape. Many observers, particularly journalists working in the mainstream media, have argued for a marked distinction between blogging and journalism, linking the former to freewheeling opinion and the latter to verifiable information.

OBJECTIVES: This article highlights the role of personal blogging as a medium of freedom of expression and how blog work as a platform of expression and thought. It also intends to focus on the various issues regarding the trend of personal blogging, its historical and concurrent stance in social media, and the its potential as an independent branch of journalism in the 21st century.

KEYWORDS: Blog, social media, journalism, social networking, freedom, civil right.

INTRODUCTION

Freedom of expression is a primary right of men. Each individual has a birth right to know. The baby just born cries out to seek and know his/her parents. For most of human history, when people have spoken critically of the socially of the social, religious, and political views of those in power they have done so at great personal peril. Even today, despite the advances of democratic values, which have swept away many totalitarian regimes, some national governments consider critics of official policies enemies of the state, to be tortured, imprisoned, or exiled (Holsinger & Dilts; 1997:26). Freedom of expression is an internationally recognized right which is enshrined in the Article 19 of the Universal Declaration of Human Rights. In this article said, "Everyone has the right to freedom of opinion and expression; this right includes freedom to hold opinions

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without interference and to seek, receive and impart information and ideas through any media and regardless of frontiers" (UNIC; 2007:11). It is true that in every era of societies reasonable restrictions are imposed on freedom of expression. But people have raised the question whether freedom is affected by imposing what is called reasonable restrictions? It is a common saying that thought is free. A man can never be hindered from thinking whatever he chooses so long as conceals what he thinks. The working of his mind is limited only by the bounds of his experiences and the power of his imagination. But this natural liberty of private thinking is of little value. It is unsatisfactory and even painful to the thinker himself, if he is not permitted to communicate his thoughts to others, and it is obviously of no value to his neighbors. Moreover, it is extremely difficult to hide thoughts that have any power over the mind. If a man's thinking leads him to call a question ideas and customs which regulate the behavior of those about him, to reject beliefs which they hold, to see better ways of life than those they follow, it is almost impossible for him, if he is convinced of the truth of his own reasoning, not to betray by silence, chance words, or general attitude that he is different from them and does not share their opinions. Some have preferred, like Socrates, some would prefer today, to face death rather than conceal their thoughts. Thus freedom of thought, in any valuable sense, includes freedom of speech (Bury, 1951, p-1). At present, in the most civilized countries, freedom of speech is taken as a matter of course and seems a perfectly simple thing. We are so accustomed to it that we look on it as a natural right. But this right has been acquired only in quite recent times, and the way to its attainment has lain through lakes of blood (Bury, 1951, p-2). It has taken centuries to persuade the most enlightened peoples that liberty to publish one's opinions and to discuss all questions is a good and not a bad thing. Human societies have been generally opposed to freedom of thought, or, in other words, to new ideas, and it is easy to see why.

HISTORY OF FREEDOM OF THOUGHT

There was, however, one illustrious Athenian, who thought differently – Socrates (470-399 BC), the philosopher. Socrates reached old age, pursuing the task of instructing his fellow-citizens, without any evil befalling him. Then, at the age of seventy, he was prosecuted as an atheist and corrupter of youth and was put to death (399 B.C.). After seventy years later, philosopher Aristotle (384-322 BC) left Athens because he was menaced by a prosecution for blasphemy, the charge being a pretext for attacking one who belonged to a certain political party (Bury, 1951, p-24).

At the end of the twelfth century Innocent III (1198-1216 AD) became Pope and under him the Church of Western Europe reached the height of its power. He and his immediate successors are responsible for imagining and beginning an organized movement to sweep heretics out of Christendom (Bury, 1951, p-40). The organized system of searching out heretics known as the Inquisition was founded by Pope Gregory IX about 1233 AD, and fully established by a Bull of Innocent (1252 AD) which regulated the machinery of persecution 'as an integral part of the social edifice in every city and every State'. This powerful engine for the suppression of the freedom of men's religious opinions is unique is history (Bury, 1951, p-41-42).

Giordano Bruno (1548-1600 AD), accepting the recent discovery of Copernicus that the earth revolves round the sun, Bruno took further step of regarding the fixed stars as suns, each with its invisible satellites. Leaving Italy, because he was suspected of heresy, he lived successively in Switzerland, France, England, and Germany, and in 1592, induced by a false friend to return to Venice he was seized by order of the Inquisition. Finally condemned in Rome, he was burned (1600) in the Campo de' Fiori. At Toulouse (1619 AD) Lucilio Vanini, a learned Italian who like Bruno wandered about Europe was convicted as an atheist and blasphemer; his tongue was torn out and he was burned (Bury, 1951, p-64-65).

The observations of the Italian astronomer Galileo de' Galilei (1564-1642 AD) demonstrated the Copernican theory beyond question. His telescope discovered the moons of Jupiter, and his observation of the spots in the sun confirmed the earth's rotation. In February, 1616 AD the Holy Office decided that the Copernican system was in itself absurd, and, in respect of Scripture, heretical. Cardinal Bellarmin, by the Pope's (Pall IV) direction, summoned Galileo and officially admonished him to abandon his opinion and cease to teach it; otherwise the Inquisition would proceed against him. Galileo promised to obey. The book of Copernicus was placed on the Index (Bury, 1951, p-67).

Pope Alexander VI inaugurated censorship of the press by his Bull against unlicensed printing (1501). In France, King Henry II made printing without official permission punishable by death. In Germany, censorship was introduced in 1529.

HISTORY OF CHANGE

Hobbes, (1588-1679 AD) who was perhaps the most brilliant English thinker of the seventeenth century, was a freethinker and materialist. Yet he was a champion not of freedom of conscience but of coercion in its most uncompromising form. The thinker whose writings appealed most to the men of his age and was most opportune and effective was John Locke (1632-1704 AD), who professed more or less orthodox Anglicanism. His great contribution to philosophy is equivalent to a very powerful defense of reason against the usurpations of authority. The most energetic and forceful leader in the campaign

against intolerance was Voltaire (1694-1778 AD) and his exposure of some glaring cases of unjust persecution did more than general arguments to achieve the object. For constructive thinking we must go to the other great leader of French thought, Rousseau (1712-1778 AD), who contributed to the growth of freedom in a different way. He was a deist, but his deism, unlike that of Voltaire, was religious and emotional. One German thinker shook the world - philosopher Kant (1724-1802 AD). His *Critic of Pure Reason* demonstrated that when we attempt to prove by the light of the intellect the existence of God and the immortality of the Soul, we fall helplessly into contradictions. The reasoned justification of liberty of thought is due to J. S. Mill (1806-1873 AD), who set it forth in his work *On Liberty*, published in 1859. This book treats of liberty in general, and attempts to fix the frontier of the region in which individual freedom should be considered absolute and unassailable.

MEDIA OWNERSHIP

More than a century ago Karl Marx observed that those who control the material means of production also control the mental means of production. So in every epoch ruling ideas are the ideas of the ruling class. Indeed, it seems so today. Freedom of the press, A. J. Liebling once said, is for those who own the presses. Who specifically owns the mass media in the United States? Ten business and financial corporation's control the three major television and radio networks (NBC, CBS, ABC), 34 subsidiary television stations, 201 cable TV systems, 62 radio stations, 20 record companies, 59 magazines including Time and Newsweek, 58 newspapers including the New York Times, the Washington Post, the Wall Street Journal and the Los Angles Times, 41 book publishers, and various motion picture companies like Columbia Pictures and Twentieth Century Fox. Three quarters of the major stockholders of ABC, CBS, and NBC are banks, such as Chase Manhattan, Morgan Guaranty Trust, Citibank, and Bank of America.

Relatively few of these have anything to do with meaningful political and social affairs. Most are devoted to mass media distractions and mass market consumerism. The diversity of publications, both serious and trivial, should not be mistaken for a plurality of ideas and ideologies, or a wealth of political information.

MEDIA CONSOLIDATION

One of the topics of most concern to media critics of the media is increasing global consolidation of the media. If the media have the ability to shape the consciousness of large numbers of people and media organizations claim that they have power when they sell advertising space or time then the fact that a relatively small number of people control the media is alarming.

As Ben Bagdikian, who was for many years dean of School of Journalism at the University of California, Berkeley, noted in a 1987 article:

> *"In 1982, when I completed research for my book (The Media Monopoly), 50 corporations controlled half or more of the media business. By December 1986, when I finished revision for a second edition, the 50 had shrunk to 59. The last time I counted, it was down to 26."*

Currently, something like half a dozen giant corporations dominates the media all over the world. These giant organizations further consolidate their power through alliances with other media corporations (Berger: 2005).

Media giants such as those listed above are concerned primarily not with the public interest but with profits. They also often have political agendas, such as favoring the election of politicians who will be friendly to them and pass laws that will be favorable to their interests. Thus, for example, the major media corporations favored a recent change in Federal Communications Commission policy that made it possible for them to purchase television stations in certain markets where they already owned media outlets, making it possible for them to consolidate their power further.

MEDIA TRANSFORMATION

All media were with the people in people's struggle for justice at any sphere of life. The unwritten motto of media was "Humanity is above all". One cannot expect that media will only serve the society despite making loss and loss. But the point is very clear that it is totally a different type of business. That's why it is called "The Forth Estate". Justice P.B. Sawant of India goes further on this point (2001:47):

> *"The argument forgets that certain professions cannot be run and should not be allowed to be run as business, and commercial practices and values should never enter them. The media like the legal, medical*

> *and teaching profession and the media institutions like the educational, the medical, the religious and the social service institutions cannot be permitted to run on a commercial basis."*

Ideals do not work more in today's media world. Both the profit and prestige are the main reasons for bringing out media. In fact, it can protect a businessperson from other troubles or disturbances from every quarter in society. In addition, it adds a status quo to the owner and the publisher. Capitalizing on this, the owner or the publisher tries to do power practice with a view to increasing her/his power, position and even wealth in a negative way. A renowned poet, writer and journalist of Bangladesh, Abu Hasan Shahriar, (2004:32) puts it in this way:

> *"In earlier days the rich-man used to pet dog to watch and to guard his wealth; now that rich man pets a Daily. A Daily in the twenty first century is an obedient dog at rich-man's house. Sometime its master incites it to here and there. The daily is used to take possession of land and also business."*

BLOG

Definition: Beyond economics and social changes, technological innovations have played no small role in the changing nature of news. Communication and technology theorists contend that the Internet will change journalism and the nature of news (Barnhurst and Nerone, 2001; Singer, 2001). Tom Koch proposes that the online abilities of journalists allow them to 'redefine the form of news in specific and of public information in general' (1991; xxiii). Stovall (2004: 12) believes the migration of journalism to an online environment may mean that the fundamental nature of journalism will change. Pavlik (2000) notes the changes thus far range from evolving story structures that ultimately de-emphasize traditions such as the inverted pyramid to re-conceptualized relationships between reporters and audiences as well as between reporters and news organizations. One manifestation of this new level of connectivity is the relatively recent phenomenon of web-based personal 'logs', also called weblogs or 'blogs' the online postings of comments by citizens, groups, and news professionals, outside of the normal venues provided by the mainstream news organizations (Reese and Others: 2007). According to online encyclopedia Wikipedia, the term 'weblog' was coined by Jorn Barger on Dec. 17, 1997. The short form, 'blog,' was coined by Peter Merholz. He broke the word 'weblog' into the phrase 'we blog' in the sidebar of his weblog in April or May of 1999. Since 2003, blogs have gained increasing notice and coverage for their role in breaking, shaping, and spinning news stories. Bloggers provide nearly instant commentary on televised events, creating a secondary meaning of the word 'blogging' to simultaneously transcribe and editorialize speeches and events shown on television.

In 2004, the role of blogs increasingly became mainstream political consultants, news services and candidates began using them as tools for outreach and opinion forming. Appropriately, that year Merriam Webster's Dictionary declared 'blog' as the word of the year. Weblogs, in particular, could become an ultimate from of news. Wendland (2003: 94) notes that blogging consists of 'news that is happening now almost in real time not filtered, edited, or delay delivered, as with traditional media'.

Of interest here is a particular form of online journalism: current events blogs. A blog is a more dynamic version of a personal websites, being updated at least weekly, and sometimes daily, hourly or even more frequently with the most recent entries appearing first (Wall, 2005). Blogs rely on hyperlinks to other sites to enhance their own posts. The blogger often scouts the Web for interesting news and links to that information. The blogger may briefly summarize the link's content or may provide commentary, criticisms, or other personal thoughts about the information to which it is linked. Today's blogging movement was fueled by the opening of commercial services such as weblog software Blogger which made it possible to post without any technological knowledge (Blood, 2002a).

Blogs allow ordinary people to become content creators, able to publish and potentially globally distribute their writing (Blood, 2002b). Content may be about world affairs or what the blogger ate for breakfast that morning as blogs blur the lines between private and public. Most bloggers tend their blogs on the side: they don't get paid. Many of the blogs cultivate a relationship with the audience. Most used the standard blogging software which includes a link at the end of each post labeled 'comment' or some other word inviting response. Here, audiences can link to other readers' responses as well as post their own. While other visitors would have to click on the comments sections in order to read this update, it still provides readers with an opportunity to participate in the production of content. Some bloggers respond to reader posts and even post in the readers' comments section. Blogging which might be a new word to many readers, is being grasped both here and abroad not only as the future of press freedom but also as an opportunity to develop media careers.

A cross between a column, a news story and a journal, the journalist's weblog (or J-blog) has started to serve as daily news in the mainstream online press. The creators of blogs contend the Web is a perfect place to display short-form reporting, short form analysis and short form writing (Dube, 2004) perfect to spur national debate about anything and everything. At first, blogs were a way for people 'out there' to take back their news, to comment on mainstream journalism and to present their own analysis of news events a sort of 'black market' journalism, according to Wall (2004). However,

mainstream publications have now started their own blogs in an attempt to recapture journalism authority. Thus, blogs represent reconstituted journalism both renegade and legitimate reporting and writing and have become part of the fabric sewn by the press.

While blogs can focus on any topic, the blogs of interest here are news blogs, which feature current events items. Although these are news blogs, typically such individually run blogs do not generate original content but rely on the sources for their links and as inspiration for their commentary. These blogs have been described as outside mainstream journalism norms with fewer gatekeepers or filters and little or no reliance on big corporate sponsors (Lasica, 2002a; Levy, 2002). Bloggers and their supporters argue that blogs are now breaking stories and sometimes driving news cycles (Kurtz, 2002). Some professional journalists have also started blogs and media outlets are sponsoring blogs. Indeed, the premise of this article is that blogging is changing journalism, creating a more conversational, dialogic, and decentralized type of news (Delwiche, 2004; Sullivan 2004). Because news media organizations have been so closely identified with the establishment of news routines, we would expect these routines and their resulting product to change with different sponsorship and production patterns.

BLOG JOURNALISM

Enter the j-blog: J-blogs are popular because 'they allow the reader to see the journalist as a human being, connecting with them without the stiff, imperial voice that turns so many young people off, And most blogs allow indeed thrive on reader interaction' (Pohlig, 2003: 25).

During US-Iraq war, spring of 2003, the mainstream media, as is historically its pattern during war, became less critical of the government and military actions and more prone to repeating propaganda both in the lead-up to and during the war (Knightley, 2004; Tumber and Palmer, 2004).

By 2004, j-blogs published by mainstream journalism publications used the Web space to compete with the independent news blogs, who were attempting to bypass traditional media news channels (Wall, 2004). Dissecting each bog for its compliance to professional norms and values provides an answer to whether these blogs could be called journalism, or if they are assuming a new form to meet the needs and desires of a new, postmodern society (Robinson, 2006).

Hyperlinks allow readers to change endings (and even extend them indefinitely), establish a nonlinear story format and bring in other authors (Landow, 1997). Wall (2004) considers blogs in general to be postmodern news in the tradition of New Journalism, in which seems to extrapolate from the given facts and expand upon them for the sake of a good story.

Various attempts have been made to identify the type of journalism news blogs produce. These concepts include personal journalism, do-it-yourself journalism, black market journalism, 'we media', and postmodern journalism (Wall, 2005). Blogs have been describe as a form of 'personal journalism', in which individuals both amateur and professional provide first hand reporting, personal commentary, and places for others to contribute or respond (Allan, 2002: 127). They have also been dubbed 'do-it-yourself journalism', which does not 'follow the canons in fact checking, seeking out alternative or opposing views or attempted impartiality' (Halavais, 2002: 29). Indeed, such practice may lead to a form of black market journalism, providing an unsanctioned space for ordinary voices shut out of the corporate controlled journalism system but also unregulated and potentially exploitative of bloggers themselves (Wall, 2004). Finally, blogs have been called participatory journalism or 'we media', which is characterized by decentralization and powered by technological blogs might better be understood as postmodern journalism (Wall, 2003.)

BLOG AS THE POSTMODERN CONTEXT

In response, what some believed was a new style of journalism arose in the 1960s: New Journalism. Characterized by a writing style that imitated fiction with a reliance on character, scene, and dialogue, New Journalism broke the rules of professional journalism not just in terms of stylistic choices but more importantly in terms of abandoning the objectivity and faux detachment that journalism practiced (Hartsock, 2000; Wolfe, 1973). More importantly, the rise of New Journalism suggested that when political and cultural crises arose, new forms of news might also appear.

Indeed, some scholars see the possibility of a new form of postmodern journalism developing online (e.g. Landow, 1997; Murray, 1997; Wall, 2005). This project more specifically assesses the ways in which blogs contribute to our understanding of new genres of news in the 21st century (Deuze, 2003; Lasica, 2002a, 2002b). Blogs represent a new genre of journalism offering news that features a narrative style characterized by personalization and an emphasis on non-institutional status; audience participation in content creation; and story forms that are fragmented and interdependent with other websites (Wall, 2005).

Post-modernity is seen as response to modernity, a worldwide associated with scientific knowledge and other so-called grand narratives that legitimize certain epistemologies and focus on professional/elite control over knowledge (Lyotard, 1984). Post-modernity argues that reality is not fixed or knowable outside of the self. Instead, we concerns of interest here are changing notions about reproduction, representation, and legitimacy. In terms of representation and reproduction, post-modernity is a world of fragments with reality created through performances (Jameson, 1991). It is not a culture of creativity but of quotation or pastiche.

Some observers see certain postmodern characteristics embodied in negatives trends in journalism, connecting it to the increasingly blurry boundaries between news and entertainment and the overall celebration of commercial culture (Hartley, 1996). Yet others have attempted to flesh out a description of postmodern journalism that embodies more positive values. Ettema (1994) suggests postmodern journalism would consist of small, local stories about people that convey human suffering and would reject a meta-narrative. With the audience engaged in actively consuming stories and creating new meanings, post-modernity would give rise to non-official voices and versions of events. Likewise, Moore (1998) suggests that postmodern journalism would consist of small, localized stories; focus on suffering; provide less emphasis on objective data-gathering and rational analysis.

THE GLOBAL NEWS ARENA

The blossoming of citizen journalism stands as one of the Internet's most exciting developments. With millions of bloggers, tens of millions of Internet posters, and hundreds of millions of readers, online news sources have radically reshaped the way we access our daily news. While mainstream news organizations initially expressed doubt about the news value of online sources such as blogs, in recent months many have launched their own blogs, frequently maintained by some of their most distinctive voices. Indeed, the remarkable growth of the blogosphere is enough to convince even the most diehard skeptic that something important is afoot. Technorati, a blog search engine, reports that it tracks 75,000 new blogs each day. (World, 2006)

A more detailed look at blog growth was provided by British business Web Site, *Vnunet.com* "A new blog is created every second, adding to the 37 million that already exist, according to David Sifry, founder of the Technorati weblog data set and link search engine. This staggering rate of increase equates to a sixty fold growth of the blogosphere within the past three years. There are no geographic or demographic boundaries to blogging. Ray Valdes, a web services analyst at Gartner, observed that the total number of bloggers worldwide makes it difficult to conclude that one geographical region could have a higher concentration of blogging activity than any other.

The emerging world of blogs must be understood within the larger context of a changing global news arena, in which the public naturally seeks perspectives beyond one specific locality and nation (e.g. Croad, 2003). The migration of news and information to an online platform has disrupted old patterns of reading and changed the relationship between audiences and news providers. The internet has increased the speed, reach, and comprehensiveness of journalism available to the public and lowered the cost of entry to anyone seeking to participate. Thus, the online environment news such that the user, creator, and news subject need no longer share the same national frame of reference.

In breaking down geographic limitations on access to information, the internet and the world wide web-based journalism and other communication it makes possible undermine the historic relationship between the press system and the national community. Morris and Waisbord (2001) observe that transnational forms of political participation have moved to a global public sphere.

FREE EXPRESS

The issue of free express is very important in discussions about blogs and blogging, as noted in London's business oriented Web site *Silicon.com* "In the same way that the Internet and technology provided the original facility for both sides those who want to be free and those who want to constrain it also provides new opportunities for communication and anonymity. Today, bloggers and citizen journalists increasingly shape the global media agenda. During the U.S. led invasion of Iraq in 2003, the Baghdad Blogger provided global audiences with a glimpse of what life was like for ordinary Iraqis stuck between an invading army and a brutal dictator. The Asian tsunami of 2004 was a global news story told largely with home video footage.

SHIFTING BOUNDARIES IN THE BLOG SPHERE

The concept of 'blogosphere' recall the public sphere idea of Habermas (1989), a provocative if elusive way to think about the social 'geography' of public communication – the realm of reason, argument and dialogue where public opinion emerges. Journalism has naturally been central to this process, with Carey (1989) suggesting that journalism ought to help encourage and amplify the conversation of the public. Thus, the public sphere is often thought to be mediated space, with the news media providing this visible forum of public voices. In this regard, the range of sources and perspectives permitted by professional news gatekeepers establishes the limits of the public sphere they manage. Alternatively, we may conceptualize the blog sphere as a conversation distributed charged with monitoring and reflecting public expression, citizens can now hold those conversations among themselves and, in a new twist, amplify the 'conversations' among journalists.

Research has begun to focus on how news practices and professional identity are changing in the wake of new technological capabilities (e.g. Allan, 2002; Deuze, 2004). Deuze (2003) observes that when journalism goes online it shares aspects of hypertextuality, multimediality and interactivity, changing and broadening its basic nature. He goes on to show how these changes range from mainstream news sites that simply transpose online their closed, traditional professional culture and relationship to the audience, to sites that encourage a more open 'dialogical' journalistic culture – an aspect that the blogsphere concept captures. Admittedly, technology has altered the nature of the profession itself, but more broadly journalism has been distributed and interlinked more fluidly with citizen communication. The blogsphere provides an interweaving of these different locations as it pushes users to a network of information, views and perspectives, thus bringing a broader journalistic conversation to life.

So, globalization and technology have produced a broader and more fluid journalistic conversation, a new global public sphere (Habermas, 1992) with shifting boundaries. The most important conceptual boundary highlighted in the blog sphere is that between 'professional' media and more informal, citizen-based, non traditional forms. The blog sphere is often regarded as set apart from traditional 'mainstream' journalism, but it may also be seen as enveloping both professional and citizen 'amateur' journalism in a larger network. By 'professional' we refer to a combination of features including a claim to 'authority' and the command of economic resources available to media organizations. The professional, traditional media draw their institutional authority and value from their casting of their work within the norms of journalism.

Citizen-based media originate from individuals and public interest groups seeking to express an idea or position within the public discourse. Its producers need not adhere to a professional journalistic code as a requirement for participation. By definition, these non-professional media command less commercial viability and may be based on a non-profit, subsidy, or no-revenue business model. They only require a motivated individual or group willing to speak to a public. They help create a more interactive online conversation on personal websites, non-governmental organization (NGO) websites, chain emails, Usenet discussion groups, and message broads.

CONCLUSION

In terms of their narrative style, the blogs are notable for their personalization. The sharing of personal information and sometimes providing diary-like personal accounts of events emphasizes the non-professional and non-elite status of the blogs. The use of personal opinion gives a certain intimacy to the blogs and suggests that the blogger is sometime the readers can believe they know someone who is not manipulated by a corporate boss or a filter of professionalism. The opinions expressed are often more vitriolic and sometimes go beyond what is acceptable for a mainstream news outlet. Most of the blogs seem to suggest that ordinary people can comb through information sources, redistribute what they find interesting, and provide intelligent commentary – all without sponsorship of a corporate news company.

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In-Vitro Antibacterial Activity of Leaf Extracts of Psidium Guajava against selected Pathogenic bacterial starins

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ABSTRACT: The research was assessed to evaluate the efficacy of crude extract of *Psidium guajava* against selected bacterial strains. The extract of *Psidium guajava* leaves was obtained by three different methods and the inhibition zones obtained through disc diffusion method. In this study, *P. guajava* extract displayed some degree of antimicrobial activity and presented compound. It was revealed from the results that *Psidium guajava* leaf extracts shows different degree of inhibition against different microorganisms. This investigation suggests the *Psidium guajava* to be a good antimicrobial agent against various pathogenic agents. Further investigation is required in this regards that can replace the plant with a very beneficial antimicrobial medicine and enhance its effects.

KEYWORDS: Antibacterial Activity, Leaf Extracts, Psidium Guajava, Pathogenic bacterial starins.

1 INTRODUCTION

Psidium guajava commonly known as guava in English of the family Myrtaceae is an evergreen small tree grown in tropics and subtropics and also cultivated commercially in Pakistan and India for its consumable fruits [1]. Different parts of the plant are used in the indigenous system of medicine for the treatment of various human ailments such as wounds, ulcers, bowels and cholera [2].

P. guajava is mainly known for its antispasmodic and antimicrobial properties in the treatment of diarrhea and dysentery. It has also been used extensively as an oral hypoglycemic agent. Several pharmacological studies have demonstrated the ability of this plant to exhibit antioxidant, hepatoprotection, anti-allergic, antimicrobial, antigenotoxic, antiplasmodial, cytotoxic, antispasmodic, cardioactive, antitussive, antidiabetic, anti-inflammatory and antinociceptive , activities, hypertension, obesity, supporting its traditional uses ([1], [3], [4]).

Plants and plants product have antimicrobial activities and confirmed by different researcher around the globe ([5], [6], [7], [8], [9]). Reference [10] studied water, alcohol and chloroform extracts of leaves were effective against *Aeromonas hydrophila, Shigella* spp. and *Vibrio spp*, *Staphylococcus aureus, Sarcina lutea* and *Mycobacterium phlei.* Recently, Reference [11] had screened 13 Brazilian medicinal plants for antimicrobial activity against bacteria and yeasts. In this study, *P. guajava* extract displayed some degree of antimicrobial activity and presented compound.

The present study was undertaken to investigate the in vitro antibacterial activity of Hot and Cold water and Methanol extracts from leaves of *Psidium guajava.*

2 MATERIALS AND METHODS

Healthy fresh and disease free leaves of *Psidium Guajava* were collected in District Mansehra, KP Pakistan and brought to Microbiology research Laboratory, Department of Microbiology, Hazara University, Mansehra Pakistan. Firstly the leaves were washed with tap water and then dried in the room for further extract process.

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Reference [12] method of extraction was used. Ten grams powdered samples of leaves and roots was soaked in 100 ml cold water and Ethanol in 250 ml sterile flask and rotated on shaker at 150 rpm for 24 hours at room temperature. The extract was filtered through a muslin cloth and then centrifuged at 4400 rpm for 7 minutes. The supernatant were collected and the pellet was discarded.

Nutrient Agar was enrichment medium for the growth of microorganisms. Medium was prepared by adding 27 g of dehydrated powder using electrical balance into 1 litter of distilled water. PH was adjusted by electrical pH meter at 7.4 and was boiled to dissolve completely. Media was poured in pre-sterilized glass Petri plates of 90mm.

Antibacterial activity of *P. Guajava* leaves and Roots extract was tested using agar well diffusion method. With the help of sterile micropipette tips *P. Guajava* leaf extract (cold water) 100µl were poured into the wells. The plates were incubated at 37 ^{0}C for 24 hours. After incubation, the diameter of the resulting zone of inhibition was measured with the help of Digital Vernier Caliper (Mitutoyo) and the average values were recorded.

3 RESULTS AND DISCUSSION

In current research, the antimicrobial activity of *Psidium guajava* leaf extract was checked out against two Gram positive and three Gram negative bacteria. The leaf extract was prepared by three ways; one was cold water extract and second was ethanol extract and Hot Water extract. Their potential antimicrobial activity was qualitative and quantitative, estimated by the presence and absence of zone of inhibition and MIC values.

Reference [11] had screened 13 Brazilian medicinal plants for antimicrobial activity against bacteria and yeasts. In this study, *P. guajava* extract displayed some degree of antimicrobial activity and presented compound. It was revealed from the results that *Psidium guajava* leaf extracts shows different degree of inhibition against different microorganisms. The diameter of zone of inhibition (ZOI) produced depends on several factors broadly classified as extrinsic and intrinsic parameters (Table 1, 2, 3 and figure 1).

Table 1. Zone of inhibition (in mm) of methanol leaf extract of Psidium guajava

Concentration(mg/ml)	*E. coli*	*S. aureus*	*P. aeruginosa*	*S. typhi*
0.125	-	-	-	-
0.25	-	-	-	-
0.50	-	-	-	-
1.0	-	-	-	-
2.0	-	-	-	5 mm
4.0	2 mm	-	3 mm	8 mm

Table 2. Zone of inhibition (in mm) of cold water leaf extract of Psidium guajava

Concentration(mg/ml)	*E. coli*	*S. aureus*	*P. aeruginosa*	*S.typhi*
0.125	-	-	-	-
0.25	-	-	-	-
0.50	-	-	-	-
1.0	-	-	-	-
2.0	-	-	-	2 mm
4.0	1 mm	-	1.25 mm	3 mm

Table 3. Zone of inhibition (in mm) of hot water leaf extract of Psidium guajava

Concentration(mg/ml)	*E. coli*	*S. aureus*	*P. aeruginosa*	*S. typhi*
0.125	-	-	-	-
0.25	-	-	-	-
0.50	-	-	-	-
1.0	-	-	-	-
2.0	-	-	-	3 mm
4.0	1.50 mm	-	2 mm	5 mm

Hot water extract was used against all the selected bacterial strains except *Staphylococcus aureus.* The hot water extract showed no activity against the bacterial strains. The reason for that were the degradation alkaloids (Coclaurine). Coclaurine has the boiling point less than the boiling point of water therefore that was degraded with the high temperature [7].

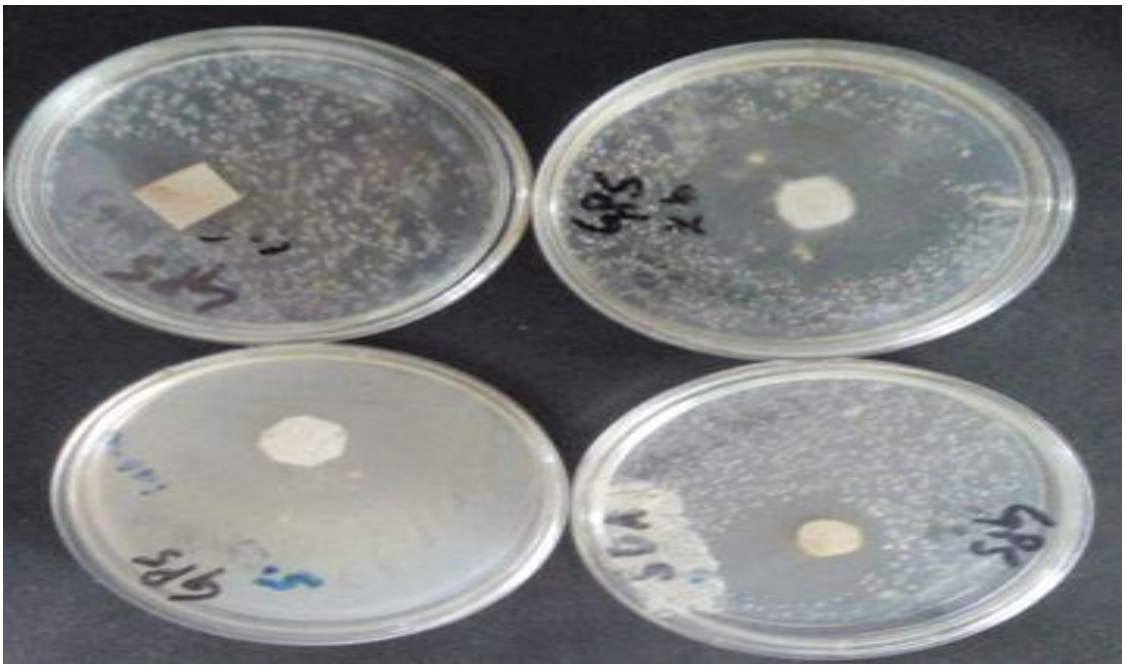

Fig. 1. Methanol Extract, Hot Water extract and Cold Water Extract and Zone of Inhibition on Nutrient agar Plate

4 CONCLUSION

This investigation suggests the *Psidium guajava* to be a good antimicrobial agent against various pathogenic agents. Further investigation is required in this regards that can replace the plant with a very beneficial antimicrobial medicine and enhance its effects.

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OCCUPATIONAL STRESS-A COMPARATIVE STUDY OF EMPLOYEES IN PUBLIC AND PRIVATE SECTOR BANKS IN TAMIL NADU

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ABSTRACT: Stress and its disastrous consequences has spread its tentacles in all the sectors, more importantly in the banking sector because of the rapid changes which is taking place in this sector. The intense competition in introducing innovative products and services to satisfy the divergent customer needs has forced the employees to be always on their toes. The employees in the banking sector are experiencing a tremendous amount of pressure at the work place. Hence the objective of this research paper was to identify and compare the factors causing stress among employees in public and private sector banks and suggest suitable remedies for the same. Statistical tools like factor analysis, regression, chi square and Man-whitney test has been used.

KEYWORDS: Job satisfaction, public and private sector banks, stress.

INTRODUCTION

The modern world which is said to be a world of race for material success and achievements is invariably a world of stress. Right from the day of birth till the last breath of man, an individual is exposed to various stressful situations. In this fast changing world today, no individual is free from stress and no profession is stress free. Stress comes in many forms and affects people of all ages and all walks of life. People experience stress everywhere, whether it is in the family or in the business organization. Stress has become an inevitable part of human life in recent times and it makes life more challenging and charming, if it is within limits.

OCCUPATIONAL STRESS

Occupational stress relates to the experience of stress in one's place of work, occupation or employment. Occupational stress is defined as adaptive response to an external situation that results in physical, psychological and or behavioral deviations for organizational participants.

Occupational stress is a state of tension that is created when a person responds to the demands and pressures that come from work, family and other external sources, as well as those that are internally generated from self imposed demands, obligations and self criticism. The terms work stress, job stress, or occupational stress is used interchangeably (Dollard 2003). Employers and governments have had increasing concern about occupational stress for over twenty years (Le Fevre, et al. 2003). In the past decade, effects of economic globalization and rapid technological changes have resulted in increased workloads and a faster pace in the work place (Dollard 2003).

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NEED FOR THE PRESENT STUDY

Occupational stress and its disastrous consequences have been observed in all the sectors, industries and organizations. One such industry which has gone into massive changes over the last ten years is the banking industry. Banking industry is the most important constituent of the financial sector of any economy. With the opening of the banking sector nationalized banks had to face fierce competition from private and foreign banks. It is here, the banks understood that infrastructure, and capital and technology are replicable but not human capital which is a valuable resource for achieving competitive edge. Nationalized banks too started introducing newer products and services to keep the profit margin at a safer level and survive in the market. Competent and energetic work force with high skill level both hard and soft became crucial to market the products and services and cater to the needs and requirements of the customers. With this background the present study made an attempt to understand the impact and intricacies of occupational stress on employees in the banking sector and suggest suitable measures to be taken by the bank managements to have a competent, productive and stress free workforce to meet the present and future challenges.

Although a lot of studies have been conducted on occupational stress and job satisfaction in various sectors, there are very few studies conducted in the banking sector. Today banking is a fast growing service industry and hence the high staff morale is very much important to deal with the customers effectively and positively. Hence, in this research paper an attempt is made to identify and suggest remedies to specific problems of bank employees related to job stress.

OBJECTIVES

1. To identify and compare the factors causing stress among employees in public and private sector banks.
2. To suggest measures for a stress free environment for the bank employees.

HYPOTHESIS

H1: Employees of private banks experience more stress than public sector bank employees

RESEARCH METHODOLOGY

a. Research design: The study has been partly descriptive and partly diagnostic. The study is based on both primary and secondary data.

i. Primary data: The primary data for this research paper was collected through survey method using a well-structured questionnaire.

ii. Secondary data: The data from secondary sources is collected through books, journals, reports, research studies, internet sources, magazines, newspapers, and bank websites to understand the basic concepts and literature pertaining to stress in general and occupational stress of bank employees in particular.

iii. Sampling method: The total number of public sector banks is 27 and private sector banks are 30 in India. The researcher has taken 3 public sector banks and 3 private sector banks for the purpose of the study. The researcher has used disproportionate stratified random sampling and chosen 30 percent of the population as its sample.

iv. Sample size: A sample size of 537 respondents from banks, of which 411 employees were from public sector banks and 126 employees from private banks, was taken for the study.

Field work for data collection

The researcher himself has collected the responses by making personal visits to the respondents are their convenience. The data thus collected were categorized and processed manually and further it was cross checked through computers. Further processing was done with the help of the master table. The data were fed into computers for analysis and the results were appropriately incorporated.

The objectives of the study warranted the selection of a state where predominant banking activities are carried out. Among the states of India, the choice had fallen on Tamil Nadu for the conduct of the present study because the state occupies 5th position in the country on its size, it has a vast potential and scope for the banking activities and has a predominant agriculture involvement as well as industrial involvement that may bring to limelight still more banking organisations successfully in the future also.

v. Data processing and statistical analysis: 5 point Likert scale was used for the study with 1=Most stressful, 2= more stressful, 3= stressful, 4= less stressful, 5= least stressful. Descriptive statistics were used to obtain the mean and standard deviations. The researcher has utilized Statistical Package for Social Sciences (SPSS) to analyze and interpret the data to be presented in this study. Techniques like Chi-square test, Anova, and regression analysis were also used.

CAUSES OF OCCUPATIONAL STRESS AMONG BANK EMPLOYEES

From the literature, the researcher has identified 72 variables that cause stress in people. Using SPSS, the factor analysis was run and 72 variables were reduced into 13 manageable factors.

Factor 1	Job conditions	18 variables such as job insecurity, demanding work, inadequate explanation etc
Factor 2	Physical environment and repressive union activities	14 variables such as union problems, frequent meetings, lack of canteen, proper transport facilities etc.
Factor 3	Work life balance	7 variables such as tight work schedules, lot of concentration required, lack of recognition etc
Factor 4	Inadequate planning of work	5 variables such as Forced / unpaid overtime/long hours, Too much pressure to complete tasks etc
Factor 5	Job ambiguity	6 variables such as lack of control over job, confusion over who should do what job etc.
Factor 6	Demands of the family	6 variables such as daily requirements of the family, child's education etc.
Factor 7	Adaptability to change	2 variables such as coping up with new techniques, ideas, technology, innovations or new challenges
Factor 8	Absence of employee involvement	2 variables such as close supervision and Indifference/ partiality shown by the superiors
Factor 9	Undue expectations from job	2 variables such as fear of making mistakes which could lead to serious consequences and lot of expectations from the superiors
Factor 10	Job rigidity	3 variables such as frequent transfers, attending more than one customer at a time etc
Factor 11	Lack of efficient manpower	2 variables such as inadequate Staff and seniors taking VRS and hence pressure on juniors
Factor 12	Performance pressure	2 variables such as fixed targets\recovery to be achieved and strict rules to be followed at every process of work
Factor 13	Unforeseen contingencies	3 variables such as work at the year end, Illness of any of the family members etc.

Factors such as job conditions, job ambiguity, demands of the family, absence of employee involvement and performance pressure caused stress in both the banks. Factors such as Physical environment and repressive union activities, work life imbalance, inadequate planning of work, adaptability to change, job rigidity, lack of efficient manpower, and unforeseen contingencies caused more stress in public sector banks. Factor undue expectations from job were more stressful in private banks.

Regression analysis was performed to evaluate the significant factors causing stress at the work place in public and private banks.

Table 1. REGRESSION ANALYSIS OF FACTORS CAUSING STRESS IN PUBLIC AND PRIVATE BANKS

Type of Bank		Unstandardized Coefficients		Standardized Coefficients	t	p
		Beta	Std. Error	Beta		
Public	(Constant)	.109	.086		1.264	.207
	Job Conditions	.168	.036	.194	4.708	.000
	Physical Environment & repressive union activities	.040	.031	.047	1.290	.198
	Work life Imbalance	.002	.029	.003	.075	.941
	Inadequate planning of work	.084	.023	.107	3.614	.000
	Job ambiguity	.017	.028	.020	.609	.543
	Demands of family	.138	.024	.175	5.727	.000
	Adaptability to change	.024	.023	.031	1.035	.301
	Absence of employ involvement	.028	.023	.045	1.249	.212
	Undue expectation from job	.113	.027	.161	4.241	.000
	Job rigidity	.048	.023	.055	2.080	.038
	Lack of efficient manpower	.178	.020	.275	8.761	.000
	Unforeseen contingencies	.131	.030	.146	4.414	.000
	Performance pressure	.180	.020	.228	8.895	.000
Private	(Constant)	-.358	.144		-2.494	.014
	Job Conditions	.028	.073	.030	.381	.704
	Physical Environment & repressive union activities	.249	.063	.284	3.969	.000
	Work life Imbalance	.113	.081	.114	1.395	.166
	Inadequate planning of work	.013	.069	.014	.183	.855
	Job ambiguity	.043	.067	.045	.642	.522
	Demands of family	.013	.053	.016	.246	.806
	Adaptability to change	.185	.041	.201	4.486	.000
	Absence of employee involvement	.247	.043	.314	5.779	.000
	Undue expectation from job	.145	.048	.182	3.032	.003
	Job rigidity	.091	.055	.103	1.651	.102
	Lack of efficiency manpower	.106	.046	.133	2.297	.023
	Unforeseen contingencies	.112	.058	.122	1.998	.047
	Performance pressure	.088	.053	.103	1.674	.097

Source: Field survey

Table 2. BANKS WITH ADJUSTED R SQUARE VALUE AND RESULTS OF ANOVA FOR STRESS

Type of Bank	Model	R	R Square	ANOVA F Value.	P Value
Public	1	.910	.829	147.738	.000
Private	1	.938	.879	62.871	.000

Source: Field survey

Here the stress level is taken as the dependent variable and all the 13 factors causing stress taken as independent variables. Regression analysis is performed seperately for private banks and public sector banks. All the 13 factors has 82.9% influence on job stress in public sector and 87.9% influence in private sector.

In public sector banks, job conditions, inadequate planning of work, demands of the family, undue expextations from job, job rigidity, lack of efficient manpower, unforseen contingencies and performance pressure have significant effect on stress level as for all the cases $p<0.05$. Further among all these factors lack of efficient manpower and performance pressure have more effect as standard beta>0.2 followed by job conditions (beta =.194), demands of the family (beta =.175), undue expextations from job (beta =.161), unforseen contingencies (beta =.146) and job rigidity has least efect on stress (beta =.055) and rest of the factors have no significant effect on stress level.

In private banks, physical environment and repressive union activities, adaptability to change, absence of employee involvement, undue expextations from job, lack of efficeint manpower, unforseen contingencies and performance pressure has significant effect on stress level as for all the cases $p<0.05$. Further among all these factors absence of employee involvement has more effect as standard beta>0.3 followed by physical environment and repressive union activities (beta =.284), adaptability to change (beta =.201), undue expextations from job (beta =.182), lack of efficient manpower (beta =.133), unforseen contingencies (beta =.122), and performance pressure has least efect on stress (beta =.103) and rest of the factors has no significant effect on stress level.

Under the strict vigilance of RBI particularly during and after the global economic crisis banks have to comply with the national and international standards. Therefore it has become common for the banks to fix high targets for deposit mobilisation, loan disbursement and other investments, loan recovery, growth and profitability etc. These targets always kept the employees on their toes with pressure to complete tasks by staying overtime or sometimes forced to stay for longer hours, attend frequent meetings which have created an enormous pressure on employees. With the advancement in science and technology most of the banking services are automated. But all the automated services such as mobile banking, internet banking etc are not popular and has not penetrated. As a result still there is a huge crowd in bank branches and they lack sufficient number of efficient employees.

HYPOTHESIS 1: EMPLOYEES OF PRIVATE BANKS EXPERIENCE MORE STRESS THAN PUBLIC SECTOR BANK EMPLOYEES

Table 3. CHI-SQUARE TEST RESULT FOR STRESS WITH THE DEMANDS OF WORK

Type of Bank		Frequency of stress with the demands oi			' work	X^2 Value	P Value
		Always	Sometimes	Rarely	Total		
Public	F	15	311	85	411	3.342	.188
	%	3.6%	75.7%	20.7%	100.0%		
Private	F	8	86	32	126		
	%	6.3%	68.3%	25.4%	100.0%		
Total	F	23	397	117	537		
	%	4.3%	73.9%	21.8%	100.0%		

Source: Field survey

Chi square test was used to test the hypothesis that 'employees of private banks experience more stress than public sector bank employees'. The test stated that there is no significant difference between public and private sector banks with respect to the level of stress experienced with the demands of the work as x =3.342, p=0.188.

Table 4. MANN - WHITNEY TEST RESULT FOR LEVEL OF STRESS DUE TO JOB

Variables	Type of bank	Mean	S.D	% Mean	Z Value	P Value
Level of stress due to job	Public	3.0	.563	60.10	1.907	.057
	Private	3.09	.704	61.75		
	Total	3.02	.600	60.48		

Source: Field survey

Further when it is tested for difference by Mann Whitney Test, shows stress level is non significant (Z=1 .907, p=0.057). Hence the Hypothesis 1 employees of private banks experience more stress than public sector bank employees is rejected.

With the entry of private and foreign banks, the public sector banks have geared up their competition and started offering new types of products and services which are in par with the services offered by the private banks. Technology up gradation and the quality of service in public sector banks have improved. The public sector banks are forced to operate beyond their office time to offer customized services to their customers. Unlike the study of Malik N (2011), Katyal S et al. (2011) where they stated that the employees from private banks experience more stress than the employees of public sector banks while Sharma J and Devi A (2011) stated that public sector employees feel stressful for being pigeonholed in one position for long and the lack of growth and learning opportunities in the public sector banks. But the present study states that employees of both public sector and private sector banks experience the same level of stress.

SUGGESTIONS FOR A STRESS FREE ENVIRONMENT AT THE WORK PLACE

In banks, promotions are tied to the transfers. Many a times to avoid the transfer employees forego the promotion which has negative effect on the growth and profitability of the bank. Keeping this in mind banks can motivate the eligible employees by assuring them the least inconvenience caused by the transfers. The location fitment can be done according to the employees' preference which would help them to be more productive at the work place. It is quite important to see that organization driven policies be well planned and communicated well in advance, so as to cause least stress to the employees in implementation. During the field work the respondents opined that when there was heavy work load they work on holidays for which they have no complaints. But they wish to get a comp off on the day they require. Therefore it is desirable for the banks to respect the feelings of their employees.

The Head office should allot a capable person as the branch head to the bank or else the employees working in the bank will have lots of trouble in dealing with their boss which would lead to stress. Banks should send their employees for training and on completion of their exams and if they pass, the fees should be reimbursed. This would be a motivation to others to take up their training and promotion exams. Resource persons for the training program should be a mixture of people both from within the bank and from outside. This would make the employees within the organization proud and happy that they got a chance to address their colleagues and share their knowledge and experience. Resource persons from outside the organization would bring in innovative ideas and thoughts.

The work of the employees should be reviewed periodically and not just at the end of the year. This would give them a boost to perform better and keep them on their toes. The employees should be motivated to take up and learn new things. Banks should provide town hall sessions to employees where they get a chance to open up freely with the higher level. As the population in most of the public sector banks are on the verge of retirement, banks should incorporate programmes to get the best manpower to fill up this gap. For this the banks should conduct IBPS coaching programmes by tying up with colleges and social organizations so that awareness is created amongst the youth about the job opportunities which will be created in the banks. Fernando W (2007) stated that the inadequacy of experienced staff in banks was considered to be another reason for increased level of stress. Hence those banks where there is shortage of staff, adequate manpower should be provided by the bank management.

CONCLUSION

The psychosocial well being of an employee is crucial to have a productive work force. The productivity of the work force determines the success of an organization. In an age of highly dynamic and competitive world, bank employees are exposed to all kinds of stressors that can affect them on all realms of life. The growing importance of interventional strategies is felt more at organizational level.

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INFLUENCE OF STREET GEOMETRY ON URBAN MICROCLIMATE – A COMPARISON OF TRADITIONAL AND MODERN STREETS OF SRIRANGAM

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ABSTRACT: Urban microclimate is very much influenced by the various anthropometric factors like pollution, population growth, scarce vegetation, lack of significant open spaces and so on. Built environment also in a very significant manner contributes in this influence. Considering the building environment of the city, factors like building layout, street geometry contribute a key role in altering the urban micro climate. The comfort of the interior spaces can be improvised with either of the active or passive techniques. Outdoor comfort is seldom thought of .Though there are many aspects of the built environment considered as factors in influencing outdoor thermal comfort, this paper focuses on the contribution of street geometry.

To understand the influence of street geometry on outdoor thermal comfort traditional and the modern streets layout are documented and analyzed. The outcome of this paper is to establish the relationship between the elements of street geometry and the outdoor thermal comfort index PET.

KEYWORDS: Street geometry, outdoor thermal comfort, PET, RAYMAN.

1 INTRODUCTION

The world is undergoing the largest wave of urban growth in history. Since 2008, for the first time more than half the worlds' population is living in towns and cities. By 2030 this number will swell to almost five billion or an estimated 61 percent of global population [1].Cities has the ability to modify their climates. These modifications include changing cloud cover, precipitation patterns, wind speeds, solar irradiance, and increasing air temperatures [2]. The most significant modification is the creation of Urban Heat Islands. The term Urban Heat Island (UHI) refers to an urban area with temperatures that are elevated relative to its less developed surroundings. While the physical mechanisms causing UHIs are well documented [3], they continue to be the most studied phenomenon in urban climatology [4], [5].

The urban research has taken very serious concern over this increase in city temperature and the various factors contributing to these phenomena are analyzed to bring out possible solutions to enable the urban planners, designers, developers and regulation authorities to work out strategies to minimize the heat island impact.

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2 URBAN MICROCLIMATE

The impact of the urban heat island is basically the cumulative effect of the various factors on the climate [6] carried out a detailed statistical analysis of UHI characteristics in Athens and concluded that the appearance of high air temperatures was reinforced by increased urbanization and industrialization coupled with the increased anthropogenic heat flows and the lack of vegetation. Urban elements play a major role in the development of UHI. Some studies [7] showed the various impacts of land use on urban temperature. The factors that influence the urban microclimate can be classified as the climatic factors and the physical factors. These factors operate together in establishing cycles in the existing climate of cities and increase the outdoor temperature.

2.1 CLIMATIC FACTORS

2.1.1 SOLAR RADIATION

Solar radiation reach the earth's surface as direct (short wave radiation) or heat up the atmosphere first and then be directed towards the earth's surface and immediately reflected back or stored and then lost to the atmosphere (long – wave radiation).More over energy may be lost due to convective flow (called the turbulent flow) and all these factors contribute in heating up the urban system and is then convected out (sensible heat) [3].

2.1.2 HUMIDITY

The percentage of moisture present in air is also influenced by the components of urban canyon. The extent to which humidity is raised depends on either vegetated area or presence of water body. The larger the extent of wet surfaces relative to dry surfaces such as bare soil, paving and walls the larger is the proportion of incoming solar energy. At the same time the increase in humidity at pedestrian head height is ultimately limited by the mixing of humidified air with dry air from outside the canyon. This depends on intensity of air flow in the canyon, which is affected by physical factors (Aspect Ratio and orientation) [1].

2.1.3 WIND

The urban wind field is complicated. Small differences in topography can cause irregular air flows. As the air flows from the rural environment to the urban environment, it must adjust to the new boundary conditions defined by the cities [8]. This adjustment results from the higher level development flow field and the uniqueness of local effects such as topography, building geometry and dimensions, streets, traffic and other local features like trees [9].Oke, 1987 [3] characterized the wind variation with height over cities by defining two specific sub layers, the obstructed sub layer or urban canopy sub layer which extends from the ground surface up to the height of the buildings and the so called free surface layer or urban boundary layer which exists above roof tops. The obstructed or canopy sub layer has its own flow field driven and determined by the interaction with the local features [10].The impact of wind is felt very significant particularly in the high density pockets of the urban area as the wind movement is obstructed by the closely packed buildings and lack of open spaces.

2.2 PHYSICAL FACTORS

The presence of buildings modify in a different degree all the energy balance terms in an urban context [11]. The physiological thermal stress that is imposed on a pedestrian in an urban canyon is an integral expression of the radiating and convective exchanges which is impacted in some way by the physical properties of the canyon [1].

2.2.1 URBAN CANYON

The urban geometry of a city is characterized by a repetitive element called the Urban Canyon. Urban Canyon is defined as the three dimensional spaces bounded by a street and the buildings that abut the street [12].

Urban Canyons restrict the view of the sky dome (characterized by the sky view factor SVF), cause multiple reflections of solar radiation, and generally restrict the free movement of air (Fig 1). For long urban canyons it is customary to specify the geometry by its height of the building/width of the street (H: W) ratio, also known as Aspect Ratio.

- Canyon Geometry for long canyons = height of building (H)/width of street (w)
- Sky View Factor (SVF) = fraction of sky visible at middle of Street
- For infinitely long canyon (SVF) = Cosβ

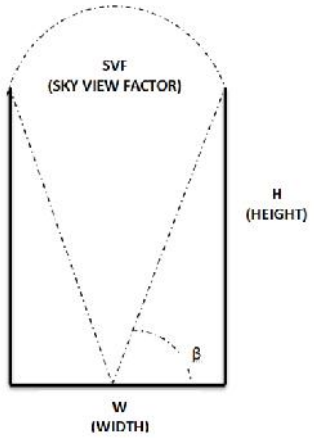

Fig 1: Urban Canyon

Fig 1 shows the urban canyon profile

2.2.2 SOLAR ENVELOPE

The concept of solar envelope was initiated by Knowles [13],[14].was a first attempt to resolve the problem of handling potential solar irradiation in the urban context. In urban areas the solar access is controlled predominantly by the shapes, form and materials [13].

2.2.3 URBAN GEOMETRY

Many experiences of urban design illustrate a real concern and consciousness in designing with the climate, either by taking advantage from the potential of natural energy or by protecting the living spaces from adverse climatic conditions. These can be verified through history [15], in the traditional built heritage [13],[16],[17],[18] as well as in contemporary urban projects [19],[20],[21],[22]. The street as climate regulator is one aspect within a whole urban design methodology [23]. The aspect ratio(height of the building to the width of the street ratio) and solar orientation are the basic components in determining street microclimate, along with the details of the street design like – galleries, vegetation, shading , façade treatment, material finish)[3].

3.0 METHODOLOGY

The aim of the study is to compare the outdoor thermal comfort of pedestrian users in the traditional streets of Srirangam with that of the newly developed streets. The index of comfort used in this study for calibrating outdoor thermal comfort is PET (Physiological Equivalent Temperature) . It can be calculated by using the Software 'RayMan' which is currently made freely available by its author. The street geometry factors considered for the analysis include the street orientation and the aspect ratio for five different time periods (7.00 Am, 10.00 Am, 1.00 Pm, 4.00Pm, 7.00Pm, 10.00Pm).The values of PET enable the understanding of the influence of street orientation and aspect ratio of the outdoor thermal comfort of the pedestrians. The study also enabled the role played by other components of the street geometry like (galleries, vegetation, shading, façade treatment, material finish) on the microclimate modification of the urban canyon. Hence this enable in deriving design solutions to modify the existing urban canyon in achieving a better outdoor thermal comfort conditions for the pedestrian users.

4.0 PET (PHYSIOLOGICAL EQUIVALENT TEMPERATURE)

The physiological equivalent temperature (PET) is put forward by a German research group headed by Peter Hoppe [24] and is already included in the new VDI guidelines (German guidelines for urban and regional planners) for assessing the thermal component of microclimate. PET is defined as the air temperature at which, in a typical indoor setting (without wind and solar radiation), the heat budget of the human body is balanced with the same core and skin temperature as under the complex outdoor conditions to be assessed.

The advantages of using PET are:

- It is a universal index and is irrespective of clothing (clo values) and metabolic activity (met values).
- It has a thermo physiological background and so it gives the real effect of the sensation of climate on human beings.
- It is measured in °C and so can be easily related to common experience.
- It does not rely on subjective measures
- It is useful in both hot and colder climates.

5.0 STUDY AREA

Tiruchirappalli is the fourth largest city of Tamil Nadu State in India (10°44'46"N to 10°52'46"N latitude, 78°39'11" to 78°44'13"E longitude) and is situated on the banks of River Cauvery. It acts as a nodal point for communication from North through South and East through West within the state. Tiruchirappalli City has a population of 8,46,732 as per 2011 census. Tiruchirappalli Corporation consists of four zones namely Srirangam, Ariyamangalam, Abishekapuram, and Ponmalai zone (Golden Rock), with each zone having 15 wards [25].

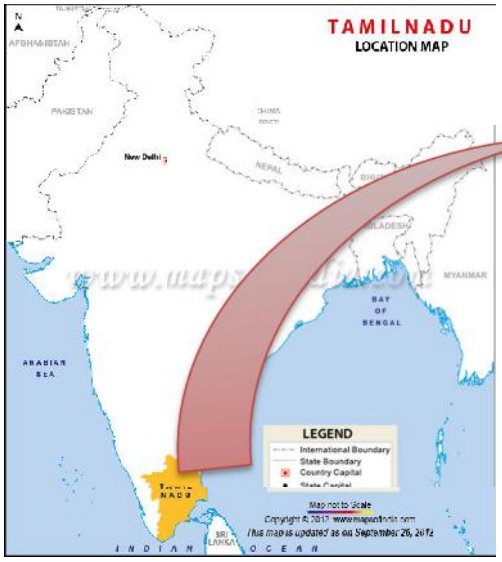

Fig 2: Tamil Nadu location Map

Figure 2 shows the location of Tamil Nadu in India

Fig 3: Tiruchirappalli location

Figure 3 shows the location of Tiruchirappalli in Tamil Nadu

5.1 SRIRANGAM CITY

The Srirangam town is located at the geographical coordinates of 10° 52' 0" N, 78° 41' 0" E in between rivers Cauvery and Kollidam. The average climate of Srirangam is Humid and the temperature range in summer is maximum of 36.9 degree centigrade and minimum of 26.3 degree centigrade. In winter maximum of 30.3 degree centigrade and minimum of 20.6 degree centigrade.

The study was carried on the 24th of April 2013 and the weather was with the following attributes: Average temperature 37 degree centigrade, Wind :4.83 km/h, N 0°,Humidity :44 %,Visibility :6 km, Pressure :982.05 mb.(Weather station , Tiruchirappalli).

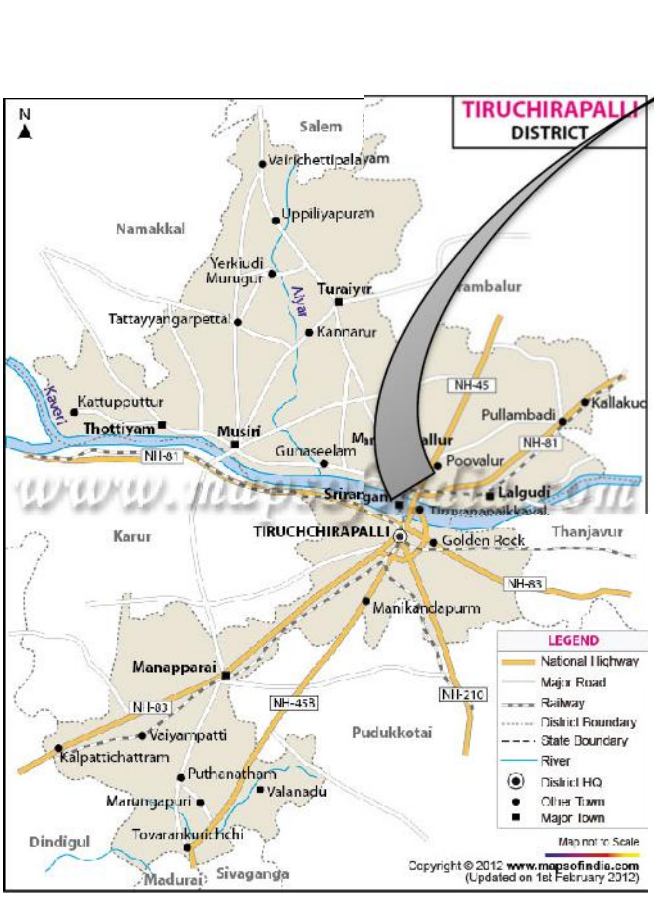

Fig 4: Srirangam district Map

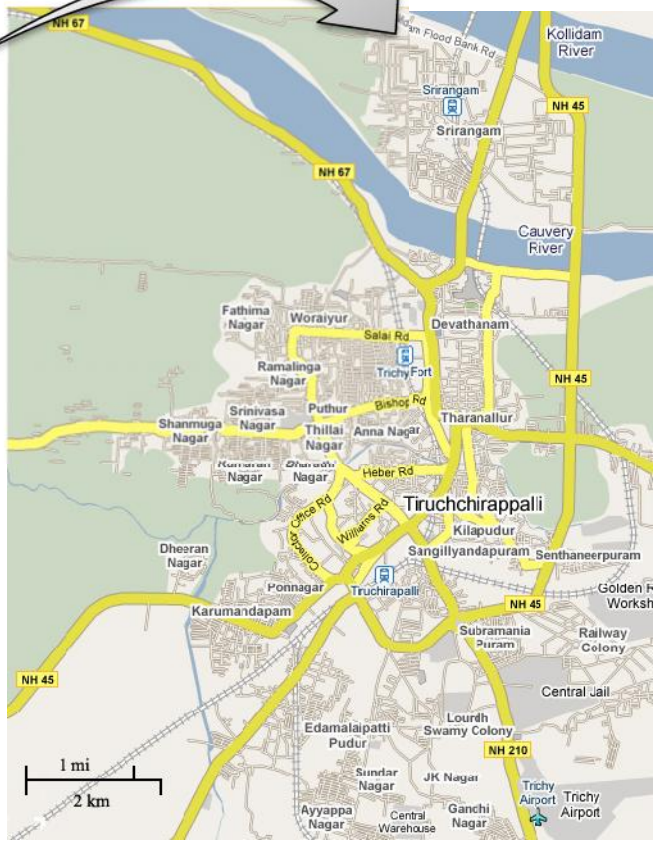

Fig 5: Srirangam location Map

Fig 4 shows the district map of Tiruchirappalli

Fig 5 shows the location of Srirangam

5.2 SRIRANGAM CITY PLANNING

The town has originated and developed only on account of the great Sri Ranganathar Swami temple that covers an enormous area on the island and is the foremost center of all the religious activities in the town. This temple town has a concentric street layout where the streets are located around the temple complex. There are overall seven streets around the temple, of which four are inside the temple (the temple praharams/processional pathways) complex and three of them are located outside the temple they are , Uthara Street, Chitra Street and Adayavalanjaan Street. The streets are predominantly occupied by people who have their employment in the temple. All these seven streets are visually enclosed by the huge wall of the traditional town.

Due to the increase in population and to accommodate more people the temple town grew organically on the southern direction due to its connectivity to the Tiruchirappalli City. The northern part of Srirangam is still undeveloped because of

poor infrastructure services like roads and other basic facilities.

For the purpose of this study the two distinctly varying street typologies are chosen.

(1) TYPE A streets: Streets inside the temple wall.

(2) Type B streets: Streets that were developed outside the temple wall.

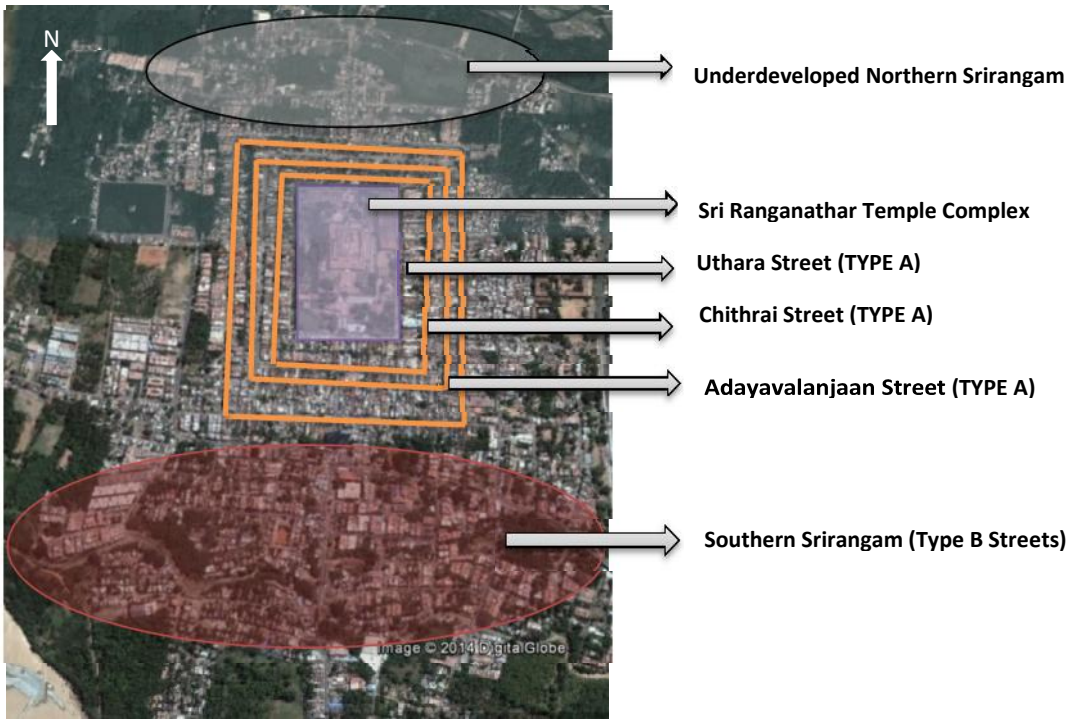

Fig 6: TYPE A and Type B Street locations – Srirangam

Figure 6 shows the location of the Temple, Temple streets (TYPE A), Type B streets Southern and Northern Srirangam.

5.2.1 TYPE A STREETS - Traditional Town character:

The streets that belong to **TYPE A** are the Uthara Street, Chitra Street and Adayavalanjaan Street. They are located outside the temple but within the traditional town wall. These threes streets have the following characteristics:

- The streets are low density residential.
- The widths of the streets are more (12m to 15m) basically to accommodate the movement of the temple car and the huge population who gather to view the festivals.
- The buildings are low rise even after some alterations.
- The streets have the common Aspect Ratio (Height of the building/Width of the street) – 0.3, 0.5.
- Though the streets of the traditional town are wide enough to have greenery, only few of the spots have vegetation and the rest lack.

Fig 7: The temple car festival along the traditional

Figure 7 shows the wide traditional streets to accommodate the crowd during temple car festival

5.2.2 TYPE B STREETS – New development outside the Traditional Town.

The streets that belong to **TYPE A** are the Uthara Street, Chitra Street and Adayavalanjaan Street. They are located outside the temple but within the traditional town wall. These threes streets have the following characteristics:

- The streets are high density residential and low density commercial and mixed use.
- The width of the streets are less (3m to 7m) and the streets are enclosed by tall buildings.
- The buildings are high rise.
- The streets have the following Aspect Ratio (Height of the building/Width of the street) – 1.3,2, 3, 4, 5.For the purpose of study I have considered the maximum and minimum value i.e 1.3 and 5.
- Since the width of the streets in new developed are of Srirangam are less, seldom greenery is observed.

Fig 8: Type B street with more Aspect Ratio.

Figure 8 shows the narrow streets on the southern part of Srirangam City

6.0 STREET CANYON TYPOLOGIES

To calculate the PET (Physiological Equivalent Temperature) and compare the traditional streets with that of the streets in new developed area following canyon typologies are derived based on the common aspect ratios. The canyons are also analyzed on the two different orientations (N-S and E-W).

The varying permutations and combinations of the canyons were studied for five different time period on the 20th of April 2013.

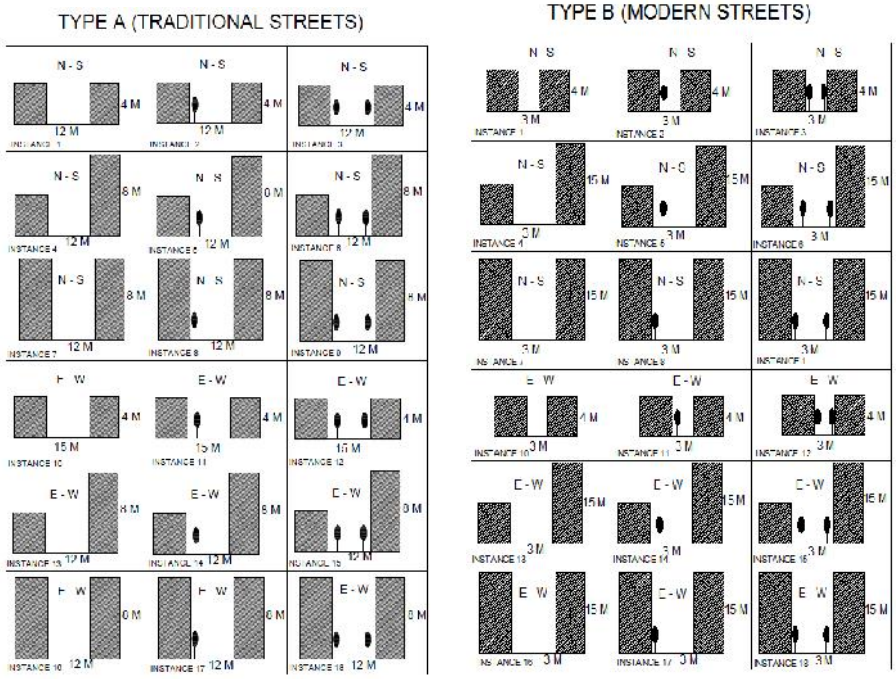

Fig 9: the 18 different canyons of the TYPE A Street and TYPE B

Figure 9 shows the 18 different canyon profiles for TYPE A (traditional streets) and Type B (Modern streets of Srirangam)

7.0 DATA FOR ANALYSIS

PET (Physiological Equivalent Temperature) can be calculated simply by the software RAYMAN, which is made freely available by its author. It avoids all the complications of the two node model and takes simple inputs in the form of data files, topography, sky view factor etc. [26].

The RAYMAN software requires the climatic Data (Air temperature, Humidity, Vapor Pressure, Wind Velocity, Cloud Cover, Surface Temperature, Sky View Factor), Personal Data (Height, Weight, Age, Sex, Clothing value, activity, and position)

The PET value for all 18 instances in both TYPE A streets and TYPE B streets are calculated. The study was based on ten samples chosen with different personal data for all the instances in TYPE A and TYPE B.

8.0 RESULTS AND DISCUSSIONS

8.1 INFERENCES – STREET GEOMETRY ELEMENTS

When the PET values within TYPE A and Type B were analyzed to find out the important geometric feature that influence the microclimate of pedestrians in street level, following observations were made:

1. Influence of vegetation contribute to a difference in microclimate: Values of PET were plotted against the five different period for the instances with similar orientation and Aspect Ratio with difference in landscape for both TYPE A street instances and Type B street Instances and it was observed that the presence of landscape contributes to microclimatic difference.

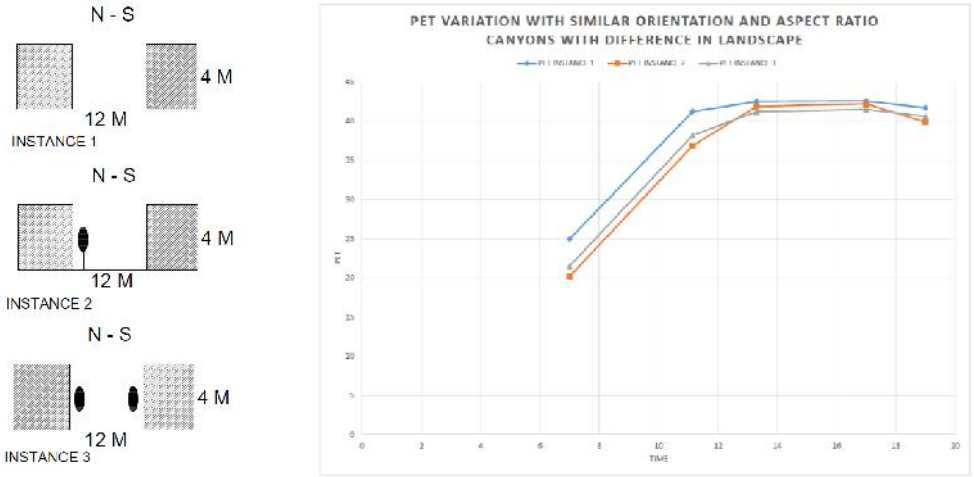

*Fig 10: PET variation with alteration in landscape – **TYPE A street***

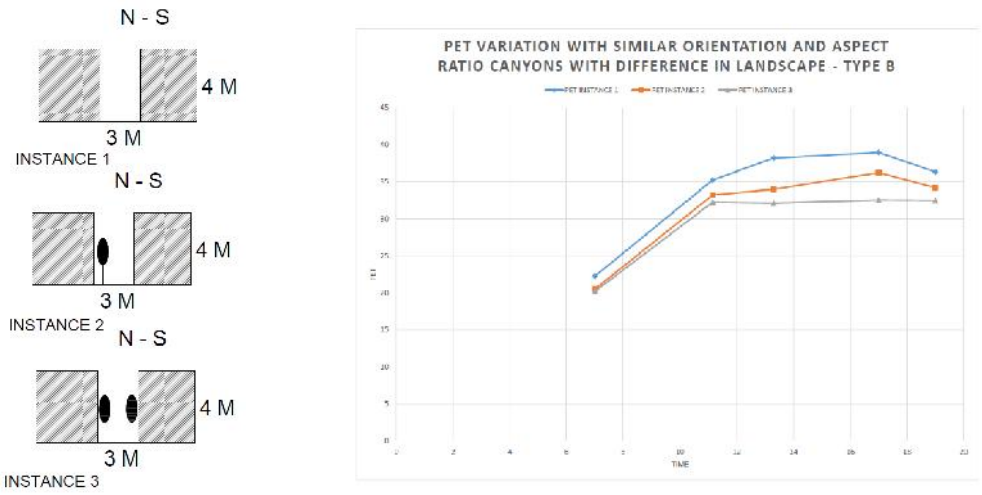

Fig 11: PET variation with alteration in landscape – ***Type B street instances****.*

Figure 10 and Figure 11 show the impact of landscape on the urban microclimate of street canyons irrespective of Orientation and Aspect Ratio.

2. The influence of orientation on the urban microclimate of streets was evident in both TYPE A (Traditional Street) as well as Type B (Modern Streets).This inference was made possible after plotting the values of PET against the five different time period on the instances with similar aspect ratio and landscape but different orientation. When the results were compared in both TYPE A and Type B it was observed that the negative impact in East – West orientation was more compared to the North – South orientation.

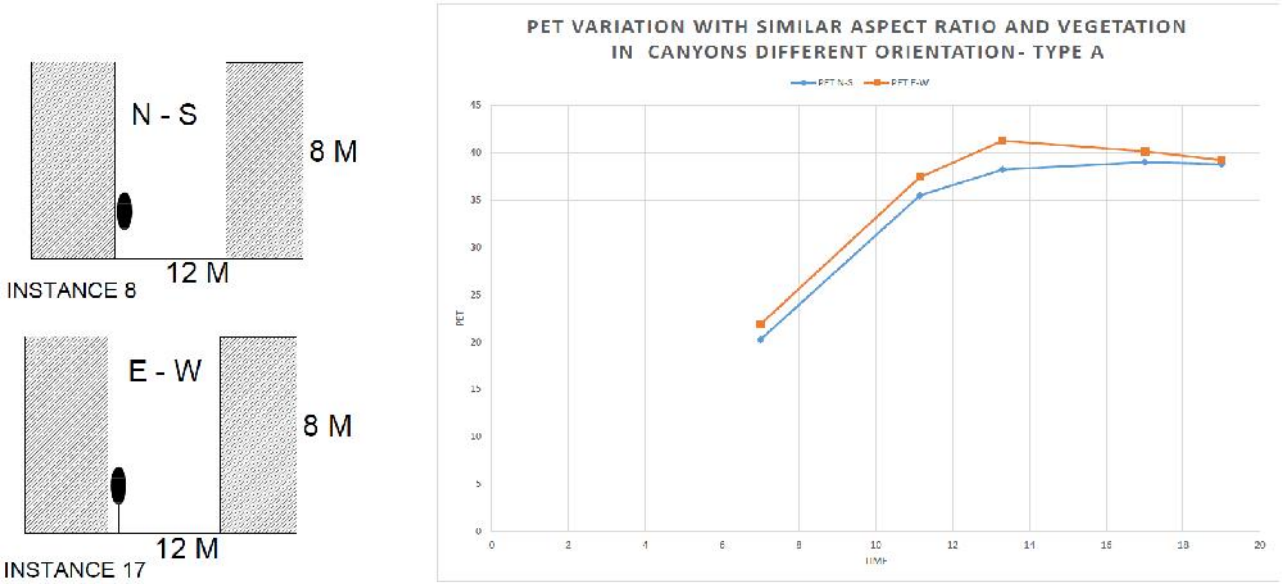

Fig 12: PET variation with alteration in orientation – ***TYPE A street***

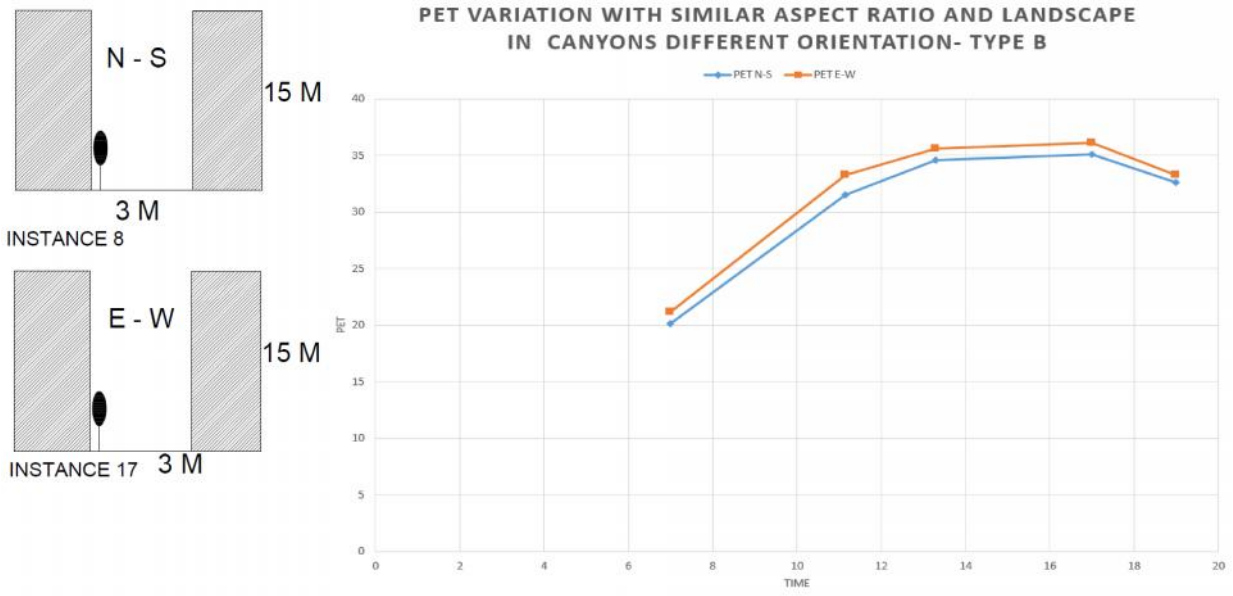

*Fig 13: PET variation with alteration in orientation – **Type B street***

Figure 12 and Figure 13 show the impact of orientation on the urban microclimate of street canyons irrespective of Orientation and Aspect Ratio.

3. The role of Aspect ratio is very critical in any urban canyon .The canyon with different aspect ratio but with same orientation and landscape was analyzed in both TYPE A and Type B. The canyons with more aspect ratio had less range of PET values. Since the Type B (modern Streets) of Srirangam are narrow with high density buildings, the PET value were comparatively less than the TYPE A (traditional streets) that had wide streets and less Aspect Ratio.

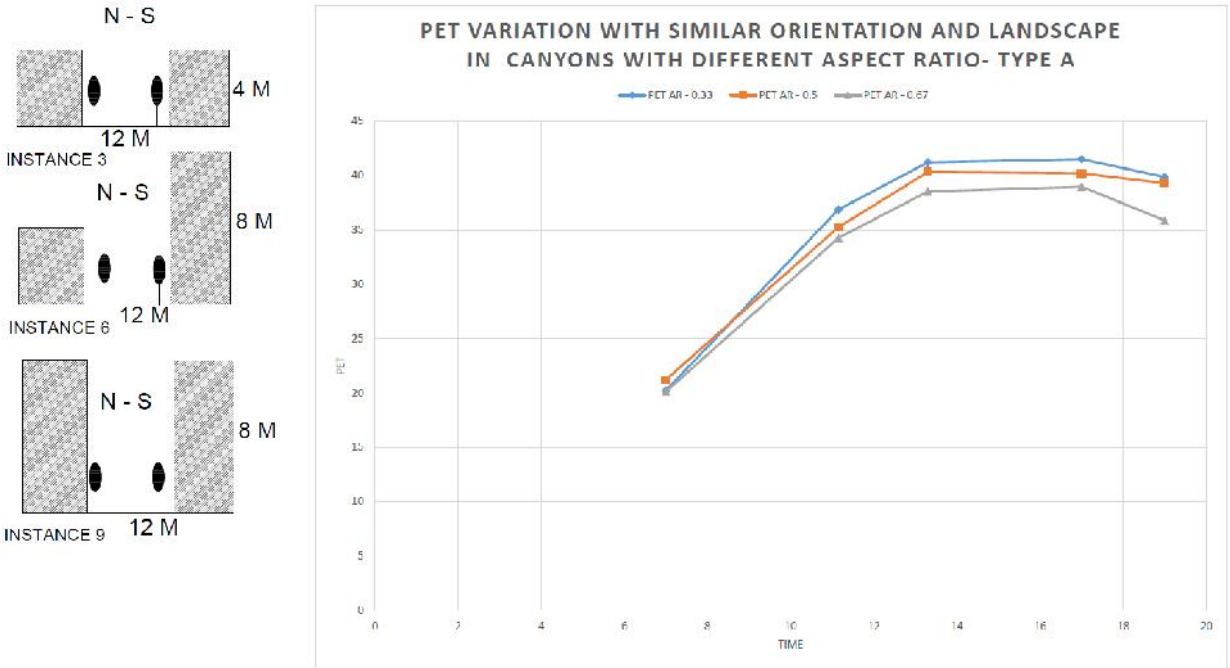

*Fig 14: PET variation with alteration in Aspect Ratio – **TYPE A street***

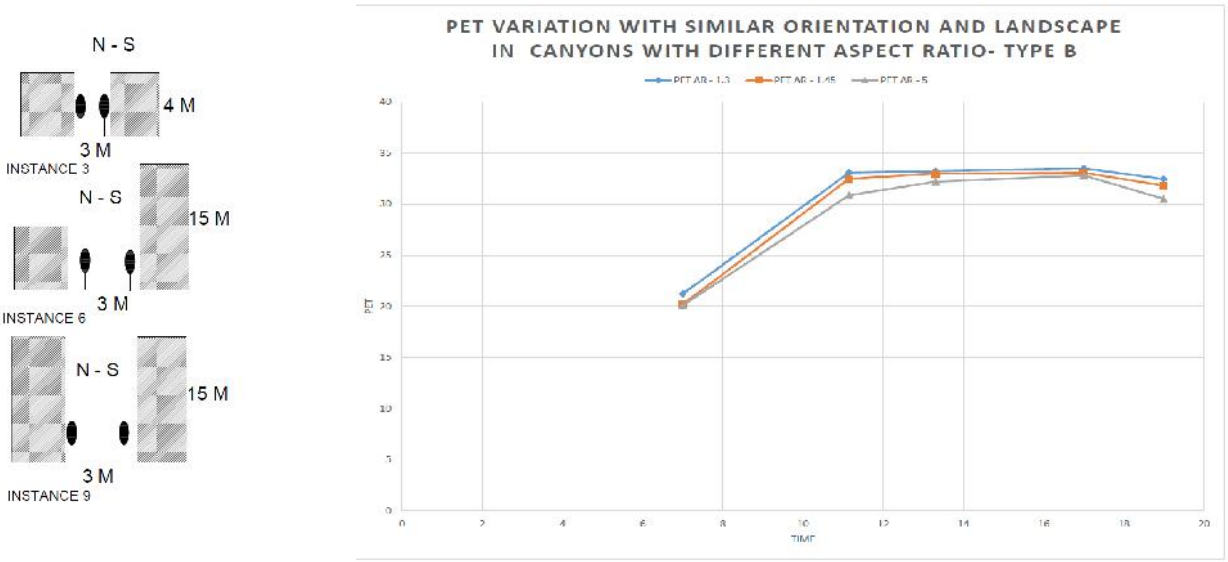

*Fig 15: PET variation with alteration in Aspect Ratio – **Type B street***

Figure 14 and Figure 15 show the impact of Aspect Ratio on the urban microclimate of street canyons irrespective of Orientation and Landscape.

8.2 Inference and Observations – Factor of Comparison

It was observed from the inferences and results of street geometrical elements **8.1** (Orientation, Aspect Ratio, and Landscape) that between TYPE A and Type B streets, **ASPECT RATIO** plays an important role. It is found that the PET (Physiological Equivalent Temperature) range for TYPE A (Traditional Streets) found to be 22.1 °C – 42.7 °C and the PET (Physiological Equivalent Temperature) for Type B (Modern Streets) found to be 21°C - 37°C.

The difference in the minimum range of PET between TYPE A and Type B is 1.2°C and the difference in the maximum range is 5.7°C between the types, which is significant to a pedestrian user in the street canyon. The most important factor which contributes to this change is the **ASPECT RATIO**.

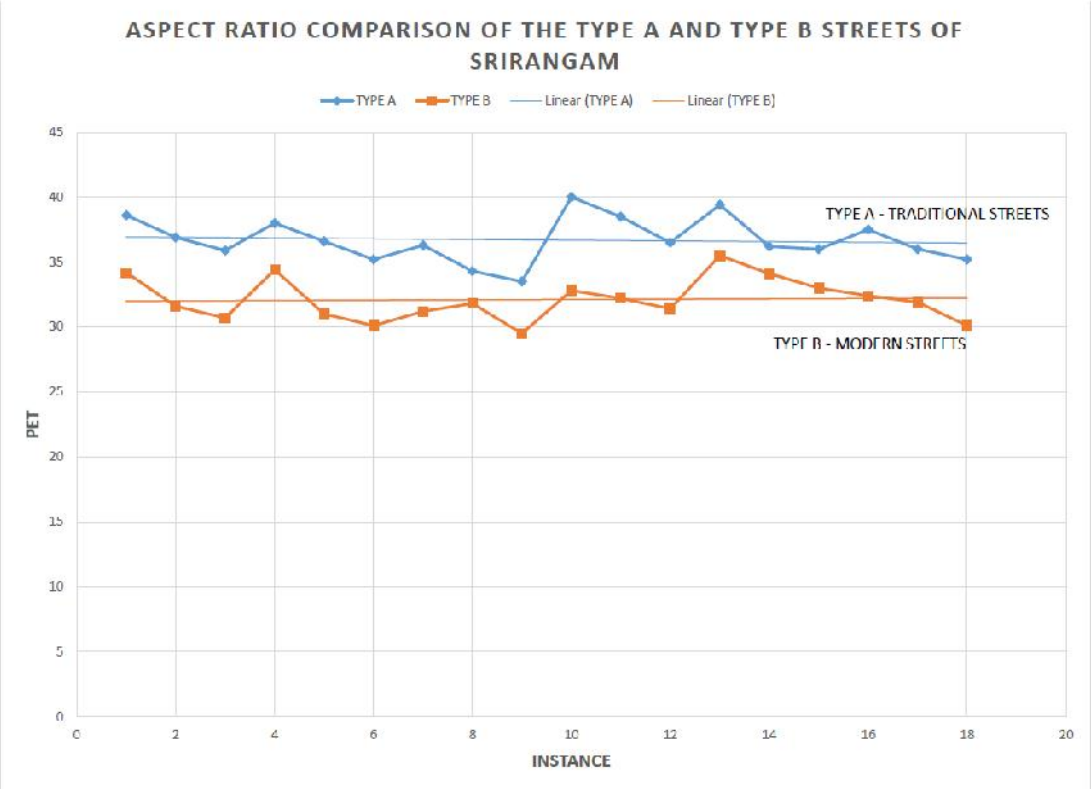

Fig 16: PET value comparison between TYPE A & TYPE B streets.

Figure 16 show comparative PET value between TYPE A street instances with TYPE B street instances.

From the observation of the graph it is evident that the factor that contributes to the significant difference between instances of TYPE A canyons and Type B canyons is the **ASPECT RATIO**. In TYPE A the Aspect Ratios (0.33, 0.45, 0.5) are less compared to the range of Type B (1.33, 1.15, 5.0). The huge value of Aspect ratio in Type B streets enable the mutual shading of building surfaces. This enables the building surface to radiate less heat, hence the PET value is also less compared to streets with less or no shading.

9.0 RECOMMENDATION

The suggested recommendation for the TYPE A streets in order to have better outdoor thermal comfort condition of its pedestrian users is that the possibility of enhancing shading. The shading can be either through landscape as well through projections from the building surfaces (balconies, galleries, simple slab projection).

10.0 CONCLUSION

- The PET (Physiological Equivalent Temperature) value that is calculated with the help of RAYMAN software enables in identifying the factors that contribute to the urban microclimate modification in specific to the pedestrian users. When the PET (Physiological Equivalent Temperature) values for different Orientation, Landscape and Aspect Ratio within the typologies (TYPE A and Type B streets) following aspects were observed:

1. The PET (Physiological Equivalent Temperature) values of N-S orientation was less compared to the E-W orientation.
2. The streets with landscape on both sides had less PET (Physiological Equivalent Temperature) value compared to the canyons with one sided landscape followed by canyons with no landscape.
3. The canyons with more aspect ratio had less PET (Physiological Equivalent Temperature) value.

- When the street canyons between the streets of TYPE A and TYPE B were compared it was observed that the TYPE B canyons (Modern Streets) had less PET (Physiological Equivalent Temperature) value than the TYPE A Streets (Traditional Streets). The factor that enables the change is the **ASPECT RATIO.**

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All about Problems and Challenges in Social Marketing

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ABSTRACT: In this study I have used a review centric research method for studying the various factors impacting on Social Marketing the Problems and challenges faced by social marketing. Post identifying the factors I have done a case study of major Effecting Social Marketing in today's market world and for the factors impacting the Social marketing developing a conceptual model for the probable impacting factors and then later studying the same for confirming the same factors. In the conceptual model it was identified that Social Market Identity is a major factor contributing to build a Market image. The objective of the review centric research study is to find out the major facts.

KEYWORDS: Social Marketing, Market Segmentation, Market Analysis, Product, Brand, Customers.

1 INTRODUCTION

In marketing literature Social Marketing has been identified as a name, term or object that identifies a seller, [1]. However the process of building a Social medium for marketing is a culture driven phenomenon and is long commitment and very similar to a lifestyle change , which takes time to nourish and flourish. There are several intangible factors which play greater roles in the bigger picture of creating brand and its image. Factors like Market segmentation, market analysis, product, promotion, price, sensitivity, a greater share of customer's service promotion, money, social, network, and a higher percentage of repeat business. [2]Customers value more than relationship they tend to form with the company and its people it could be in many forms like marketing or sales[3]. There have been lots and lots spoken about Social Marketing, but the term Social Market has made a specific meaning and could be clearly understood because of the Author or the guru Kotler and Zaltman who introduced the concept a decade ago. The literature given by the author has the extended definition about the term Social Marketing and how different science theories can be applied.[1] In this paper I have done little research from different journal papers written by different authors.

2 SOCIAL MARKETING MEANING AND DEFINITION

Much has been written about **social marketing** since Kotler and Zaltman (1971) introduced the concept a decade ago. The literature has contained extended discussions about the definition of social marketing, the ethics of social marketing, the appropriateness of broadening the marketing discipline to include social marketing, and the potential of applying various social science theories in social marketing contexts. However, there have been few attempts (Rothschild 1979) [1]to move beyond the reporting of case studies toward the development of general knowledge about social marketing, including knowledge about the problems most organizations tend to find in applying conventional marketing approaches in social programs the term social marketing is used throughout this article to mean "the design, implementation, and control of programs seeking to increase the acceptability of a social idea or practice in a target group(s)" (Kotler 1975, p. 283).[4] . An awareness of these problems should allow social agency administrators or their marketing advisors to formulate more

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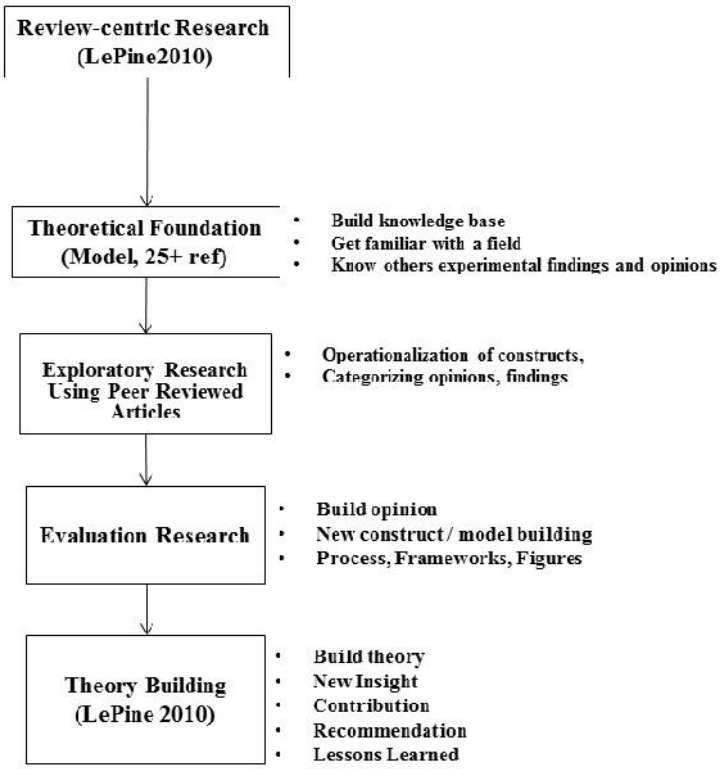
workable and effective social marketing programs. While the authors believe strongly in the contribution marketing can make to social programs[5].



2.1 RESEARCH METHOD

Research methods in social marketing This chapter discusses the current and potential role of qualitative research methods in social marketing. The major methodological approaches and the specific data collection and analysis methods that can be used to achieve social marketing objectives are outlined and examples are provided of diverse research projects that have used these methods to improve social welfare. Of note is that many of these studies are not explicitly described in the literature as social marketing projects broadly put, social marketing represents the strategic use of economic and social forces in order to change behaviors that lead to social problems (Kotler, Roberto, & Lee, 2002).

Social marketing is like commercial marketing in several ways. Both have a customer focus; i.e., the target of change is a market sector that is defined in terms of social exchange between the group in control of marketing and the group whose behavior is the focus of change. These sectors are segmented; the effectiveness of marketing depends on defining relevant sectors and then crafting a marketing format that reflects the sectors needs and interests. Customers of both efforts must perceive the benefits of partaking in the product or behavior exceeds the costs of engaging in a different behavior. In this study I identify the most important success factors that help in the current business or organizational situation to build our goal to accomplish a competitive advantage. My research approach incorporates the “interpretive paradigm” in which a rich description of each factor in our current organization context is established. 615

2.2 SOCIAL MARKETING ITS GOAL AND AWARENESS

Many believe that **social marketing** can have a major impact on society's myriad social problems. However, this impact can be seriously compromised if the technology is applied incorrectly or to areas in which it is not appropriate. [6]If practitioners misuse the concept, its effectiveness may be limited. If researchers and scholars assess its performance in areas for which it should not be responsible, social marketing may be blamed for failures for which it should not be held accountable.[2] It is time, therefore, to introduce precision into the dialogue by establishing a clear consensus on what social marketing is and is not and what its "legitimate" domains are and are not. These definitions and distinctions have important implications for present and future practical applications, academic discussions, and field research.[1] The central premise of

the article is that social marketing stands a significance chance of failure if existing issues of definition and domain are not adequately resolved

3 FACTOR IMPACTING PROBLEMS AND CHALLENGES IN SOCIAL MARKETING

In the above goal section where Social Marketing is my dependent variable and basically discussing the problems and challenges in social marketing and what each of the five authors have to say on the following goal As we know Social Marketing is a wide sea and there are many factors which have a positive and a negative effect and these authors above are trying to give a clear view point [2] As I agree with authors views and perspective and we know that Philph Kotler is the guru and he introduced the concept of social marketing with a very clear description saying social marketing can have a major impact in our society. When Kotler and Zaltam say that social marketing has a major impact in the society I completely agree with his saying because now days everything depends on social marketing I can even say the world runs on social marketing and here Kotler gives a clear evaluation and meaning of Social Marketing as the Design implementation and control of program In the second evaluation I would like to give my opinion and understandings about what [6]Andreasen when he says that the concept of social marketing should be used appropriately in the society and not miss use it or else its effectiveness will decrease and it may lead to bad impact in the society .To build a market its not only enough to know the market but we should know the wants need and the demands of the customers

This article discusses the meaning, power, and limitations of **social marketing** as an approach to planned social change. First, this will require delineating the generic nature of marketing phenomena and some recent conceptual developments in the marketing field. This will be followed by a definition of (Fox & Kotler, 1980) social marketing and an examination of the conditions under which it may be carried out effectively. The instruments of social marketing are defined, followed by a systems view of the application of marketing logic to social objectives. Marketing management is the analysis, planning, implementation, and control of programs designed to bring about desired .exchanges with target audiences for the purpose of personal or mutual gain. It relies heavily on the adaptation and coordination of product, price, promotion, and place for achieving effective response.[7]

Social marketing faces distinctive ethical challenges, which are not faced by commercial marketing, with regard to the ends it seeks, the rationale it offers for achieving those ends, and the effects it may have on its targets. The more social marketing attempts to address these ethical challenges, the more its nature as a form of social activism becomes apparent. Nevertheless, these are special ethical challenges social marketing needs to confront temporary society faces a vast number of social problems, which are both extremely complex and divers Social marketing has clear relations to commercial marketing. Still, social marketing is distinct from commercial marketing in that social marketing focuses on resolving social problems, whereas commercial marketing focuses on producing various goods or services for a profit. The "customer" of social marketing is not expected "to pay a price equal to the cost of providing the service," whereas the customer of commercial marketing is expected to do so[4]

3.1 FIGURE: THE MODEL FOR SOCIAL MARKETING WITH ITS GOAL AND ITS FACTORS

Based on the literature review and review centric research, I have tried to come up with a conceptual model for brand building in competitive markets, below mentioned are the five key factors of the model.

3.2 MARKER ANALYSIS INDEPENDENT VARIABLE

Market analysis depends on available data .Inter market linkages are commonly modeled as spatial equilibrium in which transaction costs and demand and supply in district markets jointly determine prices and trade flows Only prices, trade flows, and transaction costs and imperfectly observable .The available of these data establishes a hierarchy of methods. Study of the methodology of market analysis is a necessary part of the development of a science of marketing.

A case study in market analysis is presented to illustrate the actual problem-solving process, rather than just the rationalized reconstruction of the process often reported [8]. Market analysis reveals when demand is defined as the demand for jobs, on the part of people who want to get a job, and supply refers to the supply of jobs by employers who want to get a job done."' I will reserve until later the justification for this reversal, in which the accepted upward sloping labor supply curve gives way to the familiar downward sloping demand curve- that of people for jobs[3]. There seem to be several good reasons why social **market analysis** should be handled in special courses separate from marketing organization.

Furthermore, the general subject of marketing lends itself to being divided on this basis. The market price analysis is concerned with the actual prices prevailing in the market, and the manner of their determination and the reasons for their fluctuations. The marketing organization analysis is concerned with the structure of the market, the internal organization of the numerous types of business units operating in the various markets, and the interrelations of these various business units, and division of functions between them[9]

3.3 MARKET SEGMENTATION INDEPENDENT VARIABLE

The process of dividing up the market into homogeneous segments and then developing unique marketing programs for individual target segments (while perhaps ignoring certain segments) is fundamental to modern marketing. Market segmentation is generally viewed as being more productive than treating the entire market in an undifferentiated manner. Although market segmentation is widely utilized and accepted by most profit making and many nonprofit (e.g., universities, hospitals) marketers, social marketers find that predisposed to their offerings. Social marketers often segment on the basis of risk to the consumer.[10].

This article deals with the overall relationship between product liability and market segmentation. The legal concepts of foresee ability and notice are related to market segmentation in the context of disadvantaged consumer segments. In addition, the role of marketing research in supporting or defending a liability allegation is discussed. This article focuses on

the legal considerations relevant to the fundamental marketing strategy of segmentation, primarily from the standpoint of disadvantaged segments.[11]

The theme of the article is that, beyond attracting consumers from potentially profitable segments, companies should take steps to minimize their product liability vulnerability in these and other segments. The discussion is based on facts taken from an actual product liability case (using disguised names, places, and products); in addition, other corroborative cases and substantive law examples are presented[12].

3.4 PRODUCT STRATEGY INDEPENDENT VARIABLE

Once the marketer has analyzed the market and determined target segments, he or she should then develop an offering that conforms closely to the desires of the target segments. Conventional marketers will typically adjust product characteristics, packaging, the product name, the product concept, and the product position to increase the likelihood of a sale to the target segments. [13]However, social marketers find: Social marketers find that the development of a pricing strategy primarily involves trying to reduce the monetary, psychic, energy, and time costs incurred by consumers when engaging in a desired social behavior. Social marketers generally have much more complex objective functions than commercial marketers.[1].

The notion of **product strategy**-structure congruence within multi-product firms, however, is a complex one since diversity in product strategies implies a requirement for diversity in formal structure. Some writers have suggested that strong countervailing forces or constraints may exist which mitigate against achieving a theoretically satisfying fit between strategy and structure at lower organization levels (Bettis, 1979; Haspeslagh, 1982; Lorsch and Allen, 1973).Nevertheless, given the generally recognized importance and contribution of formal structure to the achievement of strategy, the suggestion of constraints raises some particularly important questions[14].

What is product?

In marketing term a product is anything that can a be offered to a market to satisfy a want or need .In other words a product is the item or service that you are offering your customers. A product can be physical object or a service and may refer to a single item or unit a group or equivalent or a group of goods or services [15]

3.5 PROMOTION INDEPENDENT VARIABLE

In many industries, promotions represent a significant percentage of the marketing mix budget. Nondurable goods manufacturers now spend more money on promotions than on advertising[16]. This study addresses a problem commonly encountered by marketers who attempt to assess the impact of their sales **promotion** response models in the literature either have ignored competitive promotions, focusing instead on the focal firm's promotions and sales response, or have considered the ideal situation in which the analyst has access to full information about each firm's sales and promotion activity.[8] The authors propose a random coefficients hidden Markov promotion response model, which takes the competitor's unobserved promotion level as a latent variable driven by a Markov process to be estimated simultaneously with the promotion response model[17] This article studies the nature, determinants, and impact of "negative" activities in organizations. In competing for **promotion**, the members in organizations can work not only to enhance their own performances, but also to "sabotage" their opponent's performances. It is worthwhile for them to engage in negative activities because promotion is generally based on relative, rather than absolute, performance, and its nature is winner take all.[18].

3.6 BRANDING INDEPENDENT VARIABLE

Branding Social Marketing -Approaches to solving any problem, whether commercial or social, gain favor when they are widely perceived as superior to alternatives. [19]This applies to innovations in software, cooking, health care, and golf. [16]The fundamental problem for social marketing, noted previously, is that it is neither widely known nor perceived to be plainly superior to its competition in a clearly defined set of situations. I believe that the solution is found in the marketing discipline itself. I propose that social marketing should be considered a brand in the marketplace of social change approaches-and one that needs better marketing[17]

4 CONTRIBUTIONS AND NEW INSIGHTS

I feel that Social Marketing is big era and it can be further enhanced by the by strong research and solving the factors effecting it and introducing latest approach and techniques prepared to handle the obstacles encountered during the process. A smoother strategic process process will enable not only better commercial success in the Market but also make the next upcoming social marketing strategy and research on the horizon that much better A social marketing program has as its core the wants and needs of its consumers. These are determined through market research methods that aim to learn as much about the target audience and how it thinks, feels and behaves in relation to the issue the program is addressing. These methods include quantitative research, such as a knowledge, attitude and behavior (KAB) survey, which reveals how many people think or do something. Qualitative research, on the other hand, provides insight into why people think or do what they do, through techniques such as focus groups and individual interviews.

There are many things that social marketing can do for business. Developing a strategy for using it means that the firms need to think about what they want to accomplish this year and determine how social media fits into the plan. One of the benefits of a social marketing strategy is the fact that the available tools can customized for their particular needs. The firms can choose to concentrate their efforts on the sites that seem to offer the best return on investment, while taking a "wait and see" stand on the other

5 CONCLUSION

Market Analysis Market Segmentation Product Strategy and Promotion, is the factor affecting the Social Marketing which are the problems and challenges in my research paper. We cannot proceed without these independent facts without giving a clear approach on how and why they affect Social Marketing. There is no escaping social media these days, either for individuals or for businesses. Today, it is impossible to separate social media from the online world.

The social marketing conversation is no longer considered an issue it is taking place in homes, small businesses and corporate boardrooms, and extending its reach into the nonprofit, education and health sectors. From feeling excitement, novelty, bewilderment, and overwhelmed, a growing number of people now speak of social media as simply another channel or tactic. Blogging can have a very positive effect on your Company's branding & growth. As per the Hub spot report, Customers with blogs gathered 68% more leads than customers without blogs. It is imperative to understand that today, social media have exponential potential. They are part of an ever-growing online network of people who discuss, comment, participate, share and create.

Whether you are an individual, a startup, small business or a large corporation, an online presence and an ongoing conversation with your constituents is a baseline requirement and will take time and expertise. Companies are diverting resources and rethinking their traditional outreach strategies. And as the social media wave dissipates into the vast ocean of connected experiences, the term itself will become an entry in dictionaries and encyclopedias and we will embark on a new era of knowledge, accessibility and experiences unbound by distance, time or physical walls. It is high time that every business adopts social marketing and make use of it in an appropriate way and try to make positive use of it and takes it seriously then I am sure we can deal with any problem and challenges we face in Social Marketing

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Major Traits/Qualities of Leadership

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ABSTRACT: We live in a world with a population of more than 7.1 Billion, have we ever imagine how many Leaders do we have? Yes, most of us are followers; we live in a world where we follow what have been commanded. The intension of this paper is to equip everyone with some knowledge to know how we can identify who leaders are, are you one of them, and how can we help our-selves and other develop leadership qualities. The Model highlights various traits which are very necessary for leadership.

This paper have been investigate and put together after probing almost 30 other research papers. The Principal result we arrived on was that the major/ essential traits which are identified in a Leader are Honesty, Integrity, Drive (Achievement, Motivation, Ambition, Energy, Tenacity and Initiative), Self Confidence, Vision and Cognitive Ability. The Key finding also says that the people with such qualities are not necessary to be in politics, but they are from various walks of life such as major organization, different culture, background, education and ethnicities. Also we found out that just possessing of such traits alone does not guarantee one leadership success as evidence shows that effective leaders are different in nature from most of the other people in certain key respects. So, let us go through the paper to enhance out our mental abilities to search for the Leaders out there.

KEYWORDS: Leadership, Honesty, Integrity, Drive, Motivation, Initiative, Self Confidence, Vision, Cognitive Ability.

1 INTRODUCTION

The study of leader traits has a long and controversial history. While research shows that the possession of certain traits alone does not guarantee leadership success, there is evidence that effective leaders are different from other people in certain key respects. Key leader traits include: drive (a broad term which includes achievement, motivation, ambition, energy, tenacity, and initiative); leadership motivation (the desire to lead but not to seek power as an end in itself); honesty and integrity; self-confidence (which is associated with emotional stability); cognitive ability; and knowledge of the business. There is less clear evidence for traits such as charisma, creativity and flexibility. We believe that the key leader traits help the leader acquire necessary skills; formulate an organizational vision and an effective plan for pursuing it; and take the necessary steps to implement the vision in reality[1].

Prominent trends in leadership research are reviewed. Theoretical perspectives are organized in a four-fold typology based on the dominating assumptions of the research effort: (1) the focus on a universally appropriate set of leadership traits, (2) the focus on a universally appropriate behavioral style, (3) the focus on situationally contingent leadership traits, and (4) the focus on situationally contingent behavioral styles. Potential organizational prescriptions following from each perspective are identified (e.g., selection, placement, and training). It is argued that existing research has mapped only a portion of the domain of leadership phenomena due to a concentration on relatively few leadership constructs and because of the popularity of a limited set of empirical methodologies. Recent developments, promising new directions, and novel methods in leadership research are described[2].

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Unlike "harder" sciences (e.g., physics, chemistry, biology) where well accepted "laws" may govern phenomena, the soft science of behavior in organizations remains an imprecise, inexact exploration into the causes and consequences of complex human interactions. [2] Even though researchers now agree no single set of traits or style alone always provides effective leadership, that does not mean traits and styles are irrelevant [3].

The primary data used in this research are cases of successful and unsuccessful firms, given by the CEOs or the executives of leading Korean firms who participated in the Advanced Management Program at the College of Business Administration, Seoul National University, and the CEO course of the Federation of Korean Industries from 1986 to 1995. [4] The trait-based perspective of leadership has a long but checkered history. Trait approaches dominated the initial decades of scientific leadership research. [5] The findings indicate that the perceived importance of specific leadership traits is determined partly by culturally endorsed interpersonal norms and partly by the requirements of the leadership role. [6] Our literature review focuses on the emerging construct of ethical leadership and compares this construct with related concepts that share a common concern for a moral dimension of leadership (e.g., spiritual, authentic, and transformational leadership). [7] In previous literature on employee selection, leadership, and organizational trust, scholars have identified integrity as a central aspect of work behavior. However, despite important contributions, their work often has confused integrity with other concepts (especially honesty and conscientiousness) and has treated integrity as either a morally neutral or relativistic phenomenon. [8] The ethical nature of transformational leadership has been hotly debated. This debate is demonstrated in the range of descriptors that have been used to label transformational leaders including narcissistic, manipulative, and self-centered, but also ethical, just and effective. [9] The trait-based perspective of leadership has a long but checkered history. Trait approaches dominated the initial decades of scientific leadership research. Later, they were disdained for their inability to offer clear distinctions between leaders and non leaders and for their failure to account for situational variance in leadership behavior. [5] More recently, the trait, or individual difference, approach to leadership has regained some prominence. Some of the problems and shortcomings that plagued its earlier ascendant period, however, still exist to limit the potential reach of such models. [10]

Figure 1.1: Major Traits/Qualities of Leadership

2 RESEARCH METHOD

Recently combining research methods e.g. [11] p. 112 became increasingly important in particular when pursuing the goal of gaining "**rich theoretical insights**[12] p. 613." One form for "developing new theoretical insights" [13] p. 506 is the review centric research approach in which a researcher reviews "existing theory and research" [13] p. 506, but the argument can be made that we also can include case study research findings that are based on the real world observation of practitioners and organizations e.g. [14], [12]. In the research presented here the focus is on combining the most important "**previously established studies and concepts"** that I have identified in the academic literature based on which I **provide a synthesis** that "**advances our understanding"** [13] p. 507". In this study I identify the most important success factors that help in the current business or organizational situation to build our goal to accomplish a competitive advantage. My research approach incorporates the "interpretive paradigm" in which a rich description of each factor in our current organization context is established [12] p. 615.

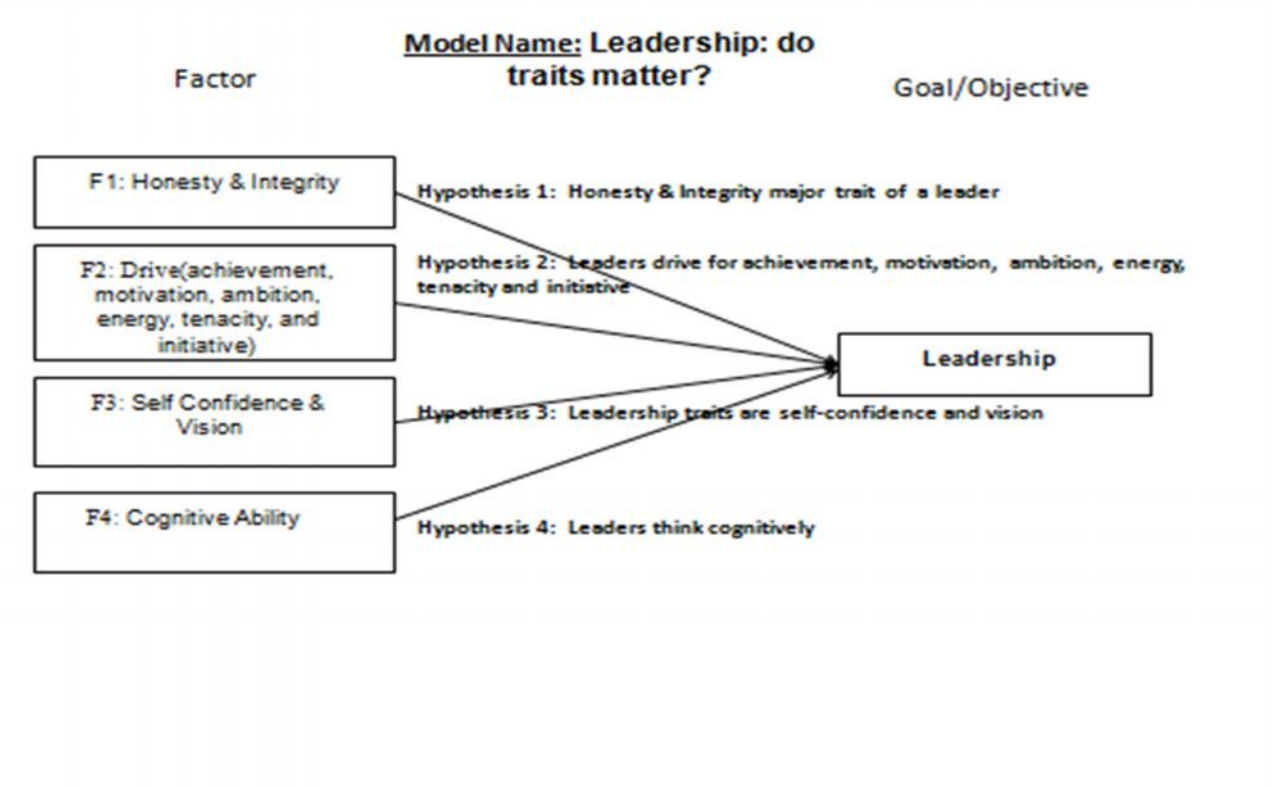

Figure 2.1: The Leadership and its relation to four independent variables

3 GOAL : LEADERSHIP TRAITS:

The study of ***leadership*** traits has a long and controversial history. While research shows that the possession of certain traits alone does not guarantee leadership success, there is evidence that effective leaders are different from other people in certain key respects[1] p. 48.Prominent trends in ***leadership*** research are reviewed. Theoretical perspectives are organized in a four-fold typology based on the dominating assumptions of the research effort: (1) the focus on a universally appropriate set of leadership traits, (2) the focus on a universally appropriate behavioral style, (3) the focus on situationally contingent leadership traits, and (4) the focus on situationally contingent behavioral styles[2] p. 315.

Following a brief historic overview of the people and limitations of research on ***leadership***, this article describes several key findings about which recent theorists and researchers agree: (1) the centrality of values to leadership, (2) the importance of an articulated goal or vision, (3) the necessity for disagreement and conflict in effective leadership, (4) the personal traits and styles of effective leaders, and (5) the critical interplay of these traits and styles with the leadership situation [3] p. 42. By

comparing ***leadership*** traits and styles of CEOs of successful Korean firms with those of unsuccessful Korean firms, this study also suggests ways to develop CEOs for corporate success[4] p. 40.

The trait-based perspective of ***leadership*** has a long but checkered history. Trait approaches dominated the initial decades of scientific leadership research[5] p. 6. Multivariate analysis of variance revealed cultural differences in terms of which traits are regarded as important for effective ***leadership***. For example, the Australians rated traits that attenuate leader–follower power differences (e.g. friendly and respectful) higher than did the Chinese[6] p. 47.

4 FACTOR 1: HONESTY & INTEGRITY:

The purpose of the present research was to address this issue directly by assessing the statistical relationship between perceived ***leader integrity*** and transformational leader ship using the Perceived Leader Integrity Scale (PLIS) and the Multi-Factor Leadership Questionnaire (MLQ)[9] p. 75. In previous literature on employee selection, leadership, and organizational trust, scholars have ***identified integrity*** as a central aspect of work behavior. However, despite important contributions, their work often has confused integrity with other concepts (especially ***honesty*** and conscientiousness) and has treated integrity as either a morally neutral or relativistic phenomenon[8] p. 154.

The findings suggest that ethical leadership is more than traits such as ***integrity*** and more than values-based inspirational leadership. It includes an overlooked transactional component that involves using communication and the reward system to guide ethical behavior [15] p.5. A reputation for ethical leadership rests upon two essential pillars: perceptions of you as both a moral person and a moral manager. The executive as a moral person is characterized in terms of individual traits such as ***honesty and integrity*** [16] p. 128.

Observers have long believed that personal traits such as integrity would be important to perceptions of leadership effectiveness and research has borne that out. For example, survey research has linked perceived leader effectiveness with perceptions of the ***leader's honesty, integrity***, and trustworthiness [7] p. 596. ***Honesty***" was the highest ranked characteristic of both emerging and entrenched groups. The younger group also valued leaders who motivated others, were receptive to people, had a positive outlook, and used good communication skill [17] p. 286.

5 FACTOR 2: DRIVE (ACHIEVEMENT, MOTIVATION, AMBITION, ENERGY, TENACITY, AND INITIATIVE)

Although research shows that certain traits alone do not guarantee leadership success, evidence that effective leaders are different from other people in certain key respects exists. Key leader characteristics are (1) ***drive, which includes achievement motivation, ambition, energy, tenacity, and initiative;*** [18] p. 3. As an introduction to this topic, it must be understood that "to lead in combat, you must be competent and courageous, ***demonstrate initiative***, understand human nature, consistently set the example, and inspire others[19] p. 2.

Paper describes the IT human resource vision that is guiding such a transformation at 3M-a large multi-product, diversified manufacturing firm (1998 sales: $15 billion)-and focuses on the implementation of its ***leadership initiative*** [20] p. 327. As expected, leadership correlates ***with initiative taking***, trait measures of intelligence specific task competencies, and several indicators of generosity. The review finds no link between leadership and dominance[21] p. 354.

The average person who occupies a position of leadership exceeds the average member of his group in the following respects: (i) sociability, (ii) ***initiative***, (iii) persistence, (iv) Knowing how to get things done, (v) self-confidence, (vi) Alertness to, and insight into, situations, (vii) cooperativeness, (viii) popularity, (ix) adaptability, and (x) verbal facility. insert quote here [10] p. 106. The first evidence comes from Stogdill's (1974) review. Stogdill found that surgency (i.e., dominance, assertiveness, energy or activity level, speech fluency, sociability, and social participation), emotional stability (i.e., adjustment, emotional balance, independence, and self-confidence), conscientiousness (i.e., responsibility, achievement, ***initiative, personal integrity***, and ethical conduct), and agreeableness (i.e., friendliness, social nearness, and support) were positively related to rated effectiveness. Stogdill (1974) did not organize his findings as we describe them; nonetheless, his findings support the idea that there is a relationship between personality and leadership[22] p. 13.

6 FACTOR 3 : SELF CONFIDENCE & VISION:

Al-though several have identified specific charismatic attributes such as a transcendent ***vision*** and/or ideology (Blau, 1963; Dow, 1969; Marcus, 1961; Willner, 1984), insert quote here [23] p. 638. He concluded that measures of dominance, extraversion, sociability, ambition or achievement, responsibility, integrity, ***self-confidence***, mood and emotional control, diplomacy, and cooperativeness were positively related to emergent leadership [22] p. 10.

Personality traits are considered especially relevant to successful leadership and those highlighted as the most pertinent include energy levels and stress tolerance, self-***confidence***,
internal control orientation, emotional maturity and integrity[24] p. 2. His history of successes in the real estate field, in combination with an ambitious personality, led ***this visionary leader*** to dream, of ever-greater expansion, but in new and unfamiliar territories [25] p. 50.

Coming back to the first dimension of the charismatic role, we all know that a primary part of the leadership role is to determine where a company needs to go and to build commitment to go in that direction. There can be no leadership ***without vision***. Hopefully, everyone who comes within the leader's sphere of influence will align themselves behind this vision. It represents the leader's core values and beliefs, and enables him or her to define the guiding philosophy of the organization: the mission[26] p. 4. Leadership in business based on a recovery of virtue. The ***vision for leadership*** articulated here draws principally on the writings of the classical philosopher Aristotle and of the contemporary philosopher Josef Pieper [27] p. 359.

7 FACTOR 4: COGNITIVE ABILITY

Results revealed that extroversion, openness to experience and cognitive ability were predictive of emergent leadership behaviors. Conscientiousness and cognitive ability were associated with team Implications and future directions for research are discussed [28] p. 27. Locke (1991) argued that cognitive ability “is an asset to leaders because information” (p. 46). Furthermore, leaders are responsible for such tasks as developing strategies, solving problems, motivating employees, and monitoring the environment [29] p. 543.

For example, Moss (1931) suggested that cognitive ability without social competence could not greatly affect leadership performance. Stogdill’s (1948) review of leader attributes indicated that the influence of leader intelligence was delimited by the level of intelligence exhibited by the average group member [5] p. 7. Psychologists have known for some time that measures of cognitive ability and normal personality, structured interviews, simulations, and assessment centers predict leadership success reasonably well (cf. Bass, 1990; Howard & Bray, 1990; Hughes et al., 1993; Sorcher, 1985; Yukl, 1989) [22] p. 6.

The accumulated research now shows that there are some universal traits leaders possess that are repeatedly associated with effective leadership, including persistence, tolerance for ambiguity, self-confidence, drive, honesty, integrity, internal locus of control, achievement motivation, and cognitive ability (Den Hartog & Koopman, 2001; Kirkpatrick & Locke, 1991; Yukl, 1998)[30] p. 28. Leaders must gather, integrate, and interpret enormous amounts of information. These demands are greater than ever today because of rapid technological change. Thus, it is not surprising that leaders need to be intelligent enough to formulate suitable strategies, solve problems, and make correct decisions [31] p. 49.

8 EXPLANATION AND DISCUSSION:

We have lot of theories describing the important traits of leaders. Society has always expected a lot from leaders. Leadership is not just about leading people to success but leading people in such a manner which is most right and fruitful for the long term. Honesty, Integrity, Drive for achievement, Cognitive ability, and self-confidence are some of the numerous qualities a leader possesses. From across the Globe there is leader who came from different backgrounds, races, ethnicities and culture but all of them had some or the other traits which we have discussed in this paper. It is through identifying these traits we can develop the new breed of leader for the uplifting the society and world. There is less clear evidence for traits such as charisma, creativity and flexibility. We believe that the key leader traits help the leader acquire necessary skills; formulate an organizational vision and an effective plan for pursuing it; and take the necessary steps to implement the vision

in reality[1] Well at the end I would like to mention about the conclusion by Kirkpatick & Locke in their paper, Regardless of whether leaders are born or made or some combination of both, it is unequivocally clear that leaders are not like other people. Leaders do not have to be great men or women by being intellectual geniuses or omniscient prophets to succeed, but they do need to have the "right stuff" and this stuff is not equally present in all people. Leadership is a demanding, unrelenting job with enormous pressures and grave responsibilities. It would be a profound disservice to leaders to suggest that they are ordinary people who happened to be in the right place at the right time. Maybe the place matters, but it takes a special kind of person to master the challenges of opportunity. Let us not only give credit, but also use the knowledge we have to select and train our future leaders effectively. We believe that in the realm of leadership (and in every other realm), the individual does matter [1].

9 CONTRIBUTION AND NEW INSIGHT

Importance of this research paper and findings is to realize that it is an essential part for one to know the traits/qualities of Leadership. This can help us to identify, develop and understand the traits of leadership. One new insight this paper discovered is that leaders do need to have “Cognitive ability” which demands a leader to gather, integrate and interpret enormous amount of information.

10 CONCLUSION

Honesty & Integrity, Drive (achievement, motivation, ambition, energy, tenacity, and initiative), Self Confidence & Vision and Cognitive Ability are essential traits/qualities of Leadership. These traits will help the leader acquire necessary skills and techniques, helps to formulate vision for any field they are in and successfully plan for pursuing vision into reality. It is not necessary that leaders are to be in politics, they can be anywhere like workplaces, educational institution, organizations, in societies and where there is need for one. As very well mention before leaders do not have to be men or women who are highly successful or intellectual but they need to have the “right stuff” which cannot be found in all.

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All about Brands and Brand Building

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ABSTRACT: In this study I have used a review centric research method for studying the various factors impacting a brand and its branding image. Post identifying the factors I have done a case study of major brands in India and for the factors impacting the brand image of a brand. Developing a conceptual model for the probable impacting factors and then later studying the same for confirming the same factors. In the conceptual model it was identified that Brand Identity is a major factor contributing to build a brand and brand image. The objective of the review centric research study is to find out the major factors that create a brand and later discuss the same, which can act as a tool for further studies for creating Brand Image of major Indian brand.

KEYWORDS: Brands, Brand Identity, Brand Management, Brand Image, Brand Equity.

1 INTRODUCTION

In marketing literature branding has been identified as a name, term or object that identifies a seller. (Kotler, 1997) However the process of building a brand is a culture driven phenomenon and is long commitment and very similar to a lifestyle change, which takes time to nourish and flourish. There are several intangible factors, which play greater roles in the bigger picture of creating brand and its image. Factors like customer satisfaction, price sensitivity, a greater share of customers' wallets, more referrals, and a higher percentage of repeat business [1] Customers value more the relationship they tend to form with the company and its people it could be in many forms like marketing agents or sales representative. The brand identity needs to focus on points of differentiation that offer sustainable competitive advantage to the firm. [2] Further the brand identity is completely based on a comprehension and understanding of any company's customer base, business environment and competitors. A company's brand identity is like a mirror it reflects its vision, the path it is going to follow and also a company's investment indention in order to obtain so. Strong brands enjoy customer loyalty, the potential to charge premium prices, and considerable brand power to support new product and service launches. Companies need to have thorough understanding of customer beliefs, behaviors, product or service attributes, and competitors[2]

"Brand" Meaning and definition

The term brand has been described by different researchers like Keller, Heckler, & Houston (1998), says Brand names come in many different forms—they can be based on real people, places, animals, birds, things, and objects or just be made up. The choice of a brand name has been suggested as one important mean lo build brand equity for a new product [3] Branding is a major marketing tool in today's world and it's a definition of creating an image of a product a name, term, sign or symbol [4] for creating a unique identity of product. At their most basic level, brands serve as markers for the offerings of a firm. For customers, brands can simplify choice, promise a particular quality level, reduce risk, and /or engender trust. I agree that Brands are built on the product itself, the accompanying marketing activity, and the use (or nonuse) by customers as well as others. Brands thus reflect the complete experience that customers have with products. Brands also play an important role in determining the effectiveness of marketing efforts such as advertising and channel placement.[5] From the

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different forms of brands name, place, people or animals it's not necessary to be real. In order to branding a product its necessary to have a core value and brand value to it. [3]As image is important to build for a brand its important to create its own network. A network which the brand can be flourish [6]To understand better how to build brand equity, several models and viewpoints of brand building have been put forth [7] However brand knowledge is rudimentary and the level of the knowing of Brands [3]But the choice of favoring a particular brand does still remain with the individual [8] So in rural terms it would be nice to say that brands creates an image of the product in the buyers mind. Powerful brands and providers of long-term security and growth , they givers high and sustainable profits and also increases the assets value and the net worth of the company. This helps in boosting the sales volume and finally strengthen up the company's economy.

"Brand Identity" meaning and defination

Brand identity is a unique set of brand associations implying a promise to customers and includes a core and extended identity. Core identity is the central, timeless essence of the brand that remains constant as the brand moves to new markets and new products. Core identity broadly focuses on product attributes, service, user profile, store ambience and product performance. Extended identity is woven around brand identity elements organized into cohesive and meaningful groups that provide brand texture and completeness, and focuses on brand personality, relationship, and strong symbol association [2] Brand identity is a tool developed for helping the marketing strategy for a product to make a mark on buyers mind. It creates self-selected environments which is very needed to support the brand which gets recognized [8]to brand identity is often marketers have to come up with tsrategies and aspires to create or maintain animosity. And the create very idegineous associations with the brand. [9] Packaging is posited to influence brand and self-identity via a dual resource base (mediated and lived experience); a conceptual positioning variant from the traditional single symbolic resource base (mediated experience) provided by advertising[10] A social, psychological and physical appearance of the brands depends in on lot about the brand identity and its basically derived from it Brand identity and brand recognition cant be isolated they certainly work hand in hand as they are part of same organization [11] Brand identoty creates a value for th eproduct which helps increasing the share value of the organization as well [12]

2 FACTORS IMPACTING TO BUILD A BRAND.

Brand identity is a big factor for building any company's image. But building a brand identity is even a bigger challenge. In this research paper I have identified some key factors that act as building factor for a brand identity. In order to build a brand its necessary we answers few important questions like "How customer shop?" or "How customer decide?" [13] Some concepts are really neatly described by Rick Heaton, for answering these questions. According to him customers are creature of habits, they shop, learn, get confused and go home to sort out everything. Shopping is a tough work and different forms of presentation even makes it tougher. A strong brand helps customer to cut through the clutter and gives them the comfortable starting point for shopping process. Consistency is very important and sometimes it works as a key to open a customers mind. But to know better how do customer decide to buy products and what impact does the brand has on it. Its sheer important to learn the decision making process. They first try to compare the options available and then try to figure out the differences, however this methodology doesn't work always. A successful brand first builds faith and helps justify the difference between the products and that's how it impacts the buyer's decision. For a brand to become successful it must have some kind of distinction. It's important because this uniqueness helps the buyers relate themselves with the brands uniqueness. Building brand is a tough exercise and its starts from the company to gasping its basics, you need to know very well of the three Cs "your company, your customer and your competitors". [5] To bring a strong these are the basic questions that needs to be asked:

What's unique about my company?

What do I do that separates me from my competitors?

What are my business attributes?

What are the core values that drive my company?

What's the company's current market position?

To build a brand it's not only enough to know yourself but to know your customers too. To know what exactly your customer think while making the decision while buying your product. It's absolutely important to know that mechanism to be successful. Once all these information is gathered companies works on finalizing to develop a brand strategy. This process means combining all the information gathered from the questions mentioned solve the puzzle and focus on getting meaningful information. Irrespective of what branding strategy a company selects the keynote for building a brand is leadership. Some of the major factors that I have figured out in this research process are Brand Equity, Brand Identity, Brand management and global markets. And now we'll discuss each factor and its impact on brands.

3 THE PICAR MODEL: A CONCEPTUAL MODEL FOR BRAND BUILDING

Based on the literature review and review centric research, I have tried to come up with a conceptual model for brand building in competitive markets, below mentioned are the five key factors of the model

- **P**ositioning the brand
- **I**dentifying Brand Image
- **C**reating brand awareness
- **A**ssessing Brand performance
- **R**elation to Brand Equity.

Below I am discussing each factor and how that particular factor acts in a real time situation.

3. 1 BRAND POSITIONING

Positioning is related with creating the perception of a brand in the customer's mind and of achieving differentiation that it stands apart from competitors' brands/offerings and that it meets the consumer's needs/expectations. Brand marketer's major objective should be to create the desired perception in the target consumer's mind. A brand position is part of the brand identity and value proposition that is to be actively communicated to the target audience and that demonstrates and advantage over competing brands. [2] In ingredient branding, key attributes of one brand are incorporated into another brand as ingredient is gaining increasing popularity in markets. Brand positioning, communicated via advertising and other integrated marketing communications tools, is important in the discussion of consideration sets. One task of positioning is to get a manufacturer's brand into the consumer's consideration set, as this increases purchase probability for the brand. Studies show that advertising affords more brands positioning matter. This increased awareness about brands results from both differentiating and reminder advertising, compared to the case of no advertising. [14]

The importance of brand positioning can be understood specially when a new product is being launched. For the manufacturing company it's really important to know the market position, to know the target market, value of difference of the target market and the ability to make difference. There are several ways this market position analysis is done; these are multidimensional scaling, factor analysis, discriminant analysis and multi-attribute contribution models. [15]

Among these multidimensional scaling is the primary tool used for brand positioning for more information on multidimensional scaling refer to Bujmolt and Wedel (1999) and Carroll and Green (1997). Discriminant analysis is most likely to yield objective dimension while factor analysis is more likely to yield affective dimension. So according to the need of the company is free to use the method for brand positioning.

Conjoint analysis is however the most common approach in case the company agrees to perform multi-attribute contribution models; this method is definite to have an edge for the conventional multidimensional scaling technique as the results obtained in conjoint analysis is more practical. For further more information refer Carroll and Green (1997) [16].

3.2 IDENTIFYING BRAND IMAGE

The term brand Image is another factor which talks a lot of the brand it decides the fate of the product. Researcher Kathman (2002), states that Package goods manufacturers were early adopters of the principle that strong brand identity supports growth. [17] Brands in self-select environments needed to support the brand recognition by delivering what soon was characterized as shelf impact [13] Also another way of saying the same is how Madhavram (2005), says that Brand identity is seen as a unique set of brand associations that a brand strategist aspires to create or maintain [9] there is a animosity about how the marketing researcher thinks about Brand Identity like Underwood (2003), says Building on existing frameworks (customer-based brand equity, consumer-brand relationships, product symbolism/self-concept), this paper forwards packaging as a product-related attribute critical to the creation and communication of brand identity.

If we go to the history Brand Image is a relatively new concept (Underwood, 2003). Shiraz has expressed similar thoughts, according to social identity perspective; consumers are identified by focal brand or organization and therefore, are occupied by brand behavior. It should be emphasized here that such identification is basically derived from brand identity [18] the recent literature available on brand identity also backs that like Blomback (2012), saying An identity based view of the corporation promotes corporate brand identity as one of many identity types, none of which can be viewed in complete isolation because they are all ultimately based on the same organization [11] so does wheeler (2006), says Marketing researchers and practitioners have developed a solid understanding that corporate brand identity communicates to customers the differential qualities of their products, which in turn help firms improve their shareholder value [12]

First, we must explore the trends that are transforming the marketplace. The breakdown of market boundaries, the liberalization of trade policies, the establishment of tariff-free zones, and the growth of Western-style market capitalism have changed the marketplace dramatically in recent years. The response has included globalization and the development of global brands.

Concurrent with this trend, however, is evidence of market fragmentation. More niche brands and short-life-cycle brands are available to consumers, not to mention product diversity. The buying public is more sophisticated, and has better information on facilitated appropriate purchases, than at any time in modern history.

All of these trends however are dwarfed by the full impact of the digital revolution that surrounds business today. The digital revolution trumps all other changes.

Evidence in the new economy would suggest that brands remain important. The emergence of new brands such as eBay, Netscape, Yahoo, Amazon.com, and others confirm that branding is paramount in the new economy.

Image management still is in its ascendancy. Brands will remain critical to the selection process. However, brand managers and designers have to lean the nuances of serving a newly empowered consumer. We believe this will lead to more satisfying and rewarding work for identity practitioners. I believe know this will create a new relationship between the designer and the newly empowered, self- selecting, self-expressing consumer. [17]

Creating a brand image is a challenging job, but the even tougher task is to identify the image you want to create. So therefore I feel this is important step in brand building activity.

3.3 CREATING BRAND AWARENESS

Once the brand is positioned and image identified, a brand is launched in the market with intention of being identified; each and every brand in the market comes with a message for the target market. For creating brand awareness there could be various ways but the prime tool is advertisement. Now in today's world there are several platform for advertisement, social, TV, Internet, radio etc. the growing literature on brand awareness talks different aspects of the same.

Awareness rep-resents the lowest end of a continuum of brand knowledge that ranges from simple recognition of the brand name to a highly developed cognitive structure based on detailed information. Recognition is taken here to be the process of perceiving a brand as previously encountered thus, the distinction between awareness and recognition is a subtle one, and the former denoting a state of knowledge possessed by the consumer and the latter a cognitive process resulting from awareness. [3]

Awareness was operationalized as a two-level blocking factor consisting of awareness and no-awareness conditions. In the awareness condition, subjects were presented with three brands of peanut butter. The first of these was a well-known national brand that had been advertised heavily. A pretest demonstrated high recognition for this brand. Two unknown brands from other regions of the country completed the three-brand set. To be included in the awareness condition, subjects had to be aware of the well-known brand (i.e., through advertising) without ever having purchased or tried it (as determined by a pretest questionnaire). They also had to exhibit no awareness of the other two brands in the set. In the no-awareness condition, subjects were presented three totally unknown brands. Two of these brands were the same as those utilized in the aware- ness condition. The third was another unknown brand from another region of the country. To be included in the no-awareness condition, subjects had to be totally unfamiliar with all three brands in the set. Thus, these subjects faced the task of choosing among and evaluating a set of brands that were totally unfamiliar to them. [3]

The challenges faced by companies in building brands are: to be noticed, to be remembered, to change perceptions, to reinforce attitudes, and to create deep customer relationships (A differentiated, "ownable" brand image can build an emotional and rational bridge from customers to a company, a product, or a service. The intangible factors used in building brand equity include "user imagery", "usage imagery", the type of personality the brand portrays, the feeling that the brand tries to elicit in customers, and the type of relationship it seeks to build with its customers. [2] The major modes of creating brand awareness is by using advertising, direct marketing, sales promotion, sponsorships, endorsements, public relations, the Internet, and integrated brand communications. For a brands success it's really important to have a good impact with all the modes mentioned in the above lines.

Researchers have come up with several models and concepts that can be used for creating awareness, couple of important ones is Awareness formation model by Blattberg and Golanty (1978) and Dodson and Muller (1978). Blattberg and Golanty (1978) develop a model called TRACKER, where change in brand awareness characterizes the decay in awareness due to forgetting effects. Second one is a Differential game model; differential game models facilitate the study of market dynamics by applying differential equations and game-theoretic concepts to obtain normative solutions to managers' decisions. [19]

The most successful brands keep up with competitors by creating points of parity in those areas where competitors are trying to find an advantage while at the same time creating points of difference to achieve advantages over competitors in some other areas (Keller, 2000). A long-term plan is very important to keep on the brand awareness continued. The awareness and message created by the brand should be consistent with the brand image, brand value and brand personality. If the brand is part of a bigger brand family the core values should also be consistent. If this consistency flows the way it should be it definite to have a great influence on the consumer's mind.

3.4 ASSESSING BRAND PERFORMANCE

A brand stays in market if its performance is consistent and continuous. Companies need to continuously track the brands performance to its competitors. They should track their the progress as to how their brands are doing in the marketplace, and what impact certain market interventions will have on the brand equity. Progress can be monitored in terms of the level of purchasing, consumption, brand recognition, brand recall, advertising awareness, etc. This approach will enable brand marketers to assess the effect of marketing campaign in influencing the target consumers, which in turn leads to measure the brand strength. [2]

Before we understand how brand performance is measured we need to see the factors impact a brand's performance. So the most important facts are markets there are primarily two markets 1) Cultural Market Conditions. 2) Socioeconomic Market Conditions.

The current literature about Culture market condition (Buzzell 1968,Jain 1989,Onkvisit and Shaw 1987) says Environmental aspects of foreign markets have long been recommended, as signals firms should use in deciding upon customized or standardized marketing programs. Cultural differences across markets are an indicator that consumers in different nations have different needs, and hence may require tailored brand images. A commonly used typology of cultural characteristics developed and tested Hofstede (1984) has been applied in international marketing settings Three of Hofstede's cultural dimensions, power distance, uncertainty avoidance, and individualism, relate to the needs-based brand image framework. Power distance is a culture's degree of social inequality, and can be directly related to the use of social or symbolic brand image. Cultural differences across markets are an indicator that consumers in different nations have different needs, and hence may require tailored brand images. [20]

National socio- economic conditions that affect consumer spending and buying power are also important indicators of the feasibility of standardizing marketing programs. Consumption patterns, such as the use of functional self-sufficiency products Information on the socio economic conditions of foreign nations is widely available and ranges from individual countries' government census reports to comprehensive computerized databases. One common indicator, GDP per capita, gives managers an overall assessment of a nation's income and thus its ability to spend money on goods and services. [20]

Brand loyalty is a measure of the attachment that a customer has to a brand and it reflects how likely a customer will be to switch to another brand, especially when that brand makes a change, either in price or in product features Brand loyalty represents a favorable attitude toward a brand resulting in consistent purchase of the brand over time and it is the result of consumers' learning that one brand can satisfy their needs Brand loyalty reflects the commitment of a customer to rebuy the company's products consistently in future. Customer retention can be achieved only through fostering premium loyalty by establishing an emotional as well as a normative attachment between the brand and the consumer Guarani's and Such loyal buyers can contribute to the positive word- of-mouth communication for the brand.

The companies need to set "operational standards" in all areas affecting day-to-day brand-related activities which can be applied to behaviors, management practices, service provision, customer relationship management, performance achievement, and so on The specific marketing effects that accrue to a product with its brand name can be either consumer-level constructs such as attitudes, awareness, image, and knowledge, or firm-level outcomes such as price, market share, revenue, and cash flow the operational standards reinforce the assurance to target customers that the brand promise will be delivered to them. [2]

3.5 BRAND EQUITY

Brand equity term belongs to marketing researchers has both positive and negative influence on market power [21] it is believed to enhance the unique elements of the selling capability of a product. It also adds value to the brand concept the particular product. Brand equity has a large impact on product line expansion even when a product is being foing through horizontal expansion brand equity has a value. [22] The roots of brand equity is customer belief which can change according to situation and time therefore very often brand equity is considered very fragile and vulnerable But still its widely believed that brand equity adds lots of value to product and the product holds a place in market. Brand equity is "a set of assets (and liabilities) linked to a brand's name and symbol that adds to (or subtracts from) the value provided by a product or service to a firm and/or that firms' customers"Firms aspire to achieve strong brand equity because it is an important measure of brand success. Strong brand equity is a signal of favorable customers/stakeholders associations toward a brand, which distinguishes a brand from that of the competitors'. Further, strong brand equity is critical because its perceptions affect both financial and non-financial results. A more integrative approach is needed to assess brand equity that integrates both the customers' perspectives about the product brand and also the stakeholders' perspectives about the corporate brand. Also, there is a need the link of brand equity with branding is a kind of relationship. In this paper I have tried to examplify the same relationship by using review centric research method. Assessing the value of a brand from a pure customer's perspective is necessary, yet not sufficient to assess the equity of an entire brand. The customer-based approach does not consider the following aspects in total brand equity measurement: (1) the impact of corporate associations on customers' evaluation of a brand, and (2) the impact of other non-customer stakeholders' perceptions on perceptions of a brand [23]

4 CONCLUSION

After reviewing many articles and journal papers I came up with the PICAR model, which would help any budding manager for defining a brand building strategy. This model basically is based upon the common brand building concepts however I have introduced some new factors that could be kept in mind while creating a brand image and coming up with the brand strategy.

Brand strategy is not an easy task to do, and in such a demanding position if a even a little tool could be helpful so this PICAR model could be that tool. According to the model the first step would be to "Position" a brand. This step basically would let the manager or designer work on identifying the positioning of the brand in current market. For example if my company is coming up with a new Car I need to know in what segment the car is being introduced and then work on creating the positioning to place the brand. Identifying the position and then work on a plan to position the same. This PICAR model would act like a guiding light when the manager is intended to do so.

This research is done as part of a marketing and innovation course and all the findings mentioned in the same are done by using descriptive and review centric research method, however the theory developed in the process is a new idea and I feel this idea could help the new managers understand branding strategies in a new way.

In today's world branding is a very important key feature of marketing and a good understanding of the subject may really help a person excel in the field of marketing, however to understand all the theories in this growing field is very complex in course of 6 months of time. So I feel this paper could be a good starting point and PICAR model can work as a guiding tool in order to understand the complex theories in brand and branding.

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The Health Concerns of Unemployed Adults: A Review

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ABSTRACT: This paper is an endeavour to highlight the health problems of unemployed adults by reviewing the literature. Unemployment is the burning and daunting issue in the present day's world. It becomes great cause for some mortal disease, health problems and suicides. Unemployment completely disturbs the individual physical and psychological wellbeing. It is main source for the various types of psychological disorders and substance abuse. Which is revealed by different researchers like Morries et.al (1994) found a strong causal relationship between unemployment and mortality. Similarly unemployment have an adverse impact on the psychological wellbeing of and individual and unemployment has been found to result in lower self-esteem (Muller et.al., 1993) and a greater incidence of depression (Feather and O'Brien, 1986). So, this paper would be an exhaustive effort to highlight the health concerns of unemployed adults.

KEYWORDS: Depression, Health, Unemployment, Wellbeing.

CONCEPT OF HEALTH

Health is a state of wellbeing with physical, cultural, psychosocial, economic and spiritual attributes, not the absence of illness. The word 'Health' is derived from old High Ceriman and Anglo Saxon words meaning "whole' hale' and 'holy'. Historically and culturally there are strong associations with concepts such as wholeness, goodness, holiness, hygiene, cleanliness, saintliness, godliness. An emphasis on health as wholeness and naturalness was present in ancient china and classical Greece where health was seen as a state of harmony, balance of equilibrium with nature like early Greek physician Galen (200-129 BC), followed the Hippocratic tradition that Hygeia (health) or euexia (soundness) occurs when there is balance between hot, cold, dry and wet component of the body.

WHO, 1946 [24], defined health as 'a state of complete physical, social and spiritual cubing, not simply the absence of illness."

Argele, Martin and Crossland, 1989. [1] understood the health in terms of three components: positive affect (pleasant mood and emotions) absence of negative affect (unpleasant mood and emotions) and satisfaction with life as whole.

Smith, 1990 [20] said "in past, Good health meant the absence of disease' Today the definition of high level wellness that goes beyond the absence of disease towards ones maximum health potential which includes mind, body sprit. High level wellness is the integration of fine health component which are: emotional, physical, social and mental. The combined use of these elements can lead to high level of wellness [4].

The health promotion approach' provides a unifying concept for those who emphasis the need to make changes in ways and conditions of living in order to improve health. Health practitioners are more than providers of services; they are agent of change, facilitation the empowerment of individuals and communities to increase their control over and to improve their health [10].

Human health is effected by a host of factors, the most significant being poverty, drought, famines, unemployment and wars. In recent years it has been witnessed of all these health scourges, the impact that they can have on human health,

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illness and suffering. The health variations reflect the social and economic circumstances of individuals. In rich countries it has been seen that one of the most significant factor is socio-economic status (SES). The mediators of SES effect on health experience are likely to be behavioural and psychosocial. The behavioural factors include diet, exercise and smoking and the psychological factors include such processes as self-efficacy, self-esteem, and perceived control [19].

KINDS OF HEALTH

PHYSICAL HEALTH

Generally physical health can be defined as the everything that is related to the physical fitness and wellbeing of a person. Physical health also refers to the functioning of physical body. Physical health is an essential part of overall health of an individual, which includes everything from physical fitness to overall wellbeing. Health can be defined as a state of complete well-being and physical health as a state of physical well-being in which an individual is mechanically fit to perform their daily activities and duties without any problem. According to the World Health Organisation, the main determinants of health include the social and economic environment, the physical environment, and the person's individual characteristics and behaviours. Physical health is a way to maintain our health and fitness through exercise or life-style activities such as walking, jogging, running, bicycling, doing yoga and feeding our body with the right type of food and drinks.

MENTAL HEALTH

The World Health Organization describes 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 [25].Mental illness is termed as 'the scale of cognitive, emotional, and behavioural conditions that interfere with social and emotional wellbeing and the lives and productivity of people.

SOCIAL HEALTH

Social health takes into account that every individual is a part of a family and wider community and focuses on social and economic conditions and wellbeing of the “whole person” in the context of his social network.

SPIRITUAL HEALTH

Spiritual health for some people is connected with religious beliefs, and practices for others it is to do with personal needs, principles of behaviour and ways of achieving peace of mind and begin at peace with oneself.

EMOTIONAL HEALTH

Emotional health can be defined by the degree to which a person can feel emotionally secure and relax us in everyday life. a person who are emotionally healthy possess a relaxed body, an open mind and open heart. The emotionally healthy people always feel themselves safe and secure with their own emotions and feelings. They have a good control over their emotions.

HEALTH AND UNEMPLOYMENT: *LITERATURE REVIEW*

The present era is the age of advancement and development. Where science has made life so comfortable and luxurious by capitalizing the human resources. In this age of advancement new scientific tools has been introduced in industries, factories and other manufacturing units. Which had replace the manpower and reduces the labour opportunities because work of thousand peoples is been done by single machine. Consequently, it gives rise to unemployment problem. This prolonged feeling of unemployment in turn disturbs the mental and physical health of the adults. The present study aims to reviews the available literature on health of unemployed adults. As it has observed by different researchers that unemployment leads to a health problems and disturbs the individual’s physical, mental and social equilibrium. Unemployment is said to be a great cause of depression, anxiety, suicide, stress. Unemployed people’s exhibit poorer mental health and wellbeing outcomes than the full-time employed [7]. In the health and social-science literature, however, the association of unemployment (and other aspects of economic hardship) with adverse health consequences has been investigated for many years. In 1897 European historian Emile Durkheim observed that suicides seemed to occur more often

during economic changes that disturbed the "social fabric" of society [5].So unemployment creates the negative feelings in a person that leads to suicide.

Unemployment is main contributors in declining the health of an individual as stated by Smith, stated that unemployment raises the chance that a man will die in the next decade by about a third, and for those in middle age- with biggest commitments-the chance doubles [21]. There are lot of literature available on health and unemployment that gives us clear details of negative relationship between them. Some researchers [23] argued that work provides an opportunity for skill utilization, interpersonal contact, additional financial resources, and gives individual opportunities for control, all of which are factors believed to contribute to psychological wellbeing. When these aspects are not available or present within workplace, or when unemployment result in loss of these aspects, physical and mental and psychological functioning have been deteriorating [3]. In simple terms it means that unemployment or lack of opportunities and financial resources directly affects the health of an individual. Similarly some research revealed that unemployment has an adverse impact on the psychological wellbeing of and individual and unemployment has been found to result in lower self-esteem [11] and a greater incidence of depression [6]. So, it is clear from such research that low-self-esteem, depression or psychological distress may contribute in some way to unemployment. Jhoda argued that unemployment produces profound life change, including loss of structured time, loss of valued working relationships, loss of purpose and meaningful life goals, and loss of status and identity [8]. It is therefore possibly unsurprising that depression emerges as the prominent mental health outcome in response to job loss [3]. Some recent research revealed that financial strain as the primary element mediating the correlation between unemployment and depression [21]. It has also been revealed that the mental health consequences appear to be more apparent among middle aged people, rather than the younger or older unemployment, among men and single women, rather than married women, and among long term unemployed (i.e. over four months) rather than those that experience a short period of unemployment [2]. Physical health also would appear to suffer as a result of unemployment or redundancy. A strong causal relationship has been found between unemployment and mortality even when Tabaco and alcohol use as controlled for [10]. Moreover, the financial hardship that can arise with unemployment and the shame of not holding a job affected the health of persons [16].

In some recent studies it has been also revealed that unemployment is the main cause for deteriorating the individual physical, mental and social wellbeing. Like, some studies showed that a connection between poor psychological health and unemployment was found to be greater among the young respondents than adults [17].similarly; long-term unemployment was also connected with an increased risk of depression and the risk became significantly higher with frequent alcohol intoxication [15]. Paul and Moser found that long-term unemployed people, young people and people older than 50 suffered more from unemployment than middle-aged people and those short-term unemployed. In contrast, they did not find that being in a relationship had a moderating effect on the impact of unemployment on mental health. Also, they found that men were more often distressed by unemployment than women [12]. It has been also found that long term unemployment at young age could have various health effects in men and women [18]. So it is obvious from the above given evidences that unemployment whether long or short term contributes to the health problems, lowers the person's self-esteem, and becomes the greater source of depression, and other mental as well as physical health problems.

CONCLUSION

From the above documentary evidence it can be concluded that unemployment is major cause for the ill health adults. The Unemployed people shows a poor social and psychological adjustment and due to prolonged feelings of unemployment they continuously remain under stress and becomes easy prey of depression and other diseases. Their physical health also deteriorates and it has been revealed that there is great relation between coronary heart disease and unemployment. Unemployment and financial strain is also said to be great A cause for suicides and substance abuse. Not only this it lowers the individual's self-esteem and a person becomes estranged in his own society. So unemployment is the daunting issue prevailing in the existing world and there is great need of research in this area to highlight this issue and to formulate some strategy that would helpful for this ill-fated community to cope up with these health problems.

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Reversible Data Hiding With Optimal Value Transfer of Data

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ABSTRACT: In reversible data hiding techniques, the values of host data are modified according to some particular rules and the original host content can be perfectly restored after extraction of the hidden data on receiver side. In this paper, the optimal rule of value modification under a payload -distortion criterion is found by using an iterative procedure, and a practical reversible data hiding scheme is proposed. The secret data, as well as the auxiliary information used for content recovery, are carried by the differences between the original pixel-values and the corresponding values estimated from the neighbours. Here, the estimation errors are modified according to the optimal value transfer rule. Also, the host image is divided into a number of pixel subsets and the auxiliary information of a subset is always embedded into the estimation errors in the next subset. A receiver can successfully extract the embedded secret data and recover the original content in the subsets with an inverse order. This way, a good reversible data hiding performance is achieved.

KEYWORDS: Reversible Data Hiding, Optimal Value, Transfer of Data.

EXISTING SYSTEM:

A number of reversible data hiding techniques have been proposed, and they can be roughly classified into three types: lossless compression based methods, difference expansion (DE) methods, and histogram modification (HM) methods. The lossless compression based methods make use of statistical redundancy of the host media by performing lossless compression in order to create a spare space to accommodate additional secret data. In the RS method [1], for example, a regular-singular status is defined for each group of pixels according to a flipping operation and a discrimination function. The entirety of RS status is then losslessly compressed to provide a space for data hiding. Alternatively, the least significant digits of pixel values in an -ary system [2] or the least significant bits (LSB) of quantized DCT coefficients in a JPEG image [3] can also be used to provide the required data space. In these reversible data hiding methods, a spare place can always be made available to accommodate secret data as long as the chosen item is compressible, but the capacities are not very high.

DISADVANTAGES:

In these reversible data hiding methods, a spare place can always be made available to accommodate secret data as long as the chosen item is compressible, but the capacities are not very high.

Payload of this method is low since each block can only carry one bit.

PROPOSED SYSTEM:

In this proposed system, we will find the optimal rule of value modification under a payload-distortion criterion. By maximizing a target function using iterative algorithm, an optimal value transfer matrix can be obtained. Furthermore, we design a practical reversible data hiding scheme, in which the estimation errors of host pixels are used to accommodate the

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secret data and their values are modified according to the optimal value transfer matrix. This way, a good payload-distortion performance can be achieved.

ADVANTAGES OF PROPOSED SYSTEM:

A smarter prediction method is exploited to make the estimation errors closer to zero, a better performance can be achieved, but the computation complexity due to the prediction will be higher. The payload-distortion performance of the proposed scheme is excellent. The host image is divided into a number of subsets and the auxiliary information of a subset is always embedded into the estimation errors in the next subset. This way, one can successfully extract the embedded secret data and recover the original content in the subsets with an inverse order.

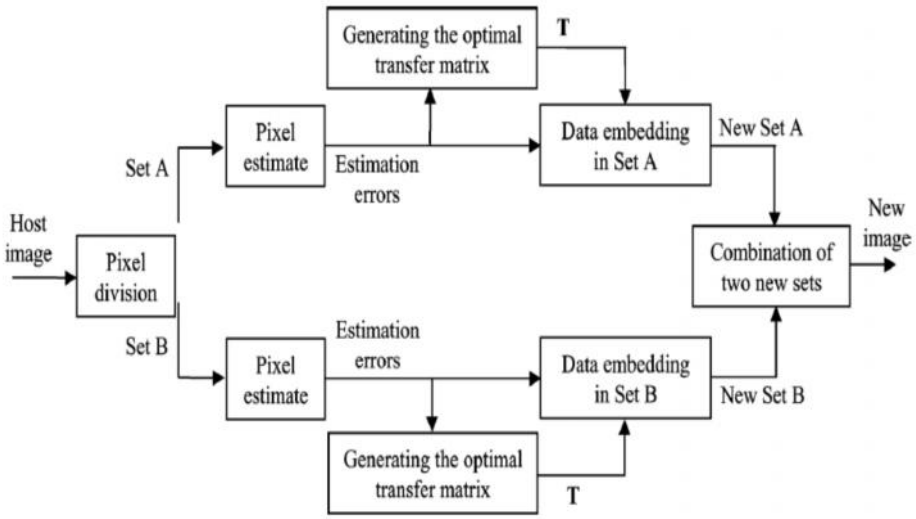
MODULES DESCRIPTION

There are five different types of modules in this project, that are listed in the following,

- Data Embedding
- Coding Module
- Recursive Construction
- Data Extraction
- Content Recovery

DATA EMBEDDING

Denote the host pixels as where and are indices of row and column, and divide all pixels into two sets: Set A containing pixels with even and Set B containing other pixels with odd. Clearly, the four neighbors of a pixel must belong to the different set. For each pixel, we may use four neighbors to estimate its value.



CODING MODEL

We denote matrices and vectors by boldface fonts and use the same notation for the random variable and its realization, for simplicity. To do RDH, a compressible feature sequence should be first extracted from the original cover. For Type-I schemes, the features can be usually represented by a binary sequence.

Therefore, we directly take the binary feature sequence as the cover to discuss the coding method and follow the notation established.

RECURSIVE CONSTRUCTION

This recursive construction performs better than the simple method because of two key points: 1) The data is embedded by an efficient nonreversible embedding code, and 2) the cover block is compressed under the condition of the marked block. However, the above recursive construction cannot approach the upper bound

DATA EXTRACTION

When having an image containing embedded data, the receiver firstly divides the image into Sets A and B, and divides Sets A and B into a number of subsets using the same manner. Then, extract and AI from the LSB of the last subset in Set B, and decompose as the weight values, the histogram difference of the first subsets and the number of iterations. With the weight values, the receiver can obtain the estimation error of each pixel in the first subsets, and with the histogram difference and the iteration number, he can use the histogram difference to retrieve the original scaled histogram and implement the iterative procedure to retrieve the optimal transfer matrix used for data-embedding in the first subsets.

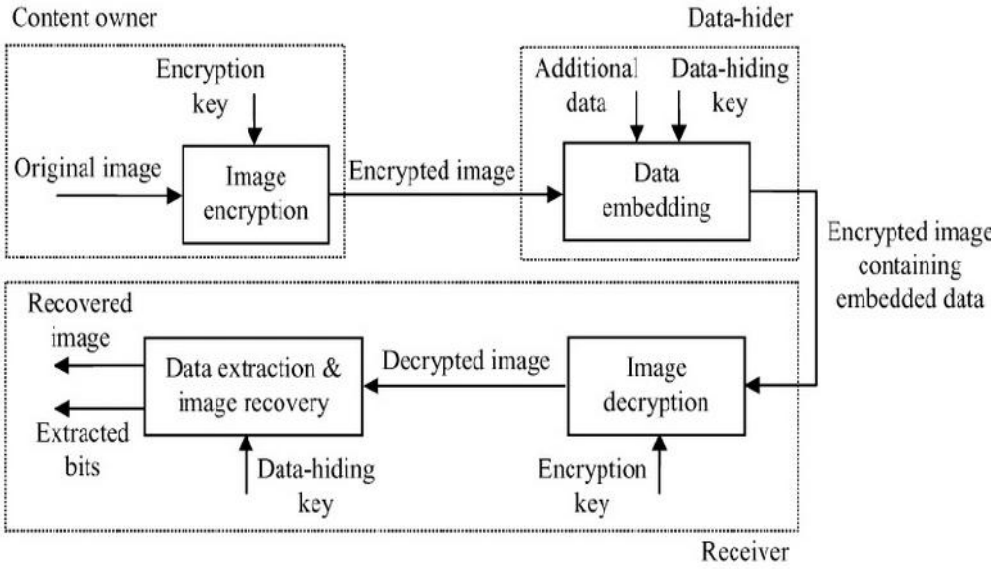
CONTENT RECOVERY

The auxiliary information extracted from a subset is used to recover the original content of the previous subset, and then the embedded data in the previous subset are extracted by using the recovered original estimation error.

That means the original content and the hidden data in the subsets of Set B, except the last one, can be recovered and extracted with an inverse order. Then, the receiver can decompose the payload hidden in the subsets into AI of Set A, LSB of Subset of Set B, and the embedded secret data.

While the LSB of Subset of Set B is used to recover the original content of the subset, is used to retrieve the optimal transfer matrix and the estimation error of each pixel in Set A. Similarly, the original content and the hidden data in the subsets of Set A can be also recovered and extracted with an inverse order. At last, by concatenating the secret data hidden in Sets A and B, the receiver reconstructs the entire secret data

There are different types of application, such as Windows-based applications and Web-based applications.



When having an image containing embedded data, the receiver firstly divides the image into Sets A and B, and divides Sets A and B into a number of subsets using the same manner. Then, extract the image from the LSB of the last subset in Set B, and decompose the weight values, subsets and the number of iterations. With the weight values, the receiver can obtain the estimation error of each pixel in the first then find out the subsets difference and the iteration number, he can use the histogram difference to retrieve the original scaled histogram and implement the iterative procedure to retrieve the optimal transfer matrix used for data-embedding in the first

Then, the receiver recovers the original content and extracts the hidden data in Subset of Set B. Since the f first part of image contains the labels of saturated pixels and the original values of the first type of saturated pixels, the first type of saturated pixels in Subset it l can be localized and their original values can be recovered. For the second types of sat-rated pixels and the unsaturated pixels, after calculating the probability, the receiver can convert the second part of image l into a sequence of original estimation error by arithmetic decoding. Thus, the original pixel values are recovered.

CONCLUSION

In order to achieve a good payload-distortion performance of reversible data hiding, this work first finds the optimal value transfer matrix by maximizing a target function of pure payload with an iterative procedure, and then proposes a practical reversible data hiding scheme.

The differences between the original pixel-values and the corresponding values estimated from the neighbours are used to carry the payload that is made up of the actual secret data to be embedded and the auxiliary information for original content recovery. According to the optimal value transfer matrix, the auxiliary information is generated and the estimation errors are modified.

Also, the host image is divided into a number of subsets and the auxiliary information of a subset is always embedded into the estimation errors in the next subset. This way, one can successfully extract the embedded secret data and recover the original content in the subsets with an inverse order.

The payload-distortion performance of the proposed scheme is excellent. For the smooth host images, the proposed scheme significantly outperforms the previous reversible data hiding methods. The optimal transfer mechanism proposed in this work is independent from the generation of available cover values. In other words, the optimal transfer mechanism gives a new rule of value modification and can be used on various cover values.

If a smarter prediction method is exploited to make the estimation errors closer to zero, a better performance can be achieved, but the computation complexity due to the prediction will be higher. The combination of the optimal transfer mechanism and other kinds of available cover data deserves further investigation.

FUTURE ENHANCEMENT

We propose a new reversible watermarking scheme. One first contribution is a histogram shifting modulation which adaptively takes care of the local specificities of the image content. By applying it to the image prediction-errors and by considering their immediate neighbourhood, the scheme we propose inserts data in textured areas where other methods fail to do so.

Furthermore, our scheme makes use of a classification process for identifying parts of the image that can be watermarked with the most suited reversible modulation. This classification is based on a reference image derived from the image itself, a prediction of it, which has the property of being invariant to the watermark insertion. In that way, the watermark embedded and extractor remain synchronized for message extraction and image reconstruction.

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Etude comparative de la qualité chimique et microbiologique des eaux de l'oued El kebir (Région d'El Tarf)

[Comparative study of chemical and microbial quality of waters of Oued el kebir (city of el tarf)]

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ABSTRACT: Water is essential and subject to careful monitoring worldwide. Its importance for the preservation of public health determines extensive monitoring programs. The objectives of monitoring the quality of water intended for human use are numerous and vary according to the resources and technical feasibility.
In this work, we studied the physicochemical parameters of water samples from Oued el Kebir city of El Tarf (Algeria) during the year 2013.

KEYWORDS: physicochemical parameters, water Oued Kebir.

RESUME: L'eau est l'élément essentiel qui fait l'objet d'une surveillance attentive à travers le monde. Son importance pour la préservation de la santé publique détermine de vastes programmes de surveillance. Les objectifs du contrôle de la qualité de l'eau destinée à la consommation sont nombreux et varient en fonction des moyens et des possibilités techniques.
Dans le présent travail, nous avons étudié les paramètres physicochimiques d'échantillons d'eau d'oued el Kébir de la ville d'El Tarf (Algérie) pendant l'année 2013.

MOTS-CLEFS: paramètres physicochimiques ; eau ; Oued Kébir.

1 INTRODUCTION

L'Algérie est un pays semi aride, voire même aride et les ressource en eau sont faibles, irrégulières, localisées dans la bande côtières et proviennent des eaux de surface et des eaux souterraines renouvelables et non renouvelables. [1].

La problématique de l'eau constitue un domaine prioritaire tant au niveau des instances nationales, régionales qu'internationales ; en particulier, dans les zones arides ou semi arides ou la demande croissante en eau est associées a une diminution de cette ressource [2].

La région d'El Tarf est une zone essentiellement rurale ou les ressources hydriques sont fortement sollicitées pour les activités agricoles. la dégradation de la qualité des eaux naturelles est provoquée par les rejets liquides domestiques et industriels. la charge de ces rejets est de plus en plus croissante avec le développement socio-économique de la région.

La présente étude vise a déterminer l'évaluation de l'indice de pollution organique dans les eaux naturelles de la région d'El tarf.

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2 MATÉRIEL ET MÉTHODES

2.1 PRESENTATION DE LA ZONE D'ETUDE

El- Tarf se trouve à l'extrême Nord-est de l'Algérie, elle est limitée par Annaba à l'Ouest la frontière tunisienne à l'Est ,la mer méditerranéen au nord ,la wilaya de Souk –Ahras et wilaya de Guelma au sud .

La Wilaya d'El Tarf est composée d'un réseau hydrographique composée de l'oued El Kebir et ces affluent secondaire comme oued Bouhaloufs et l'Amisidaà,oued Boulatane oued Bougous qui qui fait un delta à la région d'El-Battah avec l'oued Bounamoussa.

2.2 LES DIFFERENCES REJETS DEVERSANT DANS L'OUED EL-KEBIR

- L'usine de tomate de Boutheldja versée ces différents rejets dans l'oued El-Kebir
- L'eau usée des agglomérations de Ain El-Assel, El-Tarf, Boutheldja et lac des oiseaux.
- L'eau de refroidissement des machines et de lavages de tomate.
- L'eau de vidange des moteurs de pompage d'eaux.

2.3 MATERIEL EXPERIMENTALE

Le matériel expérimentale utilise dans notre travail est composé de l'eau de l'oued El-Kebir prélève dans des bouteilles en plastique étiquetées (date de sortie et site concerné) dans laquelle on ajoute formaldéhyde (5%) pour la conservation des échantillons.

2.4 LES SITES DE PRELEVEMENT

2.4.1 AIN ASSEL

Localisée sur la route national N˚44, au prés du pond au dessous de l'Oued El-Kebir et Ain Assel .

2.4.2 SEBAA

Localisé sur le chemin de wilaya d'El-Tarf entre lac des oiseaux et village de Sebàa **,** au prés du pond au dessous de l'Oued El Kebir .

3 RÉSULTATS ET DISCUSSIONS

3.1 CARACTÉRISTIQUES ORGANOLEPTIQUES

Les différents échantillons d'eau d'oued El kébir de la région d'El Tarf, après test organoleptiques sont incolores.

3.2 CARACTÉRISTIQUES PHYSICO-CHIMIQUES

Le tableau 1 présente les résultats physico-chimiques des eaux de la région d'étude.

Tableau 1 : analyses physico- chimique de l' Oued El kébir (Ain assal, 2013)

Paramètres	pH	T (c°)	Tds (mg/l)	Cond (ms/cm)	Sal (mg/l)	Turb Ntu	Tac (os)	Mg^{+2} (mg/l)	Ca^{+2} (mg/l)	CL^{-} (mg/l)	MO (mg/l)
Ain asel	7,10	21,9	218	580	0,3	28,7	230	120	650	79 ,52	0
sebaa	7,06	21, 3	245	507	0,2	61,8	336	76 ,8	450	36 ,92	0

3.2.1 PH

Les mesures du pH de l'ensemble des échantillons d'oued el Kébir montrent qu'elles sont comprises entre 7,06 et 7,10 avec une valeur moyenne de 7,08 ce qui montre le caractère neutre.

Le pH dépend de l'origine des eaux, de la nature géologique du substrat. Ce paramètre conditionne un grand nombre d'équilibres physico-chimiques entre l'eau, le gaz carbonique dissous, les carbonates et les bicarbonates qui constituent des solutions tamponnées conférant à la vie aquatique un développement favorable. Dans la plupart des eaux naturelles, le pH est compris habituellement entre 6 et 8,5 alors que dans les eaux tièdes, celui-ci est compris entre 5 et 9. Dans le cas de la région d'étude, les valeurs enregistrées varient entre 7,06 et 7,10; ce qui témoigne d'une légère alcalinité du milieu.

3.2.2 CONDUCTIVITE ELECTRIQUE

Les mesures de la conductivité électrique de l'ensemble des échantillons montrent qu'elles sont comprises entre 507 mS/cm et 580 mS/cm.

La conductivité donne une idée sur la minéralisation d'une eau et elle est à ce titre un bon marqueur de l'origine d'une eau. **[3]**. En effet, la mesure de la conductivité permet d'apprécier la quantité des sels dissous dans l'eau, donc de sa minéralisation. La conductivité électrique dépend des charges de matière organique endogène et exogène, génératrice de sels après décomposition et minéralisation et également avec le phénomène d'évaporation qui concentre ces sels dans l'eau.

3.2.3 CALCIUM

Les concentrations en ions calcium (Ca^{2+}) dans les échantillons variaient entre 270 mg/L et 650 mg/L.

Le Calcium, ce paramètre varie comme le Magnésium et leur concentration dans l'eau dépend aussi du substrat géologique traversé. Et la pollution d'origine industrielle et urbaine. Sur la base des résultats des analyses effectuées, Les valeurs enregistrées sont supérieurs aux normes OMS relatives à la potabilité des eaux **[4]**.

3.2.4 MAGNESIUM

Les valeurs des ions magnésium (Mg^{2+}) varient entre 76,8 mg/L, et 120 mg/L. Ce paramètre se trouve dans les formations calcaires, marno-calcaire et dans les formations triasiques (gypse). Selon les résultats des analyses effectuées durant la période d'étude, Les teneurs en Magnésium sont globalement inferieures à la norme. Aucune valeur dépassant les 150 mg/l **[4]**.

3.2.5 TAUX DES SELS DISSOUS (TDS)

Les mesures de la TDS de l'ensemble des échantillons montrent qu'elles sont comprises entre 218 mg/L et 245 mg/l**.** les valeurs de sels dissous respectent les normes OMS (2004), en effet, tous les valeurs dépassent pas les 1500 mg/l.

3.2.6 ALINITE

Les mesures de la salinité de l'ensemble des échantillons montrent qu'elles sont comprises entre 0,2 à 0,3mg/l.

3.2.7 TEMPERATURE

Les mesures de la température de l'ensemble des échantillons montrent qu'elles sont comprises entre 21,3°C et 21,9°C.

La température de l'eau est un facteur important dans la production biologique. Ceci vient du fait qu'elle affecte les propriétés physiques et chimiques de celle-ci ; en particulier sa densité, sa viscosité, la solubilité de ses gaz (notamment celle de l'oxygène) et la vitesse des réactions chimiques et biochimiques.

3.2.8. TURBIDITE

Les turbidités de l'ensemble des échantillons montrent qu'elles sont comprises entre 28,7 NTU et 61,8 NTU. Cette valeur de la turbidité ne répond pas aux normes de l'OMS (< 5NTU).

3.2.9. TITRE ALCALIN COMPLET.

La teneur en TAC a varié au cours de l'étude de 230 F° et 336 F°.

Le titre alcalin complet correspond à la teneur en alcalin libre carbonates, hydroxyle, et hydrogénocarbonates; pour un pH inferieur à 8.3, l'alcalinité entrainée par l'ion CO_3^- et OH^- est nulle.

3.2.10. CHLORURE

Les concentrations en ions chlorure (Cl^-) dans les échantillons variaient entre 36,92 mg/L et79, 52 mg/L. de Chlorures**,** les eaux trop riches en chlorures sont laxatives et corrosives, La concentration des chlorures dans l'eau dépend aussi du terrain traversé.

Au niveau de la région d'étude, les teneurs en chlorures sont inférieures à 400 mg/l [4]. Selon les normes Algériennes relatives à la potabilité des eaux, la concentration en chlorure maximale recommandée (CMA) est de 600 mg/l alors que le maximum admissible (CMA) est de 750 mg/l.

3.3. CARACTERISTIQUES BACTERIOLOGIQUES

Tableau 2 : Analyse bactériologiques des eaux de l'oued El kébir 2013

Types de bactéries	1 ^{er} site (Ain el assal)	2eme site (Sebeaa)
Coliformes totaux	11 germes /10 ml	14 germes/10 ml
Coliformes fécaux	07 germes/10 ml	09 germes /10 ml
streptocoques	00 germes /10 ml	00 germes /10 ml

Les paramètres microbiologiques mettent en évidence la présence de bactéries pathogènes ce qui signale un risque de contamination biologique. **[5].**

4 CONCLUSION

Dans un pays semi-aride comme l'Algérie, la question de l'eau constitue un enjeu central: social, environnemental, sanitaire, alimentaire, économique et financier. L'optimisation de cette ressource rare à travers une exploitation rationalisée des eaux superficielles et souterraines, et une politique de mobilisation des ressources en eau non conventionnelles est une priorité dans la stratégie du Ministère des Ressources en Eau algérien, qui propose, suit et contrôle la politique nationale. Cependant la qualité de l'eau dépend de facteurs naturels déterminants (sol, sous-sol, etc.) et d'activités humaines produisant des rejets qui se retrouvent directement ou indirectement dans les milieux naturels.

Le suivi des paramètres physico-chimiques est basé sur un certain nombre des échantillons qui nous a permis de détecter une évolution temporaire des concentrations de tous les éléments chimiques. Nous observons au période d'étude les eaux de oued el Kébir sont incolores, sans odeur, et les mesures effectuées montrent une dureté et une minéralisation très élevées pour la région d'étude cela est due à une pollution urbaine et industrielle.

Sur le plan de la qualité chimique et microbiologique, les eaux de la région d'étude sont loin des normes de l'O.M.S., elle est distingue à une mauvaise qualité.

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Master Cluster Head and Vice Cluster Head Algorithm for Wireless Sensor Networks Using PSO

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ABSTRACT: One of the most significant strategy measures of wireless sensor networks (WSNs) is energy efficiency. Grouping affords an effective way for encompassing the lifetime of the network. We offer a double cluster-heading clustering algorithm using particle swarm optimization (PSO-DH). The algorithm computes two cluster skulls. The determination of the dominant cluster and the immorality cluster-head needs consider the state information, including position and energy reservation about nodes and their neighbors. Because every node contains a list of information about his neighbors and location using connected dominating set. The dominant cluster head (DCH) receives and masses data to analyst directly. The algorithm poises the energy consumption, so it can encompass the network life time effectively.

KEYWORDS: clustering; sensor networks; PSO; LEACH; energy efficiency.

1 INTRODUCTION

A wireless ad hoc network consist of several number of mobile nodes that communicate one another without require any infrastructure or central management. WSNs are functional in many applications [1]. Sensor nodes are, usually spread in locations for real-time monitor. So energy restraint is the vital tricky of the WSNs. Clustering is one of the energy-efficient techniques [2] for encompassing the lifetime of a sensor network. It is often together with data collection to extend the network lifetime. Some clustering algorithms have been proposed for sensor networks. One of the well-known clustering protocols called LEACH has been introduced in Energy-efficient statement protocol for wireless micro sensor networks. LEACH is a cluster-based protocol that includes spread cluster formation in which the nodes elect themselves as cluster heads with some probability. The algorithm is run occasionally and the possibility of becoming a cluster head for each period is chosen to ensure that every node become a cluster head at least once within I/P rounds, where P is the prearranged ratio of cluster heads, LEACH systematizes its operation into rounds, where each round consists of a setup phase where clusters are formed and a steady state phase that consists of data announcement process. LEACH provides important energy savings and lengthy network lifetime over conventional multi-hop routing schemes. In HEED, the initial probability for each sensor to become a cluster head is reliant on its residual energy [3]. Later, sensors that are not enclosed by any cluster heads double their likelihood of becoming a cluster head. This procedure iterates until all sensors are covered by at least one head. In the concluding stage, sensors join cluster heads that have the lowest cost within their range. The particle swarm optimization (PSO) is a humble, active, and computationally effective optimization algorithm. It has been, practical to speech WSN issues such as optimal placement, node localization, gathering, and data combination. The application of PSO algorithm to solve the

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problem of sensor network clustering has been planned before in “Cluster-head identification in ad hoc sensor networks using particle group optimization” , The authors tried to equalize the number of nodes and candidate cluster heads in each cluster in order to-minimize the energy expended by the nodes- However, no comparison with other clustering protocols in terms of energy efficiency has been addressed in “Cluster-head identification in ad £hoc sensor networks using particle swarm optimization”. In [Energy-aware clustering for wireless sensor networks using particle swarm optimization], a protocol using PSO has been proposed. It has the objective of minimizing the intra-cluster distance and optimizing the energy consumption of £he network. In [Optimization of cluster-based routing protocols in wireless sensor network using PSO], a new cluster-based algorithm using PSO is proposed. The election of cluster-heads needs to consider the information of location and energy reserved about candidates and their neighbors. Based on this remark, this paper suggests a double cluster-heads clustering algorithm using the particle swarm optimization (PSO-DH), In the basis of LEACH, the algorithm creates two cluster heads using PSO. It not only considers the cluster-head Optimized selection, but also considers nodes energy symmetry. The intra-cluster data transmissions begin after clusters have been formed. The Chief Cluster Head (MCH) receives and totals the data from its cluster members. The combination data are sent to the vice one. The Vice Cluster Head (VCH) transmits combination data to the sink directly. MCH is not direct message with the sink, which can save energy. The mechanism better balances the network workloads, and clearly prolongs the lifetime of a sensor network.

2 PROTOCOL SPECIFICATION

We suggests a double cluster-heads clustering algorithm using the particle swarm optimization (PSO-DH), in the basis of LEACH, the algorithm generates two cluster heads using PSO. It not only considers the cluster-head Optimized selection, but also considers node' energy equilibrium. The intra-cluster data transmissions begin after clusters have been formed. The Master Cluster Head (MCH) receives and aggregates the data from its cluster members. The aggregation data are sent to the vice one. The Vice Cluster Head (VCH) transmits aggregation data to the sink directly. MCH is not direct communication with the sink, which can save energy. The mechanism better balances the network workloads, and clearly prolongs the lifetime of a sensor network. . We use multi-hop routing among the VCHs because the less time sequence between the member node and head.

Particle Swarm Optimization (PSO):

The particle swarm optimization (PSO) is a computational method that optimizes a problem by iteratively trying to improve a member of set. PSO optimizes a problem by having a population of candidate solution. PSO is originally attributed to **Kennedy and Eberhart**. The movement of organisms in a bird flock [8]. The algorithm was simplified and it was observed to be performing optimization.PSO is a met heuristic as it makes few or no assumptions about the problem being optimized and can search very large spaces of particles. The particle swarm optimization (PSO) is a humble, active, and computationally effective optimization algorithm. It has been, practical to speech WSN issues such as optimal placement, node localization, gathering, and data combination. The application of PSO algorithm to solve the problem of sensor network clustering has been planned before in “Cluster-head identification in ad hoc sensor networks using particle group optimization” , The authors tried to equalize the number of nodes and candidate cluster heads in each cluster in order to-minimize the energy expended by the nodes- However, no comparison with other clustering protocols in terms of energy efficiency has been addressed in “Cluster-head identification in ad £hoc sensor networks using particle swarm optimization”.

LEACH protocol

One of the well-known clustering protocols called LEACH has been introduced in Energy-efficient statement protocol for wireless micro sensor networks. LEACH stands for Low-Energy Adaptive Clustering Hierarchy. LEACH is a cluster-based protocol that includes spread cluster formation in which the nodes elect themselves as cluster heads with some probability. The algorithm is run occasionally and the possibility of becoming a cluster head for each period is chosen to ensure that every node become a cluster head at least once within I/P rounds, where P is the prearranged ratio of cluster heads, LEACH systematizes its operation into rounds, where each round consists of a setup phase where clusters are formed and a steady state phase that consists of data announcement process. LEACH provides important energy savings and lengthy network lifetime over conventional multi-hop routing schemes. This WSN is considered to be a dynamic clustering method. LEACH has two phases .The reason we need network protocol such as LEACH is due to the fact that a node in the network is no longer useful when its battery dies. This protocol allows us to space out the lifespan of the nodes, allowing it to do only the minimum work it needs to transmit data. The LEACH Network is made up of nodes, some of which are called *cluster-heads* The job of the cluster-head is to collect data from their surrounding nodes and pass it on to the base station LEACH is *dynamic* because the job of cluster-head rotates This is the formula for the amount of energy depletion by data transfer: LEACH’s Two Phases The LEACH network has two phases: the set-up phase and the steady-state

- The Set-Up Phase
    - Where cluster-heads are chosen
- The Steady-State
    - The cluster-head is maintained
    - When data is transmitted between nodes

It is Stochastic Threshold Algorithm. Cluster-heads can be chosen stochastically (randomly based) on this algorithm:

If n < T(n), then that node becomes a cluster-head.

The algorithm is designed so that each node becomes a cluster-head at least once. Deterministic Threshold Algorithm .A modified version of this protocol is known as LEACH-C (or LEACH Centralized)This version has a deterministic threshold algorithm, which takes into account the amount of energy in the node…Deterministic Threshold Algorithm and/or whether or not the node was recently a cluster-head. The changes between the LEACH stochastic algorithm and the LEACH-C deterministic algorithm alone is proven to increase the FND (First Node Dies) lifetime by 30% and the HND (Half Node Dies) lifetime by 20%

An Example of a LEACH Network:

While neither of these diagrams is the optimum scenario, the second is better because the cluster-heads are spaced out and the network is more properly sectioned.

Multi-Hop:

All the sensor nodes are identical in terms of battery energy and hardware complexity. In clustering, it is evident that the CH nodes will be over-loaded with the long-range communication to the **Base Station (BS)** or **Cluster Head (CH).**This means extra processing is necessary for data aggregation which results in the CH nodes expiring before other nodes, although it is desirable to ensure that all the nodes run out of their battery at about the same time. One important way to ensure this is to rotate the role of a CH among over all the sensor nodes as proposed in Low-Energy Adaptive Clustering Hierarchy (LEACH) and Hybrid Energy-Efficient Distributed Clustering (HEED).We propose Multi-Hop Data Communication Algorithm (MDCA) to evaluate the performance of heterogeneous WSN's. Each Sensor node transmits sensing data to the Base Station (BS) through a Cluster Head (CH).The CHs are selected periodically by different weighted probability. After the selection of CHs, member nodes communicate with their respective CHs by using multi-hop communication. The CHs collect the data from the member nodes in their respective clusters, aggregate the received data, and send it to the BS using multi-hop communication.

3 RELATED WORKS

Distributed Clustering in Ad hoc Sensor Networks: A Hybrid, Energy-Efficient Approach

Prolonged network lifetime, scalability, and load balancing are important requirements for many ad-hoc sensor network applications. Group of sensor nodes is an operative technique for achieving these goals. In this work, we propose a new energy-efficient advance for clustering nodes in ad-hoc sensor networks. Based on this advance, we present a protocol, HEED (hybrid energy-efficient distributed clustering) [3] that periodically select cluster heads according to a hybrid of their balance energy and a secondary guideline, such as node proximity to its neighbors or node degree. HEED does not make any supposition about the instance or quality of nodes. The clustering process complete in O (1) iterations, and does not trust on the network topology. The code of behaviors incurs low overhead in terms of processing cycles and messages interchange. It also achieves fairly different cluster head distribution. A caution selection of the secondary clustering guidelines can settle load among cluster heads.

Cluster-head identification in ad hoc sensor networks using particle swarm optimization

A new optimization system known as particle swarm optimization (PSO).The PSO approach is an evolutionary programming technique where a 'swarm' of test solutions, analogous to a natural swarm of bees, ants or termites, is allowed to interact and cooperate to find the best solution to the given problem[3]. It is a computational method that optimizes a problem by iteratively trying to improve a member of set. Function is used as a criterion for the optimization.

Particle Swarm Optimization

An idea for the optimization of small functions using particle swarm optimization is introduced [9]. The development of various paradigms is object, and an instrument of one of the paradigms is examined. Benchmark experiments of the paradigm are detailed and including small function optimization are proposed.

Energy-Efficient Communication Protocol for Wireless Micro sensor Networks

Wireless divide micro sensor systems will signal the trustworthy monitoring of a change of conditions for both refine and military applications. Based on our findings that the gathering protocols of direct conveyance, minimum-conveyance-energy, multi-hop routing may not be optimal for sensor networks, we nominate LEACH (Low-Energy Adaptive Clustering Hierarchy), a clustering-based protocol that use arbitrary rotation of local cluster-heads to smoothly divide the energy load surrounded by the sensors in the network. LEACH uses limited coordination to operate scalability and strong for energetic networks, and include the data mixing into the routing protocol to minimize the quantity of knowledge that must be pass to the base station.

Improving on LEACH Protocol of Wireless Sensor Networks Using Fuzzy Logic

The Wireless Sensor Networks (WSN) contains an extensive number of sensor nodes that are restriction in energy, processing power and storage. The effective force of nodes is the most valuable thought among them because the lifelong of Wireless Sensor Networks is boundary by the energy of the nodes. LEACH is one of the most celebrated groups of object mechanisms; it chooses a cluster head (CH) based on a likelihood model. It improves LEACH protocol using Fuzzy Logic (LEACH-FL), which takes battery level and node density into consideration.

4 IMPLEMENTATION

- Master Cluster Head
- Energy consumption
- LEACH
- Particle Swarm Optimization

Master Cluster Head

The algorithm is run periodically and the probability of becoming a cluster head for each period is chosen to ensure that every node become a cluster head at least once within ***I/P*** rounds, where P is the predetermined percentage of cluster heads, LEACH organizes its operation into rounds, where each round consists of a setup phase where clusters are formed and a steady state phase that consists of 'he data communication process. Clustering genert.es a master cluster-head and a vice cluster-head. This is followed by a steady state phase in which the data sensed are transmitted to the sink. The master^ cluster-head is -used for the date collecting and date aggregation

Energy consumption:

The transmitter dissipates energy, to run the radio electronics and the power amplifier, and the receiver dissipates energy to run the radio electronics. The radios can perform power control and hence use the minimum energy required to reach the intended recipients. We adopt a typical energy consumption model whose specific details. The energy spent for transmission

LEACH

A double cluster-heads clustering algorithm using the particle swarm optimization (PSO-DH), in the basis of LEACH, the algorithm generates two cluster heads using PSO. LEACH is a cluster-based protocol that includes distributed cluster formation in which the nodes elect themselves as cluster heads with some probability.

Particle Swarm Optimization:

The particle swarm optimization (PSO) is a computational method that optimizes a problem by iteratively trying to improve a member of set. PSO optimizes a problem by having a population of candidate solution. The movement of organisms in a bird flock. The algorithm was simplified and it was observed to be performing optimization.PSO is a met heuristic as it makes few or no assumptions about the problem being optimized and can search very large spaces of particles.

The particle swarm optimization (PSO) is a humble, active, and computationally effective optimization algorithm. It has been, practical to speech WSN issues such as optimal placement, node localization, gathering, and data combination. The application of PSO algorithm to solve the problem of sensor network clustering has been planned before in "Cluster-head identification in ad hoc sensor networks using particle group optimization" , The authors tried to equalize the number of nodes and candidate cluster heads in each cluster in order to-minimize the energy expended by the nodes- However, no comparison with other clustering protocols in terms of energy efficiency has been addressed in "Cluster-head identification in ad £hoc sensor networks using particle swarm optimization".

5 ALGORITHM

PSO ALGORITHM

PSO algorithm works by having a population of particles. These particles are moved around in the search-space according to a few simple formulas. The movements of the particle are guided by their own best position [8]. When improved positions are being discovered these will them come to guide the movement of swarm. Each particle knows best position V_{bd} and global best position V_{gd} are the entre group of paricles The particles will have velocities, which direct the flying of the candidate solution. The velocity and position equation are ollow us

$$V_{bd}(t+1) = WV_{bd}(t) + c1\alpha(P_{bd-X_{ld}(t))+} c2\beta(P_{gd-X_{gd}(t))}$$

$$V_{bd}(t+1) = X_{bd(t)+V_{bd}(t+1)}$$

Where, V- velocity
X- Position
t- Time
c1 & c2- learning factors
α and β – random number
W- Weight

PSO-DH *ALGORITHM*:

PSO-DH Algorithm is same to LEACH. This algorithm first is placed similar object using LEACH. Each object optimally selects the MCH and VCH using PSO [8]. The intra-object data communication to start after clusters has been created. Each MCH accept and mixture the data from its cluster associate. Many objects have to propose the use of TDMA listed in the MAC layer. The mixture dates are sent to the VCH. The VCH transmits mixture data to sink directly.

- We initial similar object using LEACH algorithms. All associate nodes transmit information about its present vigor and actual places.
- The Cluster head moves this algorithm to choose the MCH and VCH using PSO.

6 SIMULATION RESULT

In this concept, we calculate the presentation of PSO-DH algorithm. Pretence test are carried out in the NS2 (Network Simulator 2). We ran the simulation for 250 nodes in network area with same initial energy. The presentation of our algorithm was contrast with the clustering protocols for WSNs. LEACH and PSO-DH contrast their lifetime and energy respectively using multi-hop routing among VSHs. Thus the energy to use all nodes for communication can be minimizing since the distance between member node to cluster head are shorter. LEACH and lifetime of PSO-DH to spread nearly 50% to one of PSO-LEACH.

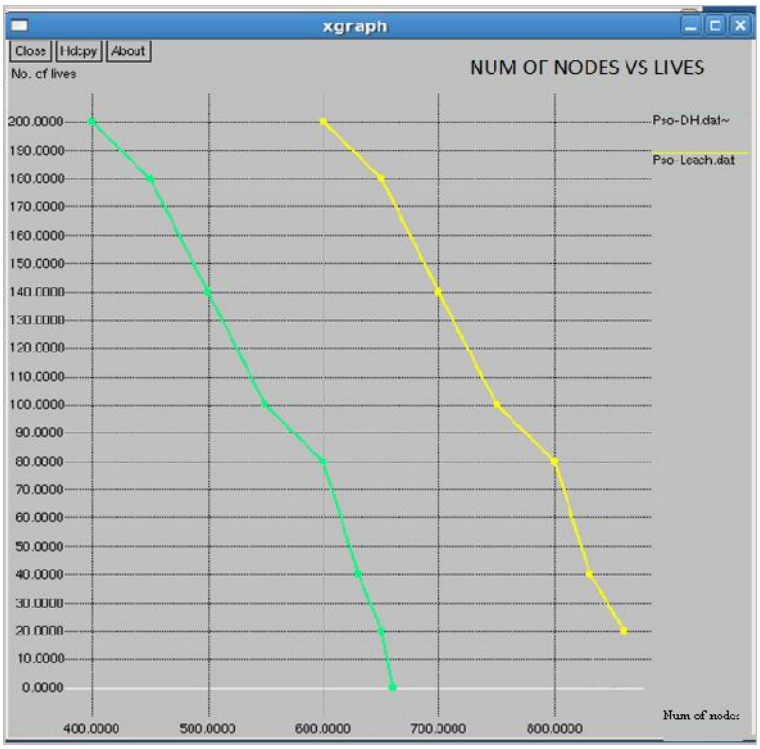

Fig. 1. Num of Nodes vs lives

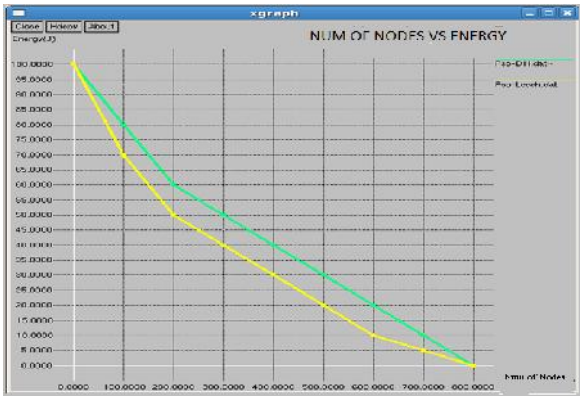

Fig. 2. Num of Nodes vs Energy

7 CONCLUSION

In this Concept, we shows double cluster-heads clustering algorithm using particle swarm optimization algorithm. We have clear a few suitability occupations that take into account the minimum distance between the member node and its bunch head, and the residual energy of the node in the cluster-head assortment algorithm. For balancing the network work load, we adapt the dual cluster head strategy and result shows proposed algorithm poises the energy consumption and extends the network lifetime very effectively. We use multi-hop routing among the VCHs because the less time sequence between the member node and head.

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Effects of Firm Size on Activity-based Costing Implementation in Nigerian Manufacturing Sector

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ABSTRACT: Activity-based costing system represents a major innovation in management accounting. It is one of the most investigated management accounting concepts, especially in the advanced market economies of United States of investigated management accounting concepts, especially in the advanced market economies of United States of America, United Kingdom, amongst others. In the organizational innovative literature usually a positive association is found between size and organizational innovativeness. Larger firms are argued to have more complex and diverse facilities and greater resources available, and to employ more professional and skilled workers, that facilitate the implementation of innovations. The results of prior studies in the area of activity-based costing are somewhat mixed, however. Using a survey research design, this study examines the influence of firm size on activity-based costing implementation in the Nigerian Manufacturing sector. Data were obtained using structured questionnaire administered to 500 Accountants, Cost Accountants, Management Accountants and Financial Managers who are in full-time employment of 24 randomly selected manufacturing firms listed in the Nigerian Stock Exchange. The result of regression analysis revealed significant relationship between the extent of ABC implementation and firm size in the Nigerian manufacturing sector. It is recommended that future studies should seek to investigate the influence of other contextual factors such as top management support, product diversity and level of competition.

KEYWORDS: Business Size, Accurate Product Costing, Activity-based Costing, Manufacturing, Nigeria.

1 INTRODUCTION

During the last few decades, business organizations have been challenged to change their costing practices and more specifically to implement new cost management innovations such as activity-based costing [1] in order to ensure accurate product costing. Activity-based costing system represents a major innovation in management accounting [2]. This costing system is one of the most investigated management accounting concepts, especially in the advanced market economies of United States of America, United Kingdom, amongst others [3], [4], [5].

1.1 STATEMENT OF THE PROBLEM

Organizational size refers to the size of the firm, usually measured in terms of number of employees. In the organizational innovative literature usually a positive association is found between size and organizational innovativeness. Larger firms are argued to have more complex and diverse facilities and greater resources available, and to employ more professional and skilled workers, that facilitate the implementation of innovations [6]. The results of prior studies in the area of activity-based costing are somewhat mixed, however. For instance, [7], [8] and [9] have found a significant positive association, whereas, for instance [9] and [10] have found no association between the size of firms and the implementation of activity-based costing. Also, [11] reported a negative association between firm size and activity-based costing implementation. In Nigeria, manufacturing firms are grouped into three main categories based on size. These include small

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size firms, medium size firms and the big firms [12]. Since manufacturing firms are in these various sizes, one wonders if there is any link between the size of firm and the implementation of activity-based costing system.

1.2 OBJECTIVE OF THE STUDY AND RESEARCH QUESTION

The main objective of this study is to explore the influence of firm size on activity-based costing system implementation in Nigerian Manufacturing Sector. In other to achieve the objective of this study, the following research question is posed: 'What is the influence of firm size on ABC implementation in Nigerian Manufacturing Sector?"

1.2.1 RESEARCH HYPOTHESIS

In other to achieve the objective of this study, the hypothesis that:

Ho_i: There is no significant relationship between firm size and activity-based costing system implementation in the Nigerian manufacturing sector.

2 LITERATURE REVIEW

Reference [9] conducted a study on the diffusion of activity-based costing in Norway. The study was based on a questionnaire survey, incorporating data from 75 of the largest manufacturing companies in Norway. The findings show that companies which had knowledge of activity-based costing were significantly larger than the others. However, size did not significantly discriminate between adopters and non-adopters within the group with activity-based costing knowledge.

Reference [13] conducted a survey in the State of Victoria in Australia. The questionnaires were sent to 350 Australian manufacturing companies and resulted in 120 useable responses which represent a response rate of 34%. The results report that only 12.5% (15 companies) had implemented activity-based costing, 2.5% (3 companies) rejected the implementation of the activity-based costing, 8.3% (10 companies) indicated that they intended to implement activity-based costing in the future, and the remaining 76.7% (92 companies) did not plan to implement activity-based costing. The findings of the study show significant differences between companies implementing activity-based costing and those not implementing activity-based costing in relation to production complexity and firm size.

Reference [14] in a survey of 60 large and medium-sized manufacturing companies in India found adoption rate of 20% for activity-based costing, 13% for activity-based management, and 7% for activity-based budgeting. The size in terms of total assets has been found to be significant factor in adoption of these contemporary management accounting techniques. Reference [15] conducted their study on the relationship between activity-based costing and firm size in Plastic manufacturing industry in Australia. Using number of employees, annual gross operating revenue and total assets as proxies for firm size; correlation analysis was carried out. The result of the analysis revealed a positive and significant relationship between firm size and activity-based costing implementation in Australia.

Reference [16] examined the extent to which activity management practices are adopted by Australian business units. They also examined the association between extent of adoption and the organizational factors of size and decision usefulness of cost information. Data were collected by mail survey questionnaire of a random sample of business units. Adoption rates were found to be higher than in prior studies, suggesting the continuing relevance of activity management. All factors were found to be associated with all activity management practices. In particular, business unit size was found to be associated with extent of adoption of Activity Analysis and Activity Cost Analysis, while decision usefulness was associated with Activity-based Costing.

Reference [4] reported on the findings of a postal questionnaire that examines the extent to which potential contextual factors influence the characteristics of product costing systems. Results indicated that higher levels of cost system sophistication are positively associated with the importance of cost information, size, extent of the use of just in time/lean production techniques and the type of business sector. Similarly, [15] conducted a longitudinal study on the diffusion of innovation and business size in Australian context. Primary data were collected through the administration of questionnaire while the data were analyzed using Pearson Product Moment Correlation (PPMC). The study revealed that there is a significant positive relationship between business size and both technological innovation and the implementation of activity-based costing system.

Reference [17] conducted a survey using a sample of four hundred (400) Sweden manufacturing firms having more than 50 employees. Although several factors were incorporated in that study, however, only the size of firm has a positive and significant relationship with the diffusion and the implementation of activity-based costing in Swedish manufacturing. In a

related study [1] conducted a survey of manufacturing, service and financial sector organizations to investigate the implementation state of activity-based costing systems in Ireland. The result reported in that study indicated that most of the firms that have not implemented activity-based costing belong to the small-size category. In other words, the few firms that have implemented activity-based costing system in Ireland belong to the large-size categories. This means that firm size is positively related to activity-based costing implementation.

In like manner, [18] carried out an empirical study to find out the application of contemporary management accounting techniques in Indian industry through a survey of 530 member companies of the National Association of Financial Directors and Cost Controllers. The sample was stratified in two segments; activity-based costing user firms and Non activity-based costing user firms. The researcher found a positive significant association between the implementation of activity-based costing and business size.

In Malaysia, [19] examined the usage of management accounting practices, particularly activity-based costing system in manufacturing firms in the context of Malaysian companies. They also studied the relationship between company size and usage of advanced management accounting practices. Obtaining data from five hundred (500) randomly selected manufacturing firms in Malaysia, the study examined whether company size is related to the use of advanced management accounting practices. Spearman correlation indicated significant positive relationships between activity-based costing usage/implementation and company size.

Reference [20] used logistic ordinal regression analysis to examine the impact of the level of competition, product customization, manufacturing overhead costs and operating unit size on the level of consideration for activity-based costing when measured on a three-point ordinal scale ranging from not considered, considering and considered activity-based costing. The results indicate that operating unit size is related positively to the level of consideration for activity-based costing.

Reference [11] conducted an exploratory study on the organizational factors influencing the choice of activity-based costing system in 170 Iranian organizations. Postal questionnaires were administered to Financial Managers of the selected companies in Tehran Stock Exchange. The findings revealed a negative relationship between industry type and activity-based costing implementation. While most of the manufacturing companies still use the traditional costing method, most of the service companies have implemented activity-based costing system. Furthermore, a negative relationship was reported between firm size and activity-based costing implementation.

Reference [21] investigated the influence of company characteristics factors on activity-based costing implementation in Jordanian manufacturing companies. The study investigated company characteristics factors which include (i) Industry type (ii) company size (Number of Employees) and Products diversity (Number of Product); and how each of these factors influences activity-based costing implementation. Questionnaire survey was used in the study, 92 surveys were distributed within the Jordanian manufacturing companies. Logistic regression (logit) analysis was carried out on the data collected. The findings in the study reveals that company sectors, size - number of employees, and diversity -number of product do not have significant influence on the implementation of ABC among manufacturing shareholding firms in Jordan.

3 MATERIALS AND METHODS

The survey research design is employed in this study. The population comprises the 86 manufacturing companies that are quoted in the Nigerian Stock Exchange, meanwhile, the sample comprise of 24 randomly selected manufacturing companies. Primary data were obtained through the administration of structured questionnaire to 500 accountants, cost accountants, management accountants, senior accountants and financial managers on full-time employment in the Nigerian manufacturing sector. Data analysis is conducted using logistic regression analysis with the model below:

$$Y_1 = b_0 + b_1 X_1 + \varepsilon \qquad (1)$$

4 RESULTS AND DISCUSSIONS

The results of the analysis are presented in this section with the discussion of findings. Table 1 below reports the "Omnibus Tests of Model Coefficients." Omnibus means overall, and so this output is simply telling us whether the model with 1 predictor (firm size) predicts the dependent variable better than chance alone. What the above table is telling us is that the model with 1 predictor does better than chance at predicting the dependent variable, and is statistically significant at $p < .001$.

Table 1. Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	254.454	1	.000
	Block	254.454	1	.000
	Model	254.454	1	.000

Source: Output of data analysis by author

Table 2 below is the "model summary" which is a summary statistics for the model at "Step 1," which recall the model with 1 predictor. The first statistic is the -2 Log likelihood value, and is equal to 210.290. Furthermore, table 2 below reports the Cox & Snell R Square value of .465. This statistic is referred to as a "pseudo-R^2" statistic; in that it is designed to tell us something similar to what R-squared tells us in ordinary least squares regression, that of the proportion of variance accounted for in the dependent variable based on the predictive power of the independent variable (predictor) in the model. Overall, high values are better than low values here, with higher values suggesting that your model fits increasingly well. Next is the "Nagelkerke R Square" statistic, it is a "pseudo" R-square value, purporting to tell us something along the lines of an OLS R-square, but not directly comparable to it.

Table 2. Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	210.290[a]	.465	.683

a. Estimation terminated at iteration number 7 because parameter estimates changed by less than .001.

Source: Output of data analysis by author

Table 3 below presents the Hosmer and Lemeshow Test, a measure of fit which evaluates the goodness of fit between predicted and observed probabilities in classifying on the DV. We see that the test is statistically significant ($p < .001$), suggesting that the probabilities of predicted vs. observed do not match up as nicely as we would like.

Table 3. Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	25.198	3	.000

Source: Output of data analysis by author

Table 4 below presents the variables in the Equation. The above table is a major part of the logistic regression output. First, we see that SPSS is reporting the Step number, which is "1," and noting that the variable in this step include firm size. Let us look at the coefficient "B" under "size." It is equal to 2.815. It means that given an increase of firm size by one unit, we can expect the log odds (or "logit") of implementing ABC system to increase by 2.815.

Next, we see "S.E." which stands for "standard error. Essentially, the standard error is a measure of how stable our estimate is. A large standard error means the estimated coefficient is not that well estimated, and a low standard error means we have a fairly precise estimate. For "firm size," the standard error is equal to .305. The Wald statistic, is very much like a t-statistic conceptually, and is a test of the null hypothesis that the "B" population coefficient is equal to 0. Do we have good reason to reject the null hypothesis? Based on the p-value of .001, we have evidence to suggest that the "B" coefficient is not equal to 0 in the population from which these data were presumably drawn. That is, we have evidence to suggest that firm size, predicts the response variable better than chance alone. Next, we see "Exp(B)," and for firm size, the value is equal to 16.685. The number 16.685 has a very special meaning. It is called an "odds" and is interpreted as follows: an increase of 1 unit on firm size increases the odds of implementing ABC system by 16.685. The 95% confidence interval is also provided for the value of Exp(B).

Table 4. Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1[a]	Size	2.815	.305	85.217	1	.000	16.685	9.179	30.329
	Constant	-10.621	1.225	75.126	1	.000	.000		

a. Variable(s) entered on step 1: size.

Source: Output of data analysis by author

From the analysis above, particularly with the result of the Hosmer and Lemeshow test and other tests conducted above suggests that significant relationship exists between the extent of ABC implementation and firm size in the Nigerian Manufacturing Sector as the p value (0.001 is less than the beta value 0.05). Thus the null hypothesis that "there is no significant correlation between the extent of ABC implementation and firm size in the Nigerian Manufacturing Sector," is rejected. It can be concluded therefore that "there is a significant relationship between the extent of ABC implementation and firm size in the Nigerian Manufacturing Sector."

This study focused on the relationship between firm size and activity-based costing system implementation in Nigerian manufacturing sector. The findings from the analysis of data revealed that there is a positive and significant relationship between activity-based costing implementation and firm size in manufacturing sector in Nigeria. This result is consistent with the result reported by [13], [17], [15], and [16] who reported a significant relationship between activity-based costing and firm size, indicating that larger firms are more likely to implement activity-based costing system than the smaller firms. Similarly, the result of this study is similar to the results reported by [1], [18], [19], and [20]; as each of them reported a positive relationship between firm size and activity-based costing system implementation in the Nigerian manufacturing sector. The reason for a positive relationship between firm size and activity-based costing implementation may be due to the cost implication of conversion from the traditional costing system to the activity-based costing system by small size firms. Since larger firms have easier access to financial and human resources, it becomes easier for such big firms to implement activity-based costing system.

5 CONCLUSION

This study examines the relationship between firm size and activity-based costing system implementation in Nigerian manufacturing sector. From the review of literature and data analysis, it becomes glaring that a positive relationship exists between firm size and activity-based costing system implementation in the Nigerian manufacturing sector. Large size firms tend to be favourably disposed to activity-based costing system implementation.

This study examines the influence of firm size on activity-based costing system implementation in the Nigerian manufacturing sector. Size is only one of the contextual factors influencing costing system implementation. Future studies should seek to investigate the influence of other contextual factors such as top management support, product diversity and level of competition, amongst others.

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Characterization of emulsification activity of partially purified Rhamnolipids from *Pseudomonas fluorescens*

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ABSTRACT: In recent years natural biosurfactants have attracted attention because of their low toxicity, biodegradability, and ecological acceptability. Rhamnolipids is composed of rhamnose sugar molecule and ß-hydroxyalkanoic acid. Soil isolates of *Pseudomonas fluorescens* was used to characterize substrate (Mustard oil, Soybean oil, Olive oil, Palm oil, Sunflower oil and Coconut oil) for highest rhamnolipid production. Highest yield of biosurfactants was obtained from Soybean oil as 7.16 g/L by *P. fluorescens*. The estimated value of rhamnolipids was 0.437 g/L using Soybean oil from *P. fluorescens* by Orcinol method. Bacterium was capable of emulsifying a wide range of vegetable oils. The emulsification activity was found stable up to 72 hours. Upon characterizing C:N ratio of higher rhamnolipid was obtained at C:N ratio of 40 (93.75%) for *P. fluorescens* using Soybean oil as carbon source and Ammonium chloride as nitrogen source. It was revealed that partially purified rhamnolipid of *P. fluorescens* showed highest emulsification at optimum temperature 4°C for Palm oil, Sunflower oil and Coconut oil (90% all), at pH 6 and pH 7 in Palm oil, Sunflower oil and Coconut oil (90% all) and for 5% NaCl concentration in palm oil (94.44%).

KEYWORDS: Rhamnolipid biosurfactant, *Pseudomonas fluorescens*, emulsification activity.

1 INTRODUCTION

Biosurfactants are amphiphilic compounds produced on living surfaces, mostly microbial cell surface or excreted extracellularly and contain hydrophobic and hydrophilic moieties that reduce surface tension and interfacial tension between individual molecules at the surface and interface respectively. Biosurfactants are produced by different microorganisms such as bacteria, fungi and yeast (Priya and Usharani, 2009). Biosurfactants have several advantages, including low toxicity, high biodegradability low irritancy and compatibility with human skin. Biosurfactant have gained importance in the field of enhanced oil recovery, environment bioremediation, food processing and pharmaceuticals. Microbial biosurfactant are classified by its chemical composition and microbial origin (Desai *et al*., 1997). Low molecular weight (glycolipids or glycopeptides) can diminish surface tension, but does not form stable emulsion. On the other hand, biopolymers are less affection, and have a considerable specificity for substrate. Petroleum-derived hydrocarbon degrading microorganisms can produce biosurfactant to increase bioavailability and degradation. Biosurfactant are produced by organism, in order to metabolize water immiscible substrates, allowing its absorption, emulsification or dispersion. For the microorganism, production of biosurfactant is an advantage in soil, giving them advantages in specific condition (Ron *et al*., 2002).

Microbial biosurfactant are mainly produced by aerobic microorganism, using carbon as sources carbohydrates, hydrocarbons, animals or vegetable oil or a mixture of them. Biosurfactant can be intracellular (remain attached to the cell well) and can be excreted to the media. When the biosurfactant are intracellular, their structure includes membrane lipids and promote the transport of insoluble substrates through the membrane; when they are extracellular, the biosurfactant help on the surface of lipids, proteins and carbohydrates (Prabhu *et al*., 2003). The main difference in the chemical nature of the different biosurfactant molecules is in hydrophilic head, allowing for wide range of variation in their physical and biological properties (Lu *et al.*, 2007).

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Rhamnose is an unusual sugar that is found primarily in plants and some bacteria. Unlike most natural sugars, it is found in L configuration instead of the usual D configuration. It forms a major structural component of plant cell walls and is also bound to other compounds, such as phenolics (Thaniyavarn et al., 2006). In some gram negative bacteria, the sugar is bound to lipids. Both the pure compound and the lipid component have a number of uses in the pharmaceutical, agricultural, and cosmetic industries. One highly important and widespread use of this sugar in plants is as a component of polysaccharides known as rhamnogalacturonans (such polymers are important for plant cell wall structural integrity and comprise part of pectin, one of the substances that holds plant cell walls together. These are long chains of L-rhamnose mixed with galacturonic acid). There are different types of rhamnogalacturonans that vary in their degree of branching and components, which may include other sugars.Other bacteria utilize rhamnose combined with lipids in their polysaccharides, resulting in compounds called rhamnolipids. Those produced by the gram negative bacterium *Pseudomonas aeruginosa* are used commercially (Hamid *et al.,* 2006**)**. At least one other type of gram negative bacterium has been genetically engineered to produce a larger percentage of rhamnolipid in the exopolysaccharide surrounding the cells to facilitate improved extraction of the compound for industrial uses (Linhardt *et al*., 1989).

Rhamnolipids have the properties of a surfactant, meaning they can mix with oil and water. Most such compounds have been made from petroleum products in the past. These naturally based compounds are considered a green alternative to older products, and are often used in cosmetics, pharmaceuticals, and agriculture (Rahman *et al.*, 2002). In addition to the direct use of rhamnolipids, they are also used as commercial sources of rhamnose sugar. It is not ideal to have plants as a source of an industrial compound, since their availability may be limited. Rhamnolipids are mainly produced by bacteria of the genus *Pseudomonas*. Rhamnolipids are composed of one or two hydrophobic ß-hydroxy fatty acids, which are linked through a ß-glycosidic bond to one or two rhamnose molecules forming the hydrophilic moiety (Wang *et al*., 2007). According to the number of rhamnose moieties, mono and di-rhamnolipidsare differentiated. The fatty acids alkyl chain length in *P.aeruginosa* can vary from C8 to C14. A rhamnose test is available for intestinal permeability in humans (Wittgens *et al*., 2011).

Application of biosurfactant and biosurfatant-producing bacteria in bioremediation and phytoremediation has been studied. Due to their biodegradability and low toxicity, they are very promising for use in environmental technologies. Optimized growth condition using cheap renewable substrates (agro-industrial wastes) and novel, efficient method for isolation and purification of biosurfactants could make their production more economically feasible. Another important aspect regarding biological bioremediation technologies is the use of biosurfactant in the process on large scale. To facilitate this process,a new techniques should be developed such as foams or micro-foams in conjunction with biosurfactants (Płaza *et al*. (2011). Rhamnolipids with one sugar molecule are referred to as mono-rhamnolipids, while those with two sugar molecules are di-rhamnolipids **(**Gunther *et al.,* 2005). *P. fluorescens* is capable of growth and rhamnolipid production using a range of different carbon sources; however, the highest levels of rhamnolipid production result from using vegetable-based oils (Santos *et al*., 2010). The genus *Pseudomonas* is capable of using different substrates, such as glycerol, mannitol, fructose, glucose, n-paraffins and vegetable oils (Palm oil, Olive oil, Coconut oil, Mustard oil, Soybean oil, Sunflower oil) to produce rhamnolipid-type biosurfactant, as substrates respectively (Santaanna *et al.,* 2002).

The objectives of study were to partially purify rhamnolipids from *P. fluorescens* and screen and characterize emulsification activity of rhamnolipids at different physiochemical parameters.

2 MATERIALS AND METHODS

For the present investigation *Pseudomonas fluorescens* was used and procured from the Microbial Culture Collection Bank (MCCB), Department of Microbiology and Fermentation Technology, SHIATS. Allahabad and maintained on nutrient agar slant.

Nutrient broth was used for preparation of the inoculum. The composition of the Nutrient broth used was as follows: beef extract 3.0 g, peptone 5.0 g, sodium chloride 5.0 g in a litre of distilled water. The seed culture was prepared in a test tube containing 10 ml of Nutrient broth medium by inoculating 1 loopful spore suspension and cultivated with agitation (150 rpm) at 30°C for one day.

2.2 Biosurfactant production from *Psuedomonas fluorescens*

2% inoculum in Nutrient broth was transferred into a Bushnell haas medium with the following composition (g/900ml): KH_2PO_4 0.5 g, Na_2HPO_4 0.5 g, NaCl 5.0 g, NH_4Cl 1.0 g, $MgSO_4.7H_2O$ 0.1 g with 100 ml distilled water containing 2% substrate whose pH was adjusted to 7 ± 0.2. Then Bushnell haas broth containing 2% of inoculum and 2% of substrate [Palm oil (K S Oils Ltd.), Olive oil (Figaro Ind.), Coconut oil (Parachute Oils), Mustard oil (Sunrise Spices Ltd.), Soybean oil, Sunflower oil (both

from Fortune cooking Oil)] was incubated at 30°C under aerobic condition in a shaking incubator (Remi Instruments Ltd., India) at 200 rpm for 72 hours to 96 hours to obtained the highest biosurfactant concentration.

2.3 Partial Purification of Rhamnolipids from *Psuedomonas fluorescens*

The culture was refrigerated at 4°C and then centrifuged (Remi Instruments Ltd., India) at 8500 rpm for 30 minutes to remove the cells and filtered with sterile whatman No.1 filter paper. The clear sterile supernatant was served as crude biosurfactant. The biosurfactent was recovered from the cell free culture supernatant by cold acetone precipitation; 2 V of chilled acetone was added and allowed to stand for 10 hours at 4°C. The precipitate was collected by centrifugation and evaporated to dryness to remove residual acetone after which it was re-dissolved in sterile double distilled water.

2.4 Screening of rhamnolipids for biosurfactant activity

Biosurfactant activity of *P. fluorescens* was detected by using Oil displacement assay, Emulsificaiton activity and Drop Collapse assay in six different oils namely Palm oil, Olive oil, Coconut oil, Mustard oil, Soybean oil and Sunflower oil.

2.4.1 Oil displacement assay

The 15 ml of distilled water was added to a Petri dish (15 cm in diameter) followed by the addition of 20 µl of oil to the surface of water and 10 µl of supernatant of culture broth of *Pseudomonas fluorescens* was inoculated to oil drop. The oil showed displacement and a clearing zone was formed. The diameter of this clearing zone on the oil surface correlates to biosurfactent activity.

2.4.2 Emulsificaiton activity (E_{24})

Sterilized biosurfactant solution (2ml) was added into each test-tube (in a set of three) containing the substrate (Palm oil, Olive oil, Coconut oil, Mustard oil, Soybean oil, Sunflower oil) 2ml. The content of the tubes was vortexed uniformly for 2 minutes and left undisturbed for 24 hours. The volume of oil that separated after 24h, 48h and 72h of standing was measured that showed the ability of a molecule to form a stable emulsion. The emulsification activity was defined as the height of the emulsion layer divided by the total height and expressed in percentage.

EI = (Height of the emulsion layer/ Total height) ×100

2.4.3 Drop Collapse assay

Oil was added to a calibrated microscopic slide, which for 1 hour at room temperature. The culture supernatant (5µl) was added to the surface of the oil dropped on slide, the shape of the drop on the oil surface was noted within 1 minute. The culture supernatant that collapsed the oil drop indicated positive drop collapse test otherwise the test was considered negative. Here distilled water with uninoculated oil drop was used as negative control.

2.5 Characterization for emulsification activity of rhamnolipids at different physical parameters

The applicability of biosurfactants in several fields depends on their stability at different parameters.

2.5.1 Quantification of rhamnolipids

For analysis, rhamnolipids were extracted using 100µl of orcinol-assay of cell free culture broth and 500µl of ethyl acetate. Sample was mixed at vortex mixer (Icon, India) with a subsequent phase separation by centrifugation at 10000 rpm for 1 min. The upper rhamnolipids containing phase was transferred to a new reaction tube. This procedure was repeated three times. Finally the organic solvent was removed by evaporation under agitation.

Orcinol assay

The evaporated rhamnolipids were dissolved in 100µl distilled water, subsequently 100µl of 1.6% orcinol solution and 800µl of 60% sulphuric acid in distilled water was added. The samples were incubated at 80°C for 30 min. and 1000 rpm orbital shaking in an incubator. After cooling to room temperature the samples were measured at 420 nm using a

colorimeter (Aimil Photochem Ltd., India) in comparison to different concentration of the commercial rhamnlipid. The rhamnolipid concentrations were calculated from a standard curve prepared with L-rhamnose by comparing the data with those of rhamnose standards between 0 and 0.5 g/L and expressed as rhamnose equivalents, RE.

2.5.2 Effect of Carbon-Nitrogen Ratio on rhamnolipid production and emulsification

Carbon source used were Palm oil, Olive oil, Coconut oil, Mustard oil, Soybean oil, Sunflower oil (2%,3%,4%,5%,6%V/V each) with NH_4Cl as nitrogen source. For evaluation of Nitrogen sources on bio emulsification NH_4Cl was employed at a concentration of 1, 2, 3, 4, 5 (g/l each) with the optimum carbon source for 24 hours. The effect of different Carbon, Nitrogen sources and emulsifying activity was carried out by the C/N ratio. Treatment control was set. Then emulsification activity was measured by E_{24} assay.

2.5.3 Effect of temperature on emulsification stability

To observe the effect of temperature on bio emulsification for supernatant (2ml of partially purified biosurfactant was mixed with 2ml of Palm oil, Olive oil, Coconut oil, Mustard oil, Soybean oil, Sunflower oil) followed by incubation at different temperatures (4°C, 10°C, 30°C, 70°C and 100°C) for 24 hours. Treatment control was set. Then emulsification activity was measured by E_{24} assay.

2.5.4 Effect of pH on emulsification stability

To observe the effect of pH on bio emulsification for supernatant (2ml of partially purified biosurfactant was mixed with 2ml of Palm oil, Olive oil, Coconut oil, Mustard oil, Soybean oil, Sunflower oil) followed by incubation at different pH ranges (5, 6, 7, 8 and 9) for 24 hours. Treatment control was set. Then emulsification activity was measured by E_{24} assay.

2.5.5 Effect of salinity on emulsification stability

To observe the effect of salinity on bio emulsification for supernatant (2ml of partially purified biosurfactant was mixed with 2ml of Palm oil, Olive oil, Coconut oil, Mustard oil, Soybean oil, Sunflower oil) followed by incubation at varied concentration of NaCl (1%, 2%, 3%, 4% and 5%) for 24 hours. Treatment control was set. Then emulsification activity was measured by E_{24} assay

3 RESULTS

3.1 Production and partial purification of Biosurfactant from *P. fluorescens*

A typical time course profile of the bacterial growth of the biosurfactant mixture produced by *P. fluorescens* in Bushnell haas medium, which was performed at 30°C under aerobic condition in a shaking incubator at 200 rpm for 72 hours at pH 7.0. The highest biosurfactant yield of 7.16 g/l was obtained after 72 hours of incubation using soybean oil and ammonium chloride as carbon and nitrogen sources, respectively.

3.2 Screening of rhamnolipids for biosurfactant activity

3.2.1 Oil displacement assay of partially purified biosurfactant from *Pseudomonas fluorescens*

P. fluorescens showed highest oil displacement for soybean oil (2.5mm) followed by 2mm for mustard oil, 1.5mm for olive oil and followed by 0.7mm for sunflower oil and coconut oil.

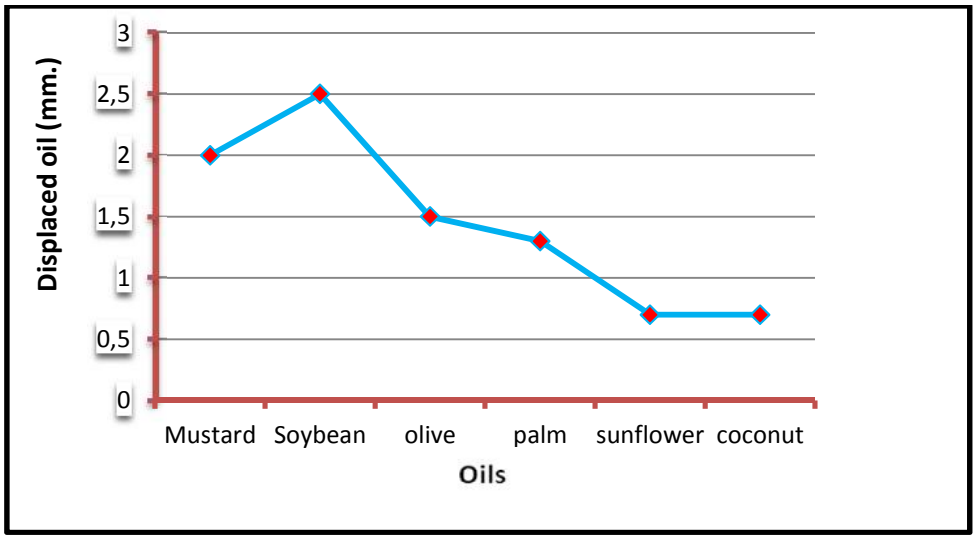

Fig.3.1 Oil displacement assay

3.2.2 Drop collapse assay of partially purified biosurfactant from *Pseudomonas fluorescens*

The partially purified biosurfactant from *P. fluorescens* showed a positive drop collapse assay that evidenced the biosurfactant activity. A positive drop collapse test by the isolates showed a preliminary indication of the biosurfactant activity of the bacterial cell that clearly indicated production of biosurfactant by the bacterial cell. The positive drop collapse assay also revealed about the extracellular production of the biosurfactant and its surface active nature.

3.2.3 Emulsification activity of partially purified biosurfactant from *P. fluorescens* on selected vegetable oils

P. fluorescens showed maximum emulsion formation on Mustard oil and Coconut oil (80% both) in 24 hours and minimum on olive oil (15%) in 72 hours. At 24 hours all six different oils *viz.,* Palm oil, Olive oil, Coconut oil, Mustard oil, Soybean oil, Sunflower oil showed the maximum emulsification index, and it gradually decreases up to 72 hours.

On analysing the data using two way ANOVA, the differences in data was found significant due emulsification and non significant due to oil. Critical difference (CD) was 21.77 for emulsification time.

Table 3.1 Emulsification activity of partially purified biosurfactant from Pseudomonas fluorescens

Emulsification at different time	Emulsification Index (%) of Partially purified rhamnolipid by *P. fluorescens*					
	Mustard oil	Soybean oil	Olive oil	Palm oil	Sunflower oil	Coconut oil
E_{24}	80	70	75	50	73.33	80
E_{48}	60	60	50	30	57.14	50
E_{72}	33.33	55	15	25	33.33	50

Table 3.2 Comparison table against CD value of emulsification at different time for Pseudomonas fluorescens

CD = 21.77	**M_3** 35.28	**M_2** 51.19
M_1 71.39	S **36.11**	NS 20.2
M_2 51.19	NS 15.91	-

Where, M_1, M_2 and M_3 are the means of E_{24}, E_{48} and E_{72} respectively. From the above Comparison table, it is evident that there is significant difference between the mean pair (M_1, M_3) and non significant was observed for (M_2, M_3); (M_1, M_2).

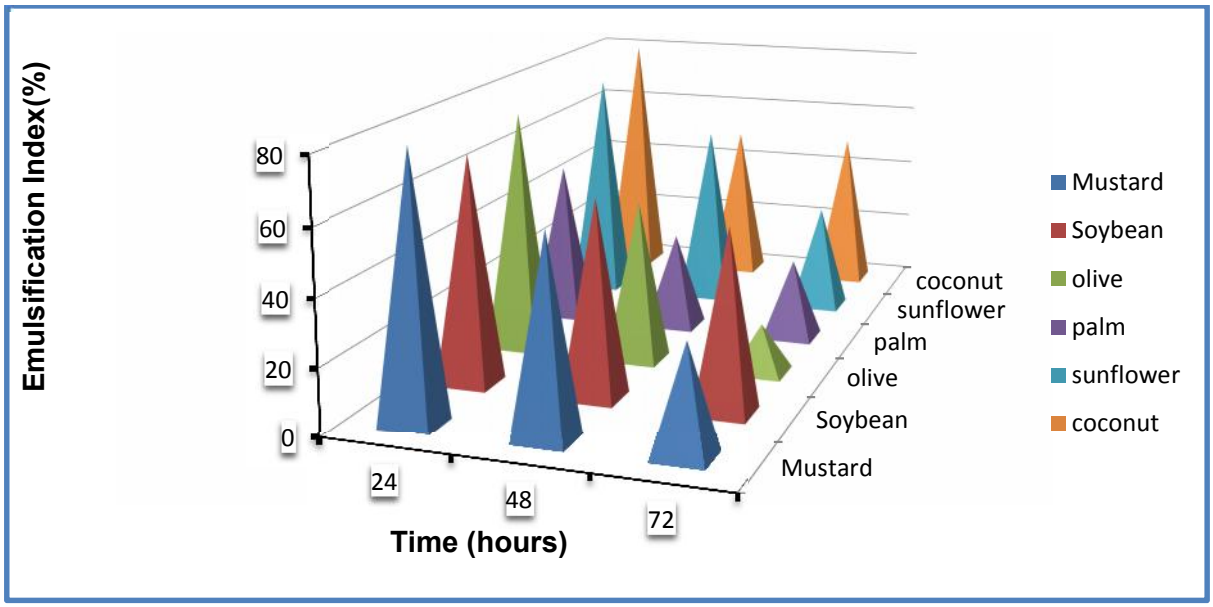

Fig.3.2 Emulsification activity of partially purified biosurfactant from Pseudomonas fluorescens

3.3 Characterization for emulsification activity of rhamnolipids at different physical parameters

The Biosurfactant from *P. fluorescens* was charecterized for emulsification activity of partially purified biosurfactant at different physical parameters *viz.,* quantification, C/N ratio, temperature, pH and NaCl concentration.

3.3.1 Quantification of rhamnolipids

P. fluorescens showed highest yield for soybean oil (0.437 g/L) followed by 0.299 g/L for coconut oil, 0.289 g/L for palm oil, 0.233 g/L for mustard oil, 0.187 g/L for sunflower oil and 0.108 g/L for olive oil. In *Pseudomonas* sp. maximum yield obtained by *P. fluorescens.*

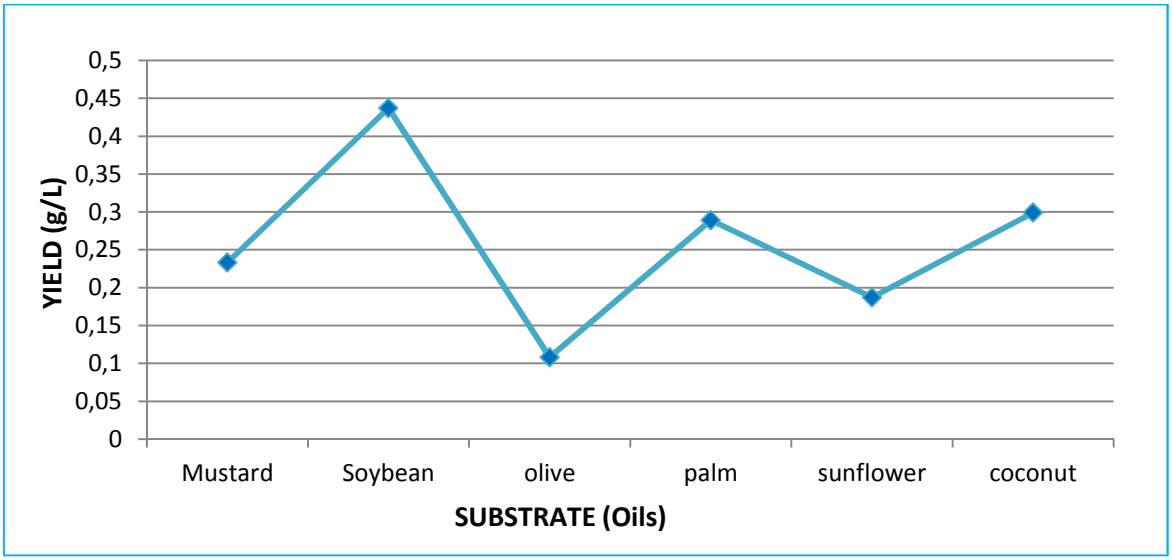

Fig. 3.3 Quantification of rhamnolipids

3.3.2 Characterization for stability of emulsification activity at varying C/N ratio by partially purified rhamnolipid

P. fluorescens was charecterized for emulsification at different C/N ratio *viz.,* 10, 13, 20 and 40. *P. fluorescens* showed highest emulsification index on C/N ratio 10 (92%) followed by C/N ratio 13 (80%), C/N ratio 20 (70%) and C/N ratio 40 (65%).

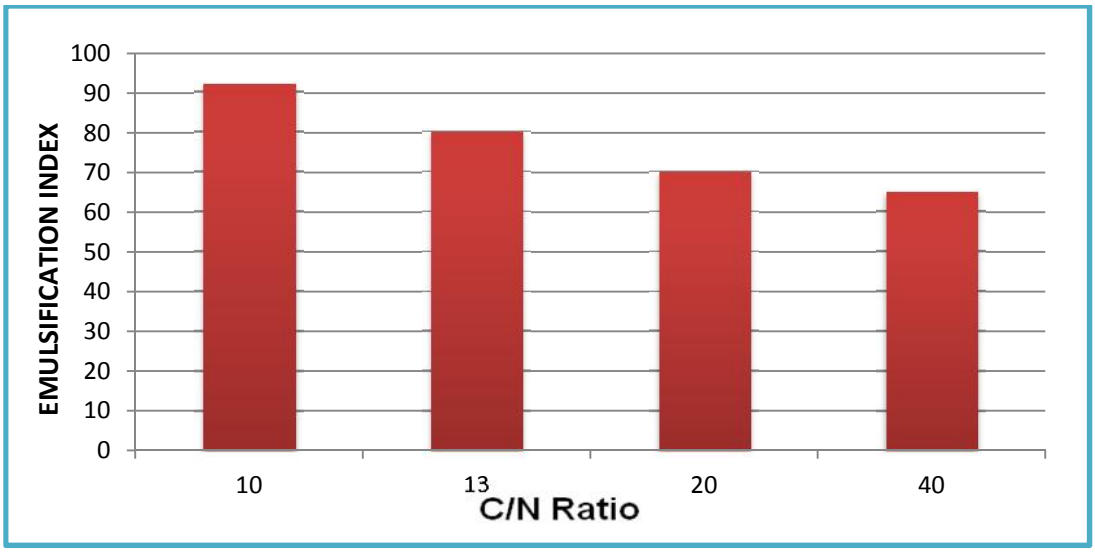

Fig.3.4 Characterization for stability of emulsification activity at varying C/N ratio by partially purified rhamnolipid

3.3.3 Effect of temperature on emulsification stability

The applicability of biosurfactants in several fields depends on their stability at different temperatures. The stability of biosurfactant was tested over a wide range of temperature. Cooling of biosurfactant to 4°C caused no significant effect on the biosurfactant performance. The emulsification activity was quite stable at the temperatures used (E_{24}=90%). *P. fluorescens* showed emulsification index on different hydrocarbons namely Mustard oil, Soybean oil, Olive oil, Palm oil, Sunflower oil and Coconut oil at different temperatures *i.e*. 4°C, 30°C, 40°C, 70°C and 100°C was observed. The highest emulsion formation was observed at 4°C on Palm oil, Sunflower oil and Coconut oil (90% all) followed by Soybean oil (66.67%), Mustard oil (73.33%) respectively. Optimum temperature 40°C for Mustard oil and Soybean oil, 30°C for olive oil and 4°C for Palm oil, Sunflower oil and Coconut oil.

On analysing the data using two way ANOVA, the differences in data was found significant due to temperature and non significant due to oil. Critical difference (CD) was 25.48 for temperatures.

Table 3.3 Characterization for stability of emulsification activity of partially purified rhamnolipid by Pseudomonas fluorescens at varying temperature

Emulsification at different temperature	Emulsification Index (%) of partially purified rhamnolipid by *P. fluorescens*					
	Mustard oil	**Soybean oil**	**Olive oil**	**Palm oil**	**Sunflower oil**	**Coconut oil**
4°C	40	46.67	66.67	90	90	90
30°C	44	53.33	73.33	83.33	60	80
40°C	52	66.67	33.33	41.67	80	70
70°C	48	33.33	26.67	66.67	50	20
100°C	40	26.67	13.33	66.67	0	10

Table 3.4 Comparison table against CD value of temperatures for Pseudomonas fluorescens

CD=25.48	**M_5 26.11**	**M_4 40.78**	**M_3 57.28**	**M_2 65.67**
M_1 70.56	S **44.45**	S **29.78**	NS 13.28	NS 4.89
M_2 65.67	S **39.56**	NS 24.89	NS 8.39	
M_3 57.28	S **31.17**	NS 16.5		
M_4 40.78	NS 14.67			

Where, M_1, M_2, M_3, M_4 and M_5 are the means of the temperatures 4°C, 30°C, 40°C, 70°C and 100°C respectively. From the above Comparison table, it is evident that there is significant difference between the temperature mean pairs (M_1, M_4); (M_1, M_5); (M_2, M_5); (M_3, M_5) and non significant was observed between the temperature mean pairs (M_1, M_3); (M_1, M_2); (M_2, M_4); (M_2, M_3); (M_3, M_4) and (M_4, M_5).

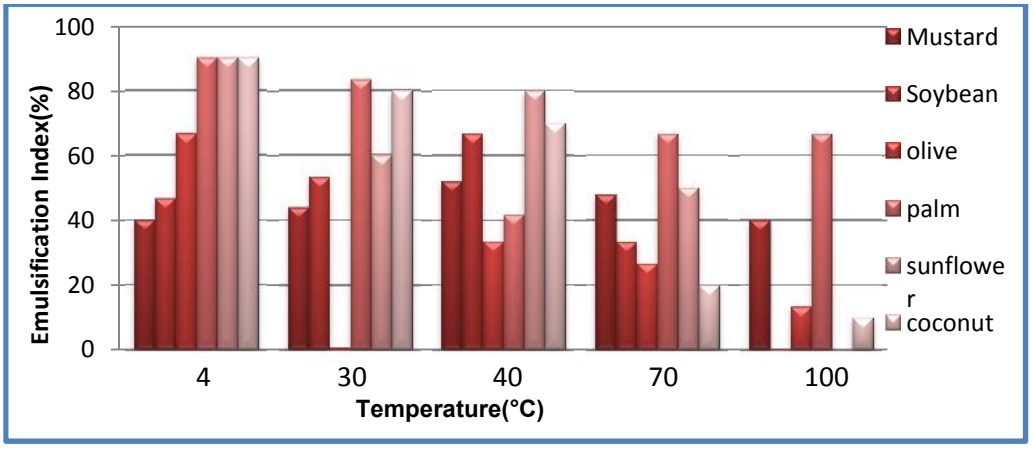

Fig. 3.5 Characterization for stability of emulsification activity of partially purified rhamnolipid by Pseudomonas fluorescens at varying temperature

3.3.4 Effect of pH on emulsification stability

The surface activity of the crude biosurfactant remained relatively stable to pH changes between pH 5 and 9, showing higher stability at pH 6 and neutral pH 7 At pH 9, the value in emulsification activity (E_{24}) showed almost more than 50% emulsification activity. *P. fluorescens* showed emulsification index on different hydrocarbons namely Mustard oil, Soybean oil, Olive oil, Palm oil, Sunflower oil and Coconut oil at different pH *i.e*. 5, 6, 7, 8 and 9 was observed. The highest emulsion formation was observed at pH 6 and pH 7 on Palm oil, Sunflower oil and Coconut oil (90% all) respectively. Optimum pH for Mustard oil was 5 and pH 8 for Soybean oil, pH 5 for olive Oil, pH 6 for Sunflower oil, pH 7 for Palm oil, pH 6 for Sunflower oil and Coconut oil.

On analysing the data using two way ANOVA, the differences in data was found non significant due to pH and oil.

Table 3.5 Characterization for stability of emulsification activity of partially purified rhamnolipid by Pseudomonas fluorescens at varying pH

Emulsification at different pH	Emulsification Index (%) of Partially purified rhamnolipid by *P. fluorescens*					
	Mustard oil	Soybean oil	Olive oil	Palm oil	Sunflower oil	Coconut oil
5	66.67	53.33	88.24	40	80	50
6	53.33	40	58.82	75	90	90
7	40	46.67	35.29	90	40	60
8	53.33	66.67	58.82	70	60	60
9	46.67	40	70.59	65	80	50

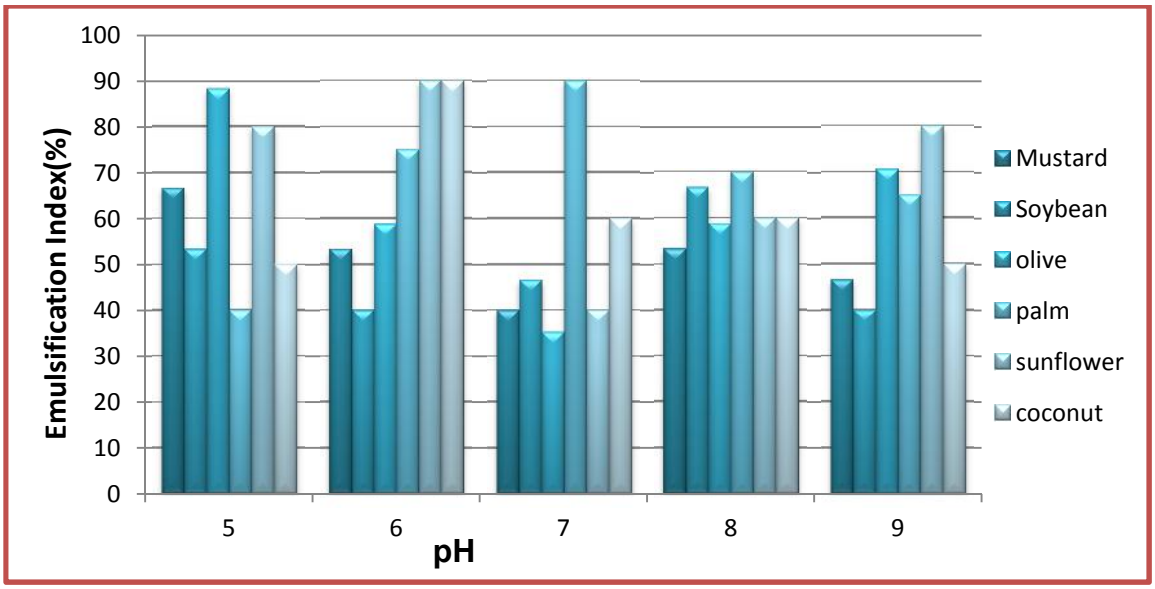

Fig. 3.6 Characterization for stability of emulsification activity of partially purified rhamnolipid by Pseudomonas fluorescens at varying pH

3.3.5 Effect of salinity on emulsification stability

The effect of sodium chloride addition on rhamnolipid was studied. Optimum stability of biosurfactant was observed at 5% NaCl concentration. Little changes were observed in increased concentration of NaCl of 1% and 5% (w/v). *P. fluorescens* showed emulsification index on different hydrocarbons namely Mustard oil, Soybean oil, Olive oil, Palm oil, Sunflower oil and Coconut oil at different NaCl concentration *i.e*. 1%, 2%, 3%, 4% and 5% was observed. The highest emulsion formation was observed at 5% NaCl concentration on Palm oil (94.44%). Optimum NaCl concentration for Mustard oil was 1% and 4%, for Soybean oil was 2%, 3%and 4%, for olive oil was 4%, for Palm oil was 5%, for Sunflower oil was 2% and Coconut oil was 1%.

On analysing the data using two way ANOVA, the differences in data was found non significant due to salinity and oil use.

Table 3.6 Characterization for stability of emulsification activity of partially purified rhamnolipid by Pseudomonas fluorescens at varying salinity

Emulsification at different Salinity concentration	Emulsification Index (%) of Partially purified rhamnolipid by *P. fluorescens*					
	Mustard oil	Soybean oil	Olive oil	Palm oil	Sunflower oil	Coconut oil
1%	75	70	70	40	70	90
2%	65	75	60	66.67	80	80
3%	60	75	70	83.33	60	80
4%	75	75	80	88.89	60	75
5%	60	25	50	94.44	80	70

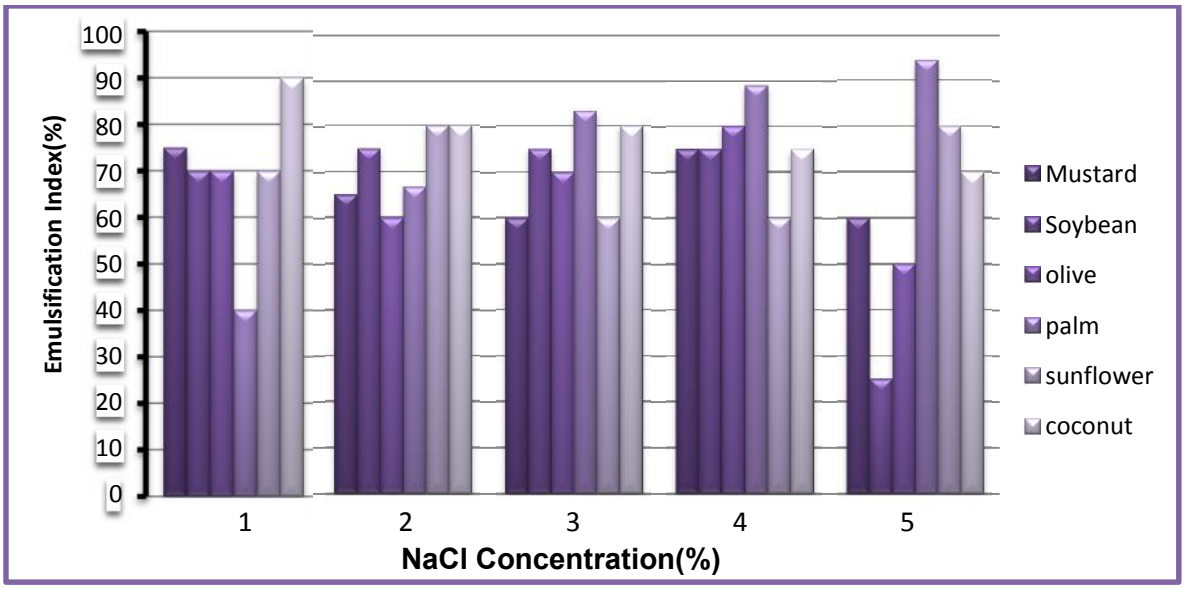

Fig. 3.7 Characterization for stability of emulsification activity of partially purified rhamnolipid by Pseudomonas fluorescens at varying salinity

4 DISCUSSION

In a similar study conducted by Pornsunthorntawee *et al*. (2008); Priya and Usharani (2009) the oil displacement assay was used to screen *P. fluorescens* for bio surfactant activity. The oil spread assay was used to screen bio surfactant activitiy against vegetable oil, kerosene, petrol and diesel. The study revealed similar results as in the present investigation. In other study conducted by Nishanthi *et al.* (2010) the diameter of clearing zone on the oil surface correlates to surfactant activity, also called oil displacement activity. Pure biosurfactant has a linear correlation between quantity of surfactant and clearing zone diameter. The approach was used for screen the biosurfactant activity of partially purified rhamnolipids.

In the present investigation the highest displacement activity was recorded for soybean oil while least was for coconut oil by *P. fluorescens.* This might be due to the different type of viscosity possessed by the oils.

The drop collapse assay relies on the destabilization of liquid droplets by surfactants. The stability of drops is dependent on surfactant concentration and correlates with surface and interfacial tension. The hydrocarbon degraders normally produce surfactants which adhere effectively to hydrophobic substrate. Many of the surfactants are reported to be basically lipids. Hence lipid content were analyzed which indicated the potential degradation of oils.

Recently, biosurfactants have gained numerous industrial and environmental applications which frequently involve exposure to extreme conditions. As a result, researchers have focused on isolating and screening strains that are able to produce biosurfactant under extreme environments, especially for MEOR and bioremediation purposes. In this study shown that *P. fluorescens* was produced rhamnolipid at pH values from 5 to 9 and at temperatures 4°C to 100°C, NaCl concentrations 1% to 4% (w/v). Kumar *et al.* (2012); Kumar *et al.* (2009); Priya and Usharani (2009) reported optimal growth for biosurfactant production by *P. fluorescens* was 37°C.

In the present investigation the highest emulsion formation was observed at 5% concentration of sodium chloride in Coconut oil. It might be due to the increases in intracellular concentration of Rhamnolipid parallel to the external concentration of sodium chloride. So, an increase in the intracellular concentration of Rhamnolipid can be resulted of increases in biosurfactant activity, also increases in retention by cytoplasmic membranes, or decreased dissimilation of fat globulli. Hence, increases the NaCl concentration decreases cellular efficacy, increases in viscosity of the aqueous phase and the increasing viscosity of the oil phase resulted in favourable emulsification activity. A similar study reported by Kokare *et al.* (2012) and Kumar *et al.* (2009) the effect of sodium chloride addition on biosurfactant activity. Optimum stability was observed at 3% NaCl concentration. In other study conducted by Christova *et al.* (2004) and Rahman *et al.* (2002) produced 0.97-2.7 g/l rhamnolipid by different species of *Pseudomonas* using glucose and waste fry oils as carbon source. The orcinol assay was used for direct asses of the amount of glycolipid in the biosurfactant. In the present investigation the highest yield were obtained from Soybean oil while least was obtained from mustard oil by *P. aeruginosa* and olive oil for *P. fluorescens.*

This might be due to Soybean oil suppliments increased the biomass and rhamnolipid production to several folds then other oils.

A more work by Rahman *et al.* (2002) showed *P. fluorescens* have higher emulsification activity in soybean oil. Emulsion formation probably due to the production of secondary metabolites which could interfere with emulsion formation and the adsorption of surfactant molecules at the oil-water interface. The reason behind the degradation of oil and hydrocarbon by *Pseudomonas* sp. is the nature of biosurfactant produced by them. As it know that surfactants are amphiphilic molecules consisting of a hydrophilic and hydrophobic domain. The surface tension and viscosity plays an important role, the more viscous in the liquid there is more chance of binding of partially purified biosurfactant as it increases the surface tension. The partition between two phases in a heterogeneous system increases the apparent solubility of a hydrophobic compound in water.

P. fluorescens strain is able to produce bioemulsifier at a wide range of temperatures, NaCl concentrations, pH values. Since biosurfactants are valuable products in industrial applications, determining the optimum conditions for improvement of the biosurfactant yield is very important from an economical point of view. The optimum pH for biosurfactant production was 7. The produced rhamnolipid has excessive oil spreading, emulsification and surface activity properties. With soybean oil and other vegetable oils it created an oil displacement zone of 3.0 mm, and reduced the surface tension and interfacial tension of the medium. According to the obtained results, it was found that temperature, pH, salinity and type of surfactant were the major factors affecting the biodegradation rate and surface activity of *P. fluorescens.* Further, the *P. fluorescens* had the ability to produce biosurfactant in the presence of long chain n-alkanes, light and heavy vegetable oil as the sole carbon source. This enables *P. fluorescens* to have potential to degrade these toxic compounds, even at relatively high concentrations. In contact with vegetable oil, it showed more growth and a higher percent of degradation than the individual strains of *P. fluorescens*. Some previous works reported that combinations of produced biosurfactants by microbial production are more effective than individual biosurfactants in lowering surface tension, improving the bioavailability of hydrocarbon and increasing the extent of degradation. *P. fluorescens* emulsifies the hydrocarbon and creates rhamnolipid which increases the solubility of crude oil in the aqueous phase. The combination of these major factors increases the bioavailability of crude oil. The ability of *P. fluorescens* to produce biosurfactant in contact with crude oil promotes its role in oil recovery, and decreasing the residual oil saturation. The highest biosurfactant production was achieved when NH_4Cl was used as the sole source of nitrogen. This result was compatible with previous works where the maximum biosurfactant yield was obtained with sodium nitrate as the sole nitrogen source. The obtained data also showed that maximum biosurfactant yield was attained using a C/N ratio of 10:1. Nitrogen limitation improves biosurfactant production and the ratio of carbon to nitrogen must be balanced in the culture medium. It is also reported that a C/N ratio lower than 11 would maximize rhamnolipid production by *Pseudomonas* sp. The biosurfactants produced by the *P. fluorescens* increased the viscosity of the aqueous phase and reduced the viscosity of the oil phase. This leads to a favourable mobility control and emulsifying index, which have potential applications in the oil industry. The results obtained from the oil recovery tests suggest that the produced biosurfactants by the *P. fluorescens* can efficiently mobilize the trapped oil under extreme conditions. The strain of *P. fluorescens* produced a high molecular weight bioemulsifier which increased the viscosity of the aqueous phase. It has also been reported that the *P. fluorescens* strain produces a high amount of gas per mole of substrate that utilized. Gas production has been mentioned as an important mechanism for oil recovery which increases the pressure of the core sample, swells the crude oil and reduces its viscosity. The simultaneous effects of the increasing viscosity of the aqueous phase and the decreasing viscosity of the oil phase resulted in favourable mobility ratios. On the other hand, the Pseudomonas sp. strain produced rhamnolipid biosurfactcnt which had a substantial effect on the reduction of oil/water interfacial tension and recovering the trapped oil. IFT reduction is responsible for the major part of oil recovery from very small pores under the MEOR process. When the salinity and temperature was increased, the oil recovery decreased.

5 CONCLUSION

P. fluorescens uses Soybean oil as the best carbon source for biosurfactant production. For isolate physical parameters *viz.,* optimum C/N ratio (10), temperature (4°C), pH (6, 7) and NaCl concentration (5%) for biosurfactant activity were analyzed. Biosurfactant obtained by *Pseudomonas* species could be used in bioremediation and phytoremediation. The study highlighted the potential of bacteria that could be used specially for hydrocarbon polluted area and oil spills. The biosurfactants in mixtures were able to produce microemulsions for a wide range of oils that are applicable for vegetable oil extraction for biofuel application, hard surface cleansers, drug delivery and detergents.

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Performance Analysis Of Output SNR Of Generalized-Gamma Channel Model

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ABSTRACT: Generalized-Gamma channel model has attracted the attention of many researchers in literature lately because of its versatility and flexibility to generalize other popular channel models like Rayleigh, Weibull, Nakagami-m to name a few. Lot of work has been reported based on output signal to noise ratio (SNR) as the main parameter but literature based on higher order moments of output SNR is relatively sparse. In this paper analysis of higher order moments in terms of skewness and kurtosis of output SNR is presented using generalized gamma model. Analytic expressions for skewness and kurtosis of both transmitted signal and output SNR have been numerically evaluated and illustrated.

KEYWORDS: Generalized-Gamma, Skewness, Kurtosis, Moments, Fading channel.

INTRODUCTION

Wireless communication is playing a pivotal role in personal communication services. In practical situations the existence of line of sight is not always possible rather the propagating signal wave reaches the transmitter after multipath fading, multiple scattering and path loss .The path loss depends upon the distance between transmitter and receiver, while the other two effects can be modeled by various fading channels. These multiple effects reduce the strength of transmitted signal. Various channel models are available in literature [1] to model such multiple and multipath fading situations. A multiparameter fading model which generalizes many well-known channel models for multiple fading conditions is Generalized Gamma fading model. This channel model was introduced by Stacy, late in 1962 .Because of the flexibility and versatility this model has extensively been used by various researchers in recent past. In [2] complex forms of moments of SNR of dual hop channel model were derived in Meijer-G form. In [3] approximate expressions of Moment Generating Function (MGF), Probability Density Function (PDF), Cumulative distribution function (CDF) of N-Generalized Gamma (GG) model were obtained to derive upper bounds of sum of GG model. In [4] pade approximation technique is used to derive the expressions of MGF of GG channel model. Approximate expressions of PDF, CDF and Outage probability of product of GG random variables are obtained in [5]. In [6] expressions for moment generating function (MGF) of generalized gamma were computed using fox's H function .The statistical behavior of channel based on third and fourth order moment is not available in open literature .However analysis of third and fourth order moments of instantaneous SNR for Generalized-gamma channel model has never been done before. SNR is a measure of signal's strength to the background noise. The quality of signal obtained at the output depends upon the instantaneous SNR. Higher order moments are also useful in signal processing algorithms for signal detection, classification, and estimation as they play an important role for the performance analysis of wideband communications systems in the presence of fading [7]. Skewness and kurtosis of the output SNR of correlated Nakagami-m fading channels antenna subset diversity schemes and are studied in [8]. The concept of skewness has also been used to improve the precision of the time of arrival estimation in [9].

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In this paper analysis of higher order moments of Generalized Gamma channel model is done using Mellin transformation technique in terms of Skewness and Kurtosis. Effect of skewness of output SNR is studied for various values of fading parameter. The relation between skewness of output SNR with Amount of Fading has been derived here. It is worth mentioning here that Amount of fading is widely accepted performance metric used to study the behavior of fading channels. The rest of the paper is organized as follows: The propagation channel model is presented in Section 1. Expressions of skewness and kurtosis of output SNR have been derived and their results have been discussed in Section 2 before the paper is finally concluded in section 3.

1 PROPAGATION CHANNEL MODEL

Consider the signal transmission over slow, flat fading Generalized - Gamma channel model , whose PDF for the fading envelope 'X' is given as ([4], Eq.(1))

$$f_X(\mathrm{x}) = \frac{2vm^m x^{2mv-1}}{\Gamma(\mathrm{m})\Omega^m}\exp(-\frac{mx^{2v}}{\Omega}) \tag{1}$$

Where $\Gamma(.)$ is Euler's gamma function, m and v are fading parameters, Ω is scaling parameter. Weibull (m=1, 2v=c), Nakagami-m (v=1) and Rayleigh (m=1, v=1) are special cases of Eq. (1)

The Mellin transformation of PDF $f_X(x)$ is defined as ([10], Eq. (8.2.5))

$$\varphi_X(\mathrm{f}_X(\mathrm{x}),\mathrm{s}) = \mathrm{E}(\mathrm{X}^{s-1}) = \int_0^\infty f(\mathrm{x})\,\mathrm{x}^{s-1}dx \tag{2}$$

where s □ C is complex transform variable , E(.) is the expectation operator.

Substituting Eq. (1) in Eq. (2) the Mellin transform for $f_X(x)$ is

$$\varphi_X(\mathrm{s}) = \frac{\Gamma(\mathrm{m}+\frac{s-1}{2v})}{\Gamma(\mathrm{m})}\left(\frac{\Omega}{m}\right)^{\frac{s-1}{2v}}$$

The rth order moment of the transmitted signal is evaluated by replacing s-1 by r in above equation

$$\mu_n^{'} = E(\mathrm{X}^r) = \frac{\Gamma(\mathrm{m}+\frac{r}{2v})}{\Gamma(\mathrm{m})}(\frac{\Omega}{m})^{\frac{r}{2v}} \tag{3}$$

The received SNR at the output is given as

$$\gamma = \frac{E_s}{N_o}X^2$$

where E_S and N_0 are resp. the transmitted signal's average energy and one sided additive white Gaussian noise.

The average SNR at the output (destination) is

$$\overline{\gamma} = \frac{E_s}{N_o} E(X^2)$$

Mellin transformation of output SNR is given as

$$\varphi_\gamma(\mathrm{s}) = \mathrm{E}(\gamma^{s-1})$$

$$\varphi_\gamma(\mathrm{s}) = \left(\frac{E_s}{N_o}\right)^{s-1} \varphi_X(2\mathrm{s}-1)$$

$$\varphi_\gamma(\mathrm{s}) = \left(\frac{E_s}{N_O}\right)^{s-1} \frac{\Gamma(\mathrm{m}+\frac{s-1}{v})}{\Gamma(\mathrm{m})} \left(\frac{\Omega}{m}\right)^{\frac{s-1}{v}}$$

The nth order moment of output SNR (γ) is

$$\nu_n' = E(\gamma^n) = \left(\frac{E_s}{N_O}\right)^n \frac{\Gamma(\mathrm{m}+\frac{n}{v})}{\Gamma(\mathrm{m})} \left(\frac{\Omega}{m}\right)^{\frac{n}{v}} \quad (4)$$

From (3) and (4) skewness and kurtosis have been evaluated in next section.

2 PERFORMANCE METRICS

Knowledge of higher order moments is very important in evaluating the performance of any wireless channel model. Two such performance measures are skewness and kurtosis. These measures are based on third and fourth order central moments.

2.1. SKEWNESS

It is the measure of degree of asymmetry for the distribution of transmitted or received signal. It is denoted by β_1. More the skewness, more is the scatterness or variability of signal about the mean value and hence lesser will be the stability. The coefficient of skewness of transmitted signal and output SNR is given as:

$$\frac{\mu_3^2}{\mu_2^3} \text{ and } \frac{\nu_3^2}{\nu_2^3} \text{ resp.}$$

Depending upon the value of β_1 the distribution is considered as normal ($\beta_1 = 0$), positively skewed ($\beta_1 > 0$) or negatively skewed ($\beta_1 < 0$). Now μ_2 and μ_3 are second and third order moments about mean which can be evaluated from (3) using some conversion formulae.

$$\mu_2 = \mu_2' - (\mu_1')^2 \quad ; \quad \mu_3 = \mu_3' - 3\mu_1'\mu_2' + 2(\mu_1')^3 \quad ; \quad \mu_4 = \mu_4' - 4\mu_1'\mu_3' + 6(\mu_1')^2\mu_2' - 3(\mu_1')^4 \quad (5)$$

Similar is the relation between ν_n and ν_n'. Using these transformations the expression for coefficient of skewness of transmitted signal and output SNR is given as

$$\frac{(\mu_3' - 3\mu_1'\mu_2' + 2(\mu_1')^3)^2}{(\mu_2' - (\mu_1')^2)^3}$$

$$\frac{(\nu_3' - 3\nu_1'\nu_2' + 2(\nu_1')^3)^2}{(\nu_2' - (\nu_1')^2)^3}$$

and resp. (6)

Relationship Between Amount Of Fading And Coefficient Of Skewness Of Output SNR

The formula for amount of fading is given as ([11], Eq. (1.27)):

$$AF = \frac{E(\gamma^2)}{(\mathrm{E}(\gamma))^2} - 1$$

using (4) the expression of amount of fading becomes:

$$AF = \frac{\nu_2^{'}}{(\nu_1^{'})^2} - 1 \tag{7}$$

From Eq. (6) and Eq. (7) the relationship between amount of fading and coefficient of skewness of output SNR is given as:

$$Coefficient\ of\ skewness\ of\ output\ SNR = \frac{(\nu_3^{'} - 3\nu_1^{'}\nu_2^{'} + 2(\nu_1^{'})^3)^2}{((\nu_1^{'})^2\,\mathrm{AF})^3}$$

From above expression it is evident that the coefficient of skewness of output SNR is inversely proportional to Amount of fading. Higher the value of coefficient of skewness lesser is the amount of fading. It is interesting to note that more the dispersion of signal from mean value, lesser is the value of Amount of Fading.

Variation of skewness of transmitted signal 'x' and output SNR 'y' with the fading parameter 'm' is shown in Fig (1)

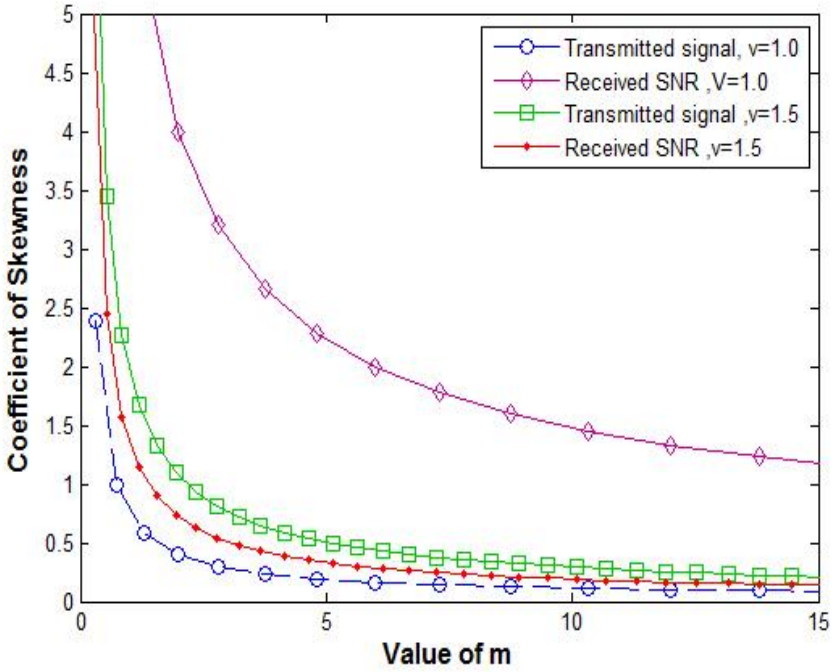


Fig (1).Coefficient of skewness vs Fading parameter 'm'

From Fig (1) it is clear that the coefficient of skewness decreases with increase in value of fading parameter 'm'. As the value of 'v' is increased, then the coefficient of skewness of output SNR decreases while the coefficient of transmitted signal increases. Hence the strength of signal decreases with increase in value of v. Also the difference between the coefficient of skewness of transmitted signal and output SNR decreases with increase in value of parameter 'v'.

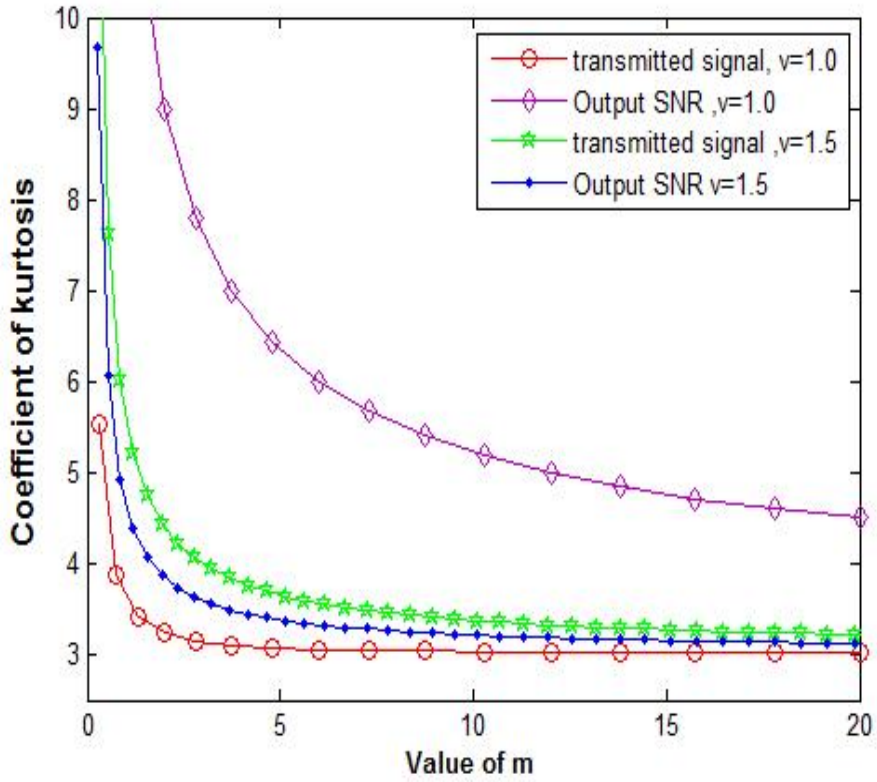
2.2 KURTOSIS

It is the degree of peakedness or bulginess of the transmitted signal or received SNR around the mean value. It is denoted by β_2 , where β_2 for transmitted signal and output SNR is given by:

$$\frac{\mu_4}{\mu_2^2} \quad \text{and} \quad \frac{\nu_4}{\nu_2^2} \quad \text{resp.}$$

For ($\beta_2 = 3$) the signal is said to be normally distributed .However signals with higher value of coefficient of kurtosis ($\beta_2 > 3$; leptokurtic) tend to have a higher peak near the mean and heavy tails. While signal with low value of coefficient of kurtosis ($\beta_2 < 3$; platykurtic) tend to have a flat top near the mean.

Kurtosis of transmitted signal 'x' and received SNR 'γ' with the variation of fading parameter 'm' is given in Fig (2).



Fig(2). Coefficient of Kurtosis vs Fading Parameter 'm'

From Fig (2) it is evident that the value of β_2 is greater than 3 for both transmitted signal and output SNR which shows that the distribution curve of signal is leptokurtic. With increase in value of v peak of output SNR decreases i.e Value of β_2 decreases while the peak of transmitted signal increases with increase in value of v. In nutshell coefficient of kurtosis decreases with increase in value of fading parameter m.

3 CONCLUSION

In this paper higher order moments based performance metrics such as skewness and kurtosis have been used to predict the behavior of wireless fading channels. Generalized Gamma fading model has been used to derive novel expressions of skewness and kurtosis using Mellin transformation method. The numerical evaluation of the derived expressions has given us an insight regarding the peculiar behavior in terms of skewness and peakedness of transmitted signal and output SNR. A new relation between skewness and amount of fading has been obtained. The novel results obtained here can be useful for wireless system designers in studying the stability of system through diverse fading situations created using higher order moments of generalized gamma channel model.

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