







# CONFERENCE PROCEEDINGS

## 3rd International Multidisciplinary Research Conference 2016
## On
## Global Prosperity through Research & Innovation
## September 27 & 28, 2016

# SARHAD UNIVERSITY OF SCIENCE AND INFORMATION TECHNOLOGY, PESHAWAR

## FOREWORD

***Sarhad University of Science & Information Technology*** is delighted to publish the Proceedings of ***The 3rd International Multi-disciplinary Research Conference (IMRC-3)–Global Prosperity through Research and Innovation*** held in Peshawar, Pakistan on September 27-28, 2016. The Conference received a total of 155 papers from 08 countries including, Canada, France, Iran, Turkey, Afghanistan, United Kingdom, and Malaysia. Out of the total papers received 126 papers were accepted for presentation at the Conference. However, 85 researchers turned out to present their paper during the two days of the Conference. From these 85 presentations, 23 papers were selected to be published in full in the Proceedings. For the remaining papers, Abstracts have already been included in the Conference Abstract Proceedings which is available on the University Website (www:suit.edu.pk).

The 23 papers published in full are Success Stories of this Conference. The quality of the papers presented and the subsequent discussion represented the thinking and experience of researchers in their respective field. In my capacity as the Editor of this Conference, I would like to express my thorough thanks for those who made the Conference and Proceedings possible. The researchers contributed the most recent scientific knowledge known in the field of their respective disciplines. These proceedings will furnish to the research community the world over a reference book. I am confident that this will work as an impetus to stimulate further study and research in their respective fields.

Conducting a research is not an easy task. It requires a lot of inputs to make the event success. And this has been the 3rd Conference of the University which reflects its unflinching efforts in the field of research. In this journey, the supporting and encouraging environment provided by the University Management is worthy of expression. The vision of the Vice Chancellor for the promotion of research culture in the University has made this difficult task easy. I am also thankful to our collaborators which include Higher Education Commission, Shaheed Benazir Bhutto University Peshawar, University of Haripur, and National Testing Service (NTS). Finally, I must also thank all members of different Organizing Committees, Registrar Office, Session Chairs, and all those who helped us in making this event a success. Thank you all!

*Dr. Wali Rahman*
*Editor—3rd IMDRC3*

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## Introduction

The research activities at Sarhad University of Science and Information Technology, Peshawar Pakistan, have gained a fast momentum. During the year 2014-15, the University produced more than hundred research papers of international standard which have been published in International Journals. In order to further boost/promote the research culture and allow scholars both at National and International level to present their research work, the University conducted a two-day International Multidisciplinary Research Conference on 27th & 28th September, 2016.

The conference focused on the promotion of research in the fields of global significance. Submission of original research work, case studies and practices for presentation in the proposed conference were called for.

Researchers from different disciplines and regions participated in the Conference. In this way the University provided a research platform to the scholars to share their views and research findings with one another thereby got enriched from this conference on the one hand and added their respective contribution in their respective domain to leave a rich knowledge legacy to the generation to come on the other hand.

## Sarhad University of Science and IT, Peshawar

Sarhad University of Science & Information Technology (SUIT), Peshawar, is a renowned name in the educational circles of Pakistan and abroad. It was established in 2001 through an Ordinance of the Government of Khyber Pakhtunkhwa and is duly recognized by the Higher Education Commission (HEC). Since its inception, the University has made commendable achievements in disseminating quality education and, in a short span of time; it has become a leading institution of higher education in Pakistan. The University offers a wide range of programs from bachelor to doctoral level. These programs are executed through highly qualified and professionally groomed faculty holding PhD degrees from renowned institutions of Pakistan and abroad.

The University is dedicated to imparting high quality education with emphasis on demand-oriented skill-development and training under excellent conditions of learning. Its educational programs are designed to enable the students and servicemen to Develop skills and competence in their respective areas of specialization. Obtain broad-based, cross-functional education with due emphasis on developing critical, analytical and logical thinking, and knowledge of societal matters. The education is cost-based, but affordable. The University is devoted to students' welfare and intends to provide all support and guidance in their pursuit of successful careers and jobs.

## University of Haripur, Haripur

The establishment of University of Haripur (UoH) is an important milestone in the history of higher education in Hazara region of Khyber Pakhtunkhwa, Pakistan; a region which entails the international Karakorum Highway. There was a strong motivation to establish UoH and a significant coherence among the potential stakeholders regarding the direction that such a project should take. The motivation can be supported by (unofficially validated) estimates which suggest that in 2017-18 approxi- mately 8,000-10,000 pupils will be enrolled in the University with the completion of proposed physical and academic infrastructure. Having education at all levels with strong Islamic foundations is important for the nation as a whole and we firmly believe that education should be focused on providing principled, morally motivated leaders to serve the country - a new generation of leaders who understand the need for justice and peace in Pakistan. It is an understood notion that the UoH shall have a globally recognized validation.

**Shaheed Benazir Bhutto Women University, Peshawar**

Shaheed Benazir Bhutto Women University Peshawar is a premier women university of Khyber Pakhtunkhwa. It has earned this position by virtue of its futuristic outlook towards higher education, strong emphasis on research and focus on innovation and entrepreneurship. Its academic programs are designed to meet the national needs and challenges of the new millennium. Traditional fields of Social, Biological and Physical Sciences have been updated with emerging trends and new disciplines are being introduced to prepare professionals to manage the ever-growing demands of knowledge economy with requisite degree of expertise. By the grace of Almighty Allah, Shaheed Benazir Bhutto Women University Peshawar has come a long way to develop into a global centre of excellence for imparting higher education. The universities at large have assumed the role of drivers of knowledge inventers and discoveries. Shaheed Benazir Bhutto Women University Peshawar, being a premier educational institution in Khyber Pakhtunkhwa has been keenly building a consortium across the government, business and higher education sectors to actively pursue sustainable growth of a knowledge-based economy.

**Higher Education Commission Islamabad, Pakistan**

Higher Education Commission of Pakistan (EC) is an independent, autonomous, and constitutionally established institution of primary funding, overseeing, regulating, and accrediting the higher education efforts in Pakistan.

Preceded by the University Grants Commission (UGC) in 2002 by a constitutional amendment, the universities were formerly accredited by the UGC established in 1947; the institution was revised in 1974 and came into its modern form in 2002 with additional executive reforms granted by the constitution. Under a new and revised reforms agenda, the HEC is made responsible for formulating higher education policy and quality assurance to meet the international standards as well as providing accrediting academic degrees, development of new institutions, and uplift of existing institutions in Pakistan. The HEC also facilitated the development of higher educational system in the country with main purpose of upgrading the universities and colleges in the country to be focal point of the high learning of education, research, and development. Over the several years, the HEC plays an important and leading role towards building a knowledge based economy in Pakistan by giving out hundreds of doctoral scholarships for education abroad every year.

## VICE CHANCELLOR'S MESSAGE

**Prof. Dr. Salim-ur-Rehman**
**Vice Chancellor,**
**Sarhad University of Science & IT, Peshawar**

It is a matter of immense pleasure that Sarhad University of Science & Information Technology, Peshawar, is holding 3rd International Multi-disciplinary Conference– Global Prosperity through research and innovation in Peshawar on September 27-28, 2016.

All credit goes to the Faculty of Management Sciences which organized this international conference for the third time in Peshawar within a short period of time. I am also glad to learn that many academics and scholars especially from Pakistan and abroad will be participating in this conference. Therefore, I am sure this conference would provide a good platform to our academics to share their knowledge in the fields of sciences, social sciences, management, computer science, and arts & humanities.

I hope this conference will encourage management specialists and social scientists to initiate dialogues on contemporary issues. In order to achieve the vision "To be the prime intellectual thrust of the nation" it is needed to strengthen the research activities in the region. So, I will try my best to develop a vibrant research culture in Khyber Pakhtunkhwa (KP).

I assure that our youth have considerable potential in research provided we give them an opportunity by arranging such kind of conferences in the province, which is in a state of war for the last two decades. Organizing an international conference is always a big challenge and I am confident that Faculty of Management Sciences did tremendous job to make it happen.

I extend my congratulations to the organizers of the conference, and wish them all success.

## VICE CHANCELLOR'S MESSAGE

**Prof. Dr. Razia Sultana**
**Vice Chancellor,**
**Shaheed Benazir Bhutto Women University, Peshawar**

The world has turned into a global village and only through collective approach its problem can be resolved as it is said, 'The whole is greater than the sum of its part'. It is time that we start searching for solutions to the existing problems not only with thorough deliberations but by revolutionizing our researches via new ideas and their commercialization. The international conference by SUIT on **Global Prosperity through Research and Innovation** is indeed an important step in this regard and I firmly believe that conference will open new horizons which will benefit society in general and universities in particular.

## KEYNOTE SPEAKER

**Title:** ***Emerging Research Trends in Social Sciences***

**Prof. Dr. Razia Sultana**
**Vice Chancellor, Shaheed Benzir Bhutto University, Peshawar**

The world we are living in today is witnessing a great deal of technological and scientific innovations and discoveries. This development in the fields of Science and technology has brought with it associated packages of new social and political dynamics. As we all know Social Sciences takes in its scope of study and research of the entire social and scientific phenomenon that directly or indirectly affect the course of social evolution.

There are various trends making their way to change or sometimes alter the previously held theories and social laws in the society. Apart from various other trends following are the most important emerging research trends that are taking place in the field of Social Sciences.

In the recent past, one notices a major shift in research in education from basic (or fundamental) research to applied (and empirical) research. Both have their own significance and utility. Both complement each other. Many 'fundamental' research contributions have not been noted in the recent past. In contrast, empirical research bulged rather in geometric progression. It is obvious that fundamental research cannot progress at the same rate of growth as of empirical research. Otherwise perhaps fundamental research contributions do not remain 'fundamental'.

Further, the emphasis has been on policy relevant research, as against what is characterized as 'abstract' research. Researchers are asked repeatedly to highlight the policy relevance (use) of their research proposals, and to highlight policy implications of their concluded studies. Thus prescriptive research is more valued than analytical research. The prescriptions, however, tend to be more generalized, non-controversial, than location/region specific. As the phenomenon of policy use dominates the whole research scene, it is not surprising to find condem-

nation of 'other' research as 'academic' research, or 'professional' research, if not as 'irrelevant' research.

A strong tendency in research has been a shift from data analysis to collection and compilation of data. The funding agencies or consulting firms, particularly international consulting firms which do not know even the basic information about a country or a given region, seem to be more interested in information rather than the analysis.

**Brief Bio-data**

Professor Dr. Razia Sultana has her PhD in History from Area Study Center, University of Peshawar in 1999. She has two gold medals at her credit. Dr. Sultana has won Fulbright Post Doc Scholarship during 2002-03. She has been a member of 14 professional bodies, like Vice President Council of Social Sciences; Member, National Plagiarism Committee, HEC, etc. She has remained editor of two HEC recognized journals.

Prof. Sultana has a vast administrative experience of more than 25 years. She has served on various key posts and delivered successfully throughout her career. She has taught a number of courses to graduate and post-graduates students, supervised 27 M.Phil and 08 PhD scholars. She has been conducting research projects independently and in collaboration as well. Dr. Sultana has 35 research articles published in various journals, participated in more 40 international and 20 national research conferences.

## PLENARY SPEAKER I

**Title: *Internationalization of Higher Education***

**Engr. Dr. Habib SOUISSI,**
**Director International Services (IS)-**
**(FRANCE)**

**Abstract**

Universities are the main creators and disseminators of knowledge through formal learning processes, and in this era of internationalization, they have gained much attention by the stakeholders which has further changed the vision and scope of the universities. Higher education internationalization is generally considered as an array of academic activities in teaching & research and this usually takes place by the cooperation and support of international partners virtually, as well as crossing the borders physically. Most of the universities in the world have been influenced by the challenges of globalization and one of the reasons is that academic requirements of the students particularly the research scholars are getting higher day by day. Unfortunately many domestic universities in developing countries do not have the solutions to for such issues and in addition, because of intense competition, they have to design some solutions and they tend to get global. In connection to the above mentioned realities pertaining to the internationalization of universities, the third world and developing countries are facing a lot of challenges e.g. WTO control over higher education, insurability of quality standards for high ratings, availability of international scholars & researchers, competition for international scholarships & grants etc. Though WTO aims to guarantee that degree awarding institutions could set up branches across the globe and/or export degrees by investing in offshore universities and importing/exporting teachers and students for the said purpose, many stakeholders criticize regarding accreditations and quality control dimensions pertaining to internationalization of higher education. Can WTO/GATS ensure quality standards, which must be maintained in both the countries particularly the one which is in need of state of the art higher education services? Despite of these challenges, it

is worthwhile to mention that Pakistan is second to none with particular reference to higher education system, and the credit goes to Higher Education Commission of Pakistan for its tireless efforts in making Pakistan a role model for other developing countries.

**Brief Bio-data**

Engr. Dr. Habib SOUISSI, a French citizen, has his PhD in Metallurgical (Materials) & International MBA from University, of Lyon3 France in 1988. Engr. SOUISSI has been Implant Manager in France and abroad (Greenfield) and Team Leadership (Project Management), Crises Leader Commercial Director, and International Development Expert Realization of the Joint Ventures (JV) and technological transfer.

Currently, Engr. SOUISSI is serving as Director of **INTERNATIONAL SERVICES (IS)**, France. IS is a consultant cabinet specialized for Exports & New International Trade, Commercial and marketing strategy development, Market analysis and study, the strategy for the transactions and other allied services. Engr. SOUISSI has remained Practice Manager of **ALTRAN Group (France)**, global leader in innovation and high-tech engineering in the Aerospace, Automotive Energy, Railway, Finance, Healthcare and Telecoms.

Engr. SOUISSI has a long list of achievement in several countries including Tunisia, Solvenia, Italy, Sudan, Lybia, Iran, Brazil, etc. Dr. SOUISSI can fluently speak a number of languages including Arabic, French, English, German and Persian. He is also a member of a number of Professional Associations.

## PLENARY SPEAKER II

**Title:** ***Management lessons from Muhammad Ali, the three time world heavyweight boxing champion***

**Prof. Dr. Amran bin Muhammad Rasli,**
**Universiti Teknologi Malaysia, Malaysia**

### Abstract

The world weeps when a great person dies, as in the case of Muhammad Ali. Such is the impact of people who holds on to their value system, who holds onto what they believe till the very end and goes against the grain to uphold their principles. And when they are gone, you feel the immense vacuum left behind. No one can ever fill their shoes, as they are the few shining stars that exist among a million of us. Muhammad Ali, the three-time world heavyweight champion and one of the most recognizable and loved figures on the planet recently passed away leaving behind much legacy for us to ponder. While many would remember his prowess in the sport of boxing, his struggles against racism and discrimination coupled with his determination to uphold his pride and dignity as a Muslim should also be admired. With his witty tongue, eloquence and infectious bravado, Muhammad Ali charmed the world and proved to be an inspiration to many. And, proving his courage was not just physical, he established himself as a significant figure in the civil rights movement. This keynote address will discuss eight points that makes Muhammad Ali the Greatest and the valuable lessons that can be applied in the world of management.

### Brief Bio-data

Professor Dr. Amran bin Muhammad Rasli, a Malaysian citizen, has his PhD in Society, Business & Globalisation from Roskilde University, Denmark. Prof. Amran is currently the Director of Innovation & Commercialization Centre, University of Teknologi Malaysia. He has been a member of a number of world known societies like Advisory Member & Board of Trustees to the Asia Pacific Business, Innovation and Technology Management Society. His main task is to screen UTM research and development projects and subsequently create commercial

ventures through licensing and/or formation of spin-offs companies. He is a director of two spin-off companies on behalf of UTM. He also liaises plans and conducts entrepreneurship activities with funding agencies.

Prof. Amran has a vast administrative experience of more than 25 years. He has served on various key posts and delivered successfully throughout his career. At the Faculty of Management, Prof. Amran teaches post-graduates students, supervise doctoral student, conducts research projects independently and in collaboration. He has more than 30 doctoral students at current. Dr. Amran has been invited as a visiting Professor at University College of Engineering and Technology, Pahang; Indian Institute of Risk Management, Hyderabad, India; Hebei University China; Kaunas Technological University, Lithuania; National Centre University, Taoyuan, Taiwan; National Chen Kung University, Tianan, Taiwan; and Universities Sebelas Maret, Surabaya, Indonesia. He has more than 135 research articles published in various journals, six books, seven Book chapters, and attended nearly 70 research conferences.

# CONFERENCE ORGANIZATION

**Prof. Dr. Salim-ur-Rehman**
Vice Chancellor, Sarhad University of Science & IT, Peshawar

**Prof. Dr. S. Ghiasul Haq**
Dean, Faculty of Management Science, Sarhad University of Science & IT, Peshawar

## Conference Organizing Secretary

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# CONFERENCE PRESENTED PAPERS

# SOCIAL SCIENCES PAPERS

# Paper No. 340

## EVALUATING THE "PREVENTION AND CONTROL OF HUMAN TRAFFICKING ORDINANCE, 2002" FROM THE PERSPECTIVE OF SOCIO-ECONOMIC CONTEXT OF PAKISTANI SOCIETY

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**Abstract**

*This article aims to evaluate the "Prevention and Control of Human Trafficking Ordinance, 2002 from the perspective of socio-economic conditions of Pakistani society. This article also throws light on the ancient, medieval and modern development of the practice of human trafficking, and its causes and effects on the human life. Talking about Pakistan, it is considered as a major contributor in increasing the ratio of the human trafficking in the South Asia after India. Particularly, for the last two decades there has been a significant rise in the issue of the human trafficking. To overcome this problem, the Ordinance 2002 has been passed by the parliament that primarily aims to eliminate the practice form Pakistan. It is however, an alarming situation that the ratio of human trafficking could not be reduced which leads that the Ordinance could not achieve its target and that the government's measures are not sufficient. There are many socio-economic constraints such as day –by- day increasing poverty, uncontrolled growth of population, illiteracy, ignorance of religious norms, political instability and ignorance of the concerns etc. This research thus concludes certain conclusions and recommends some recommendations*

**Key Words**: Human trafficking, history, Pakistani society, ordinance 2002,

### Literature Review

The literature on the modern development of human rights law and its associated issues is found everywhere almost in all the libraries. The issue of human trafficking is also a well-addressed issue by many foreign authors and human right activists though a very little is found in the writings of the local authors. The author thus, has gone through many books and articles to have a comprehensive knowledge about the issue. To get data of Islamic point of view about slavery and trafficking in persons, the author collected some relevant verses of slavery from the Qur'an and utilized some important tafasir such as tafsir al-Qurtabi, Tafseer al-Kabir by Imam al-Razi and Ahkam al-Qur'an by Ibn al-Arabi and tafsir al-Manar by Muhammad Abduh etc. The author also overviewed the writings of some significant Muslim writers such as Muhammad Hamidullah, The Emergence of Islam and Muslim Conduct of State, Fazlur Rahman. Islamic Methodology in History, Ibn Rushd, Bidayah al-Mujtahid wa Nihayah al-Muqtasid, Allama Shibli Nu'mani, AL-Farooq: A Biography of Hadrat Umar etc. To have an honest investigation over the issue, the author studied many books of international writers such as Belden Fields, Rethinking Human Rights for the New Millennium, David Hume, A Treaties of Human Nature, Bodenheim, jurisprudence,

Edmund Jan Osmanczyk, The Encyclopedia of the United Nations and International Agreements, Kenneth Waltz. Man, the State and War, Adamantia Pollis and Peter Schwab. Human Rights New Perspectives, New realities, Jennifer L. Solotaro and Rohini Prabha Pande, Violence against Women and Girls: Lesson from South Asia, Tom Obokata who wrote a book on Trafficking of Human Beings from a Human Rights Perspective, Roberta Arnold and Noelle Quenivet, eds., International Humanitarian Law and Human Rights Law: Towards a New Merger in International Law, Faust & Brantingham, Juvenile Justice Philosophy: Readings, Cases, and Comments, Anthony M. Platt, The Child Savers, Adward Neman and Joanne Van Selm, Refugees and Forced Displacement, Adamantia Pollis and Peter Schwab. Human Rights New Perspectives, New realities, Paul Sieghart, The International Law of Human Rights, Catherine Itzin, Ann Take and Sarah Barter godfrey. Domestic and Sexual Violence and Abuse: Tackling the Health and Mental Health Effects.

To collect up to date information about the issue, the author also consulted many websites of International and national organizations. However, the author did not find any academic research that provides an evaluation of the "Prevention and Control of Human Trafficking Ordinance, 2002 from the perspective of socio-economic conditions of Pakistani society and in the light of the objectives of the Ordinance. Further, no academic research could be found that elaborate that Islamic was that religion which introduced the concept of abolition of forced labour and slavery during seventh century while the modern phenomenon of anti human trafficking arose in the mid of 20$^{th}$ century.

**Research Method**

This research aims to utilize theoretical and empirical methods of research rather some combination thereof by utilizing experimental reasoning based on naturally occurring data, surveys and reports.

**Introduction**

The issue of human trafficking is against the phenomenon of fundamental human rights. At present, it is considered as one of the most complex issues of human beings. Human trafficking has become a worldwide profitable industry for the traffickers who traffic people of all age and all sex including children and women. The victims are treated like personal property, sold purchased and are left at the mercy of the buyers. Although for the last two centuries, the modern world showed unprecedented development in many aspects yet could not overcome some basic issues of the human beings such as access to the fundamental rights to all, access to justice, elimination of poverty, forced labor and human trafficking etc. A recent report (2015) reveals that about 800,000 people are trafficked each year worldwide for forced labor, domestic servitude and sexual exploitation1. The

[1] See, Report (2015). United Nations Office on Drugs and Crime (UNODC),. Available at , http://www.unodc.org/unodc/en/human-trafficking/global-report-on-trafficking-in-persons.html Last visited on Saturday, 18-06-16.

issue of trafficking of human being has become a more complex and complicated issue than human smugglings. The most vulnerable region of the modern world is third world countries where poor and needy people are trafficked but have no voice. In this context, this article is divided into two sections. First section explores the issue of the human rights and human trafficking in historical perspective. Second section throws light on the development of the issue in Pakistan. It also discusses some socio-economic causes that cause to increase in the problem of human trafficking in Pakistan. It also evaluates the Ordinance 2002 in the light of its objectives and performance. In the end, some conclusions have been drawn and some recommendations have been suggested to overcome the issue.

**Section First**

**History of the Issue of Traficking in Persons**

The idea of the fundamental human rights that is to say that every human being enjoys simply by virtue of being human was first introduced by Islam during the seventh century by declaring that all human beings are children of one parents. It is stated in the Qur'an: "O mankind be dutiful to your Lord, Who created you from a single person (Adam)"[2].

The instinct of self-preservation is a basic natural urge of life in all its gradations. It is stated in the Qur'an: "And indeed we have honored the children of Adam and we have carried them on land and sea and we have provided them with pure and lawful things and have preferred them above many of those whom We have created with a marked preferment"[3]. Islam declared human beings free from all forms of oppression by declaring him His vicegerent and discouraged slavery[4]. To preserve, the dignity and self-respect of human beings, fulfillment of necessities of life was declared as a collective responsibility by way of zakat and charity[5]. It was advanced during the time of Caliphate and access to the necessities of life was declared as a primary responsibility of the state[6].

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2 The Qur'an, Chapter, 4, verse, 1, See for detail, Muhammad Hamidullah. (1998). The Emergence of Islam. Islamabad: Islamic Research Institute. p.78-133; Fazlur Rahman. (1988). *Islamic Methodology in History* .Islamabad: Islamic Research Institute.pp.122-25.

3 The Qur'an, Chapter, 17, verse no 70. See, Imam al-Razi (1997). *Al-Tafsir al-Kabir*. Beirut: Dar Ihya al-Turath al-'Arabi. vol.3, pp.23-26.

4 See, Ibn al-ʿArabi, Muhammad bin 'Abd Allah. (1958). *Ahkam al-Qur'an*, ed. Muhammad al-Bajawi. 4 vol. Misr: Dar Ihya al-Kutu. Vol. I,p.121. Chapter, 2, verse,30.

5 Ibn Rushd, Abu al-walid. (1989). Bidayah al-Mujtahid wa Nihayah al-Muqtasid. Lahore: Faran Academy.vol.1, p.78.

6 Allama Shibli Nu'mani (1988). AL-Farooq: A Biography of Hadrat Umar. Lahore: Maktabah Rahimiyah. p.122-128.

In the west, the concept of the fundamental human rights however, developed late in the seventeenth and eighteenth centuries by Diggers in their struggle to claim the very necessities of life[7]. Different legal philosophers such as Thomas Aquinas, Francisco, Hooker Hugo Grotius, John Locke and Thomas Hobbes etc., however, developed the phenomenon of human rights in the west[8] By seventeenth century, Thomas Hobbes gave the initial philosophical form of the human rights. In his treaties "Leviathan" and "De Cive", he discussed natural rights as general rules found by reason of human beings. He thus, claimed that certain rights are inherent by virtue of human being and recognized universally through human reason. Every person indeed has a natural and inalienable right to life. He further argued that given the real nature of human beings, the right to life could be ensured best by political absolutism[9]. Human trafficking and similar issues are great violation of the fundamental human rights. The term human trafficking is defined in the meaning of holding a person without his/her consent by way of force and exploitation and not let him free to move, to go, or to do something at his own discretion[10]. The "Organized Crime Convention and Trafficking and Smuggling Protocols 2000" have adopted a more comprehensive definition of the term. Article 3, of the "Protocol" stipulates, that the "trafficking in person shall mean the recruitment transportation, transfer, harboring, or receipt of a person by means of threat or force or other form of coercion, of abduction, fraud, of deception, of the abuse of power or of a position of a vulnerably or of the giving or receiving of payments or benefits to achieve the consent of a person having control over another person for the purpose of exploitation"[11]. The roots of the issue can be found in the ancient practice of slavery and subjugation of a person. From the time immemorial, it was a well-known and common practice among all the ancient societies, the Greeks, the Romans, the Asia, and the Arab. War was the most favorable means of slavery[12]. Likewise, all the traditional societies adopted the slavery and the trafficking in person such as Hinduism favored bondage as a religious practice and millions of the people were made forced to bonded labor. Further, discriminated caste system also made the people of inferior caste vulnerable and victim of trafficking in persons[13]. Trafficking in person was

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7 Belden Fields, A. (2003). Rethinking Human Rights for the New Millennium. Urbana: University of Illinois. p. 34.

8 David Hume. 1962). A Treaties of Human Nature. London: J.M. Dent & Sons Ltd, pp.78-88.

9 Bodenheimer. (1978). *Jurisprudence.*USA: Harvard College.pp.267-68.

10 Edmund Jan Osmanczyk, ed. (2006). The Encyclopedia of the United Nations and International Agreements. London: Taylor and Frances. p. 655.

11 See, UN General Assembly Resolution 1999 and Organized Crime Convention and Trafficking and Smuggling protocols adopted in Palermo, Italy in December 2000. Available at www.unconventions.com. Last visited on Wednesday, 15-06-16.

12 Kenneth Waltz. Man. (1959). The State and War. New York: Columbia University Press. pp.45-48.

13 Adamantia Pollis and Peter Schwab. (2007). Human Rights: New Perspectives, New realities. UK: Lynne Rienner, p.255; Jennifer L. Solotaro and Rohini Prabha Pande.

also a common practice in form of slavery feudalism and tenancy. The people practiced different kinds of the trafficking such as for forced labor, sexual exploitation, prostitution, smuggling and for commercial purpose to sale the trafficked persons. The trafficked persons were treated like slaves and as personal property and were usually utilized as housekeepers, guards, cooks and manufacturer of poetry, glassware etc. They were forced to engage in agriculture, construction and other labor without any wage or with very low wage. Women and children were trafficked for sexual exploitation as well as for household works. Men, women and children were also smuggled through trafficking and were forced to live in inhuman conditions and constant fear. They had no legal entity and could not enjoy their natural rights rather were totally, dependent upon the discretion of their masters[14]. The practice of slavery and trafficking in persons remained as a well-recognized and common practice and never be condemned or discouraged until the dawn of Islam in early seventh century. The Qur'anic revelation recognized slavery just by way of context as it was a well-recognized customary practice yet discouraged it in different manners. The revelation through Qur'anic verses, adopted the process of gradual reformation by ordering the owners to treat with their slaves equally and humanly. It is stated in verse 36 of chapter 4 of the Qur'an: "Worship Allah and join none with Him and do good to parents . . . and to slaves whom your right hands possess. Verily Allah does not like such as are proud and boastful[15]." Further, Islam ordered the believers to do marry with the slave girls if they accept Islam and give them status of their wives and ordered to pay them dower[16]. Moreover, to discourage the practice of slavery, Islam motivated the believers to set free the slaves in case of some mistake, intentional breach of an oath, for ransom or expiation[17]. At that time, the main source of the practice of slavery was war and the prisoners of wars were to be taken as slaves[18]. However, Islam ordered his believers to set free the prisoners against ransom[19]. During the period of Caliphate, slavery was condemned and to eliminate slavery Hadrat Umar banned certain types of slavery. Once he commented: "Why you people make the persons slave while their mothers delivered them free?[20] In this way, Islam led to abolish the system of slavery from the world yet in later

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(2005). Violence against Women and Girls: Lesson from South Asia. India:Asia Development Forum, World Bank Group. p.288.

14 Tom Obokata. (2005). Trafficking of Human Beings from a Human Rights Perspective. UK: Martinus Nijhoff Publishers. p.67

15 The Qur'an, Chapter 4, verse 36.

16 The Qur'an, Chapter 4, verse 25.

17 See, The Qur'an, Chapter,2,verse,177. Chapter 4, verse.29. chapter 5, verse,89,

18 Roberta Arnold and Noelle Quenivet, eds.,(2007). International Humanitarian Law and Human Rights Law: Towards a New Merger in International Law. New York: Lexington Books. P.233.

19 The Qur'an, Chapter 47, verse, 4, See, Ibn al-ʹArabi. *Ahkam al-Qur'an.*vol.3, pp.67-69.

20 Al-Suyyuti, Jalalal-Din Abdur Rehman. (1979). Tarikh al-Khulafa'. Misr: Al-Maktabah al-Tijariyayh al-Kubra. viol.1,p.289.

period the Muslim governments showed least concern towards the issue and no significant steps could be taken to ban or to protect the rights of the slaves or against trafficking in persons except on moral and ethical grounds.

Talking about the contemporary movement against the trafficking in person, the credit goes to the western social activists and the philosophers of the 17th and eighteenth centuries who raised their voice against this inhumane practice. Towards the end of the seventeenth century, some anti slavery movements succeeded to draw the attention of the developed countries towards the issue[21]. In the same manners, some contemporary philosophers and social activists also contributed for the protection of the rights of the weak, poor and neglected segment of the human societies through their philosophies and social reforms movements. For instance, in the early 17th century, John Lock (1632-1704) presented his theory of natural rights and declared the government responsible to protect the fundamental rights of his citizens. He further argued that the government has limited power over its citizens and can be overthrown by the people if failed to protect their rights[22]. During the 18th century, a philosopher Jean-Jacques Rousseau (1712-1778) from Geneva presented the theory of "Social Contract" and contended that man has born free and this freedom should be ensured through a sound political system that allow the people to live with equal status and co-existence. He also focused on the protection of the rights of the children and their proper education[23]. The practice however, continued until the 19th century around the globe including the Muslim countries[24]. In 1833, the British government banned the practice of the slavery and in 1848 France released bonded labors in its colonies. The US Civil War (1861-1865) was a result of the antislavery movement and finally led the abolition of the slavery in the country[25]. It was in 1865 when the thirteen amendment of the Constitution of the United States abolished slavery that later on followed by the other states of the world[26]. The first international legal instrument that declared slavery prohibited was the International Agreement for the Suppression of the White Slave Traffic 1904 and 1910[27]. In these agreements, the term "White Slave Traffic" was adopted only for the protection of white slaves. These agreements were adopted due

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21 Faust & Brantingham. (1979). Juvenile Justice Philosophy: Readings, Cases, and Comments. New York: West Publishing Co. pp.34-38.

22 Kenneth Waltz. Man, the State and the War. p.49; David Hume. A Treaties of Human Nature. P.99.

23 Anthony M. Platt. (1969). *The Child Savers*. Chicago: University of Chicago Press. p.145.

24 Obokata. Trafficking of Human Beings from a Human Rights Perspective, p.108.

25 Kenneth Waltz. Man, the State and War. p.65; David Hume. A Treaties of Human Nature. p.98.

26 Anthony. *The Child Savers*. p. 145.

27 Adward Neman and Joanne Van Selm. (2005). Refugees and Forced Displacement. UK: Oxford University Press. p.89. see, White Slave Traffic 1904 and 1910. Available at www.internationaltreaties.com. Last visited on Thursday, 16-06-16.

to stagnant economic conditions in Europe that led to the sale of women into prostitution and thirteen European States deemed it necessary to suppress the practice[28]. The issue of the trafficking in person as a general was taken into consideration by the Western Europe in the early 20th century[29]. In 1921 at an International Conference, member states of the League of Nations signed the "International Convention for the Suppression of Traffic in women and Children" for combating trafficking in persons[30]. The scope of the Convention however, was limited as it aimed to stop sexual exploitation and prostitution of women. After WWII, the issue of the trafficking of human beings was started to be discussed in connection with the fundamental rights of the human beings[31]. In 1948, the UN General Assembly adopted the "Universal Declaration of Human Rights" that declared all forms of slavery and slave trade prohibited and banned it completely[32]. Likewise, the UN General Assembly adopted the "United Nations Convention for the Suppression of the Traffic in Persons and of the Exploitation of the Prostitution of Others" in 1949. The preamble of the Convention declared, "Whereas the prostitution and the accompanying evil of trafficking in persons, for the purpose of prostitution, are incompatible with the dignity and worth of the human beings and endanger the welfare of the individual, the family and the community. . .[33]" It was the first legally binding Convention yet ratified only by sixty six member states. In 1993, the "Maastricht Treaty" was signed by the European Union regarding abolishing of trafficking of human beings in Europe and consequently, the EU started taking action against the issue of human trafficking and several actions in relation to trafficking were implemented[34]. In 1997, the European Union Ministers conference was held on trafficking in women and "the Hague Ministerial Declaration" was adopted for effective measures and to prevent and combat trafficking in women for the purpose of sexual exploitation[35]. In 1997, the "SAARC Convention on the prevention of Trafficking

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28 Adamantia and Peter . Human Rights New Perspectives, New realities, p. 258; Obokata. Trafficking of Human Beings from a Human Rights Perspective, p.109.

29 Edmund Jan. The Encyclopedia of the United Nations and International Agreements. p. 668.

30 See, www.internationaltreaties.com. Last visited on Thursday, 16-06-16.

31 Adward and Joanne Van Selm. *Refugees and Forced Displacement*. p. 258.

32 Edmund Jan. The Encyclopedia of the United Nations and International Agreements. p. 697.

33 See, preamble of the "United Nations Convention for the Suppression of the Traffic in Persons and of the Exploitation of the Prostitution of Others" in 1949. Available at http//www.unconventions/ treaties.com. Last visited on Friday 17 June 2016.

34 Paul Sieghart (1987). The International Law of Human Rights. Oxford:Clarendon Press. p.533; Adward and Joanne Selm. Refugees and Forced Displacement. pp.103-7.

35 Ibid.

in Women and Children" was adopted to combat the grave crime of trafficking in women and children[36].

However, a significant improvement occurred during the last decade and a series of treaties and conventions started against the trafficking in persons. In 2000, the UN General Assembly adopted the "Palmero Protocol" and the "Protocol against the Smuggling of Migrants through Land, Sea and the Air" to launch a worldwide movement against trafficking and smuggling in person. This protocol named trafficking in person as "modern day slavery" and included all forms of slavery and exploitation like organ harvesting and forced labor of migrants. It is also called as "The United Nations Convention against Transnational Organized Crime (UNTOC)[37]". In 2002, the Council of the European Union adopted the "Treaty of Amsterdam". The Council suggested for the member states three key elements for combating trafficking of human beings such as adopting a common definition of the relevant act by way of legislation, prescribing a minimum penalty for traffickers, inserting the provisions for the protection of victims[38]. Accordingly, the "Protocol to Prevent, Suppress and Punish Trafficking in Persons, especially, Women and Children Supplementing the UN Convention against Transitional Organized Crimes" entered into force on 25 December 2003[39]. This Convention defines human trafficking as a crime by including all forms of exploitation and aims to protect the rights of the victims to all possible extent. It has made its member states bound to legislate for combating trafficking in persons and for the protection of the rights of the victims of trafficking. It also aims to create an environment of cooperation among the member states in order to meet the objectives of the Protocol. To act upon the suggestions, in 2003, a "Group of Experts" was constituent that was comprised of the agents of governments, universal associations, NGOs and researchers who have experience and master in trafficking. The principle capacity of this group is to inform the commission on the improvement with respect to EU activity against trafficking. In accordance with its order, the "Expert Group" has so far distributed a report and issued sentiments on different parts of the EU activity against trafficking[40]. Another, development on this issue is that in 2005, and in Warsaw, the "Council of European Convention on action against Trafficking in Human Beings was opened for signature on the occasion of the third Summit of head of the states and government of the Council of Europe. The process of ratification however, was slow and

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36 Adamantia and Peter Schwab. *Human Rights New Perspectives, New Realities*. p.268; Obokata.*Trafficking of Human Beings from a Human Rights Perspective*, p.109.

37 Catherine Itzin, Ann Take and Sarah Barter Godfrey. (2012). *Domestic and Sexual Violence and Abuse: Tackling the Health and Mental Health Effect*s. UK: Rutledge Publishing Co. pp. 323-37.

38 David P. Fosythe. (1991). *The Internationalization of Human Rights*. Toronto: Lexington Books.p.233; Obokata. *Trafficking of Human Beings from a Human Rights Perspective*. p.107.

39 Catherine and Sarah Godfrey. *Domestic and Sexual Violence and Abuse.* p. 109.

40 David. *The Internationalization of Human Rights*, p.166.

until 2007, it received only ten ratifications yet entered into force on 1 February 2008. Until May 2016, the Convention got ratification by 46 member states[41]. In 2007, the U.S. Senate designated January 11 as a National Day of Human Trafficking[42]. Moreover, the "United Nations Office on Drugs and Crime (UNODC) started a research project throughout the world to collect primary data about the issue of the trafficking in persons and to take the response of the governments. The most recent development about the issue is that in 2014, many significant political and religious leaders met and signed a declaration for the elimination of slavery and human trafficking by the year 2020. Despite all these efforts, trafficking in persons could be controlled and the ratio of the human being's trafficking is increasing day by day. Each year millions of the people are trafficked and are treated inhumanly and are exploited physically and sexually. Rather a new form of trafficking also come into being that is trafficking in persons for using their organs for transplantation that has a worth-mentioning contribution in the increase of trafficking in person[43]. The most vulnerable for trafficking are the minorities, migrants, children and women from developing countries[44]. A UNODC Report (2014-15) reveals that half of the victims are female while children make 1/3 of the total number of human trafficking while among the traffickers 72% are male and female are 28%[45] . Moreover, the most popular form of the human trafficking is trafficking for sexual exploitation and for forced labor as shown in the graph below[46]. The graph shows that in Asia, 64% of the trafficked persons are exploited by way of forced labor, and servitude while in America and Africa majority of the trafficked persons that is almost 48% and 53% respectively is exploited sexually.

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41 See, http://www.unodc.org/unodc/en/human-trafficking/global-report-on-trafficking-in-persons.html. Last visited on 17-06-16.

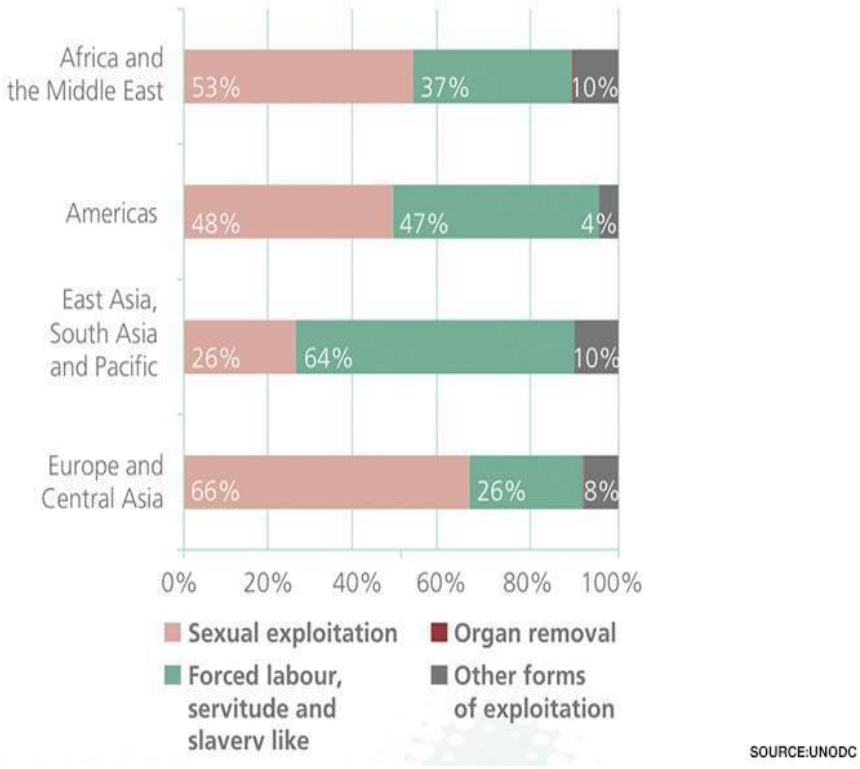
42 Ibid

43 Catherine, and Sarah. *Domestic and Sexual Violence and Abuse.* p.311.

44 Paul Sieghart. *The International Law of Human Rights*, p.133.

45 See, Report (2015). United Nations Office on Drugs and Crime (UNODC),. Available at , http://www.unodc.org/unodc/en/human-trafficking/global-report-on-trafficking-in-persons.html Last visited on Saturday, 18-06-16.

46 See, https://www.enca.com/world/five-facts-about-human-trafficking. Last visited on Saturday, 18-06-16.




Likewise, the US State Department released a Report on trafficking in Person on July 2015 that shows that about 20 million persons are trafficked each year[47]. The report declared trafficking in person as "modern day slavery" and against the fundamental right of the movement of the people. It stated that like poverty, gender discrimination and corruption, human trafficking has become a grave challenge for the international community. It aims to target the root cause of this issue to eliminate it around the globe[48]. Trafficking in persons has become a profitable industry for the traffickers. A report of International Labor Organization (2015) shows that the traffickers earn almost 1900-billion rupees earn each year[49]. The US Secretary of State John F. Kerry commented that, "Money may be able to buy a lot of things, but it should never, ever be able to buy another

[47] See, Report US State Department. (2015). Available at , http://www.unodc.org/unodc/en/human-trafficking/global-report-on-trafficking-in-persons.html

[48] Ibid.

[49] Ibid. see, Report (2015) International Labor Organization

human being[50]." The issue is so severe that it is considered as the third illegal trade after drug and weapons.

**Section Two**

**Human Trafficking in Pakistan**

Pakistan is a country of about 196,174,380 million people with a growth rate of 1.49% (2014 est.). It is situated in the western part of the Indian subcontinent, with Afghanistan and Iran on the west, India on the east, and the Arabian Sea on the south[51]. Pakistan is suffering from many acute problems such as poverty (50%), Illiteracy (50%), over population, corruption, unemployment and lack of political concern. All this has gave birth many sever and intense associated issues like child labor, bonded labor, feudalism, tenancy, day to day increase in crime rate, terrorism and trafficking in person etc.[52] In this context and like all other issues, the issue of trafficking in person has become an irresolvable problem of the society. Many people including women and children are great sufferers of the trafficking. Illiteracy, poverty, feudalism and lack of government concern are the major causes due to which this issue could not be overcome. Pakistan is considered an origin and a safe destination for trafficking in person. The issue has become a subject of great debate from the perspective of the modern development. It is reported that the largest number of the victims of trafficking belong to South Asia particularly, to India and Pakistan[53]. The prevailing situation is that at each city and village many children, men and women are being trafficked yet due to unawareness of the human rights, the trafficked persons do not know that they are being trafficked. Throughout the country, many organized mafias and groups are indulged in trafficking of persons actively without any fear. In the fields many children and women are hired against very low wage or without any wage just for wheat or bread of one from morning to night. The feudal lords have many families at their farms and homes who have restricted freedom and cannot move without the permission of their lords. They have no right to negotiate the terms of their work or labor[54]. Almost all forms of trafficking are common and practiced by the traffickers. The poor people are also trafficked to bonded labor and domestic servitude for the return of the loan they had to fulfill the necessities of life such as food, clothing and

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50 See, Report US State Department. (2015). Available at , http://www.unodc.org/unodc/en/human-trafficking/global-report-on-trafficking-in-persons.html

51 See, http://www.infoplease.com/country/pakistan.html. Last visited on 19-06-16.

52 See, http://yumtoyikes.com/2015/11/24/10-biggest-problems-faced-pakistan-not-even-priority-government/

53 Report US State Department. (2015). Available at , http://www.unodc.org/unodc/en/human-trafficking/global-report-on-trafficking-in-persons.html

54 Solotaro and Pande. *Violence against Women and Girls: Lesson from South Asia.* p.266.

medical treatment55. Further, existence of militant groups also a great cause of trafficking in persons in Pakistan. The militant groups kidnap children and abuse them sexually, forced them to do labor and to die as suicide bombers[56].

Due to poverty and illiteracy, willing trafficking is also very common and the traffickers easily trafficked and smuggle millions of men, women and children with deceptive promises and good jobs abroad. The traffickers and illegal labor agents take high fees from parents for giving work visa to their children. People let their sons and daughters with a hope for an improved economic condition and for a better future for their generation. Thus, the traffickers can abuse, exploit and sale them easily, the victims who are dependent upon them and have no way to escape[57]. Pakistan is also a safe transit and destination to absorb persons in trafficked for purpose of bonded labor and prostitution. A report (2014) shows that the people from the different countries like Afghanistan, Iran, Russia, China, Sri Lanka and Nepal are brought in Pakistan by way of trafficking and forced for bonded labour and prostitution[58]. In the same manners, trafficked persons are transited through Pakistan to Iran, Dubai, Abu Debi and European countries. It is reported that during 1991-1993, everyday 19000 children were to be trafficked to Dubai from Pakistan[59]. There are systematic networks throughout the country that are busy in this inhuman trade. A report on human trafficking in Pakistan (2014) reveals that number of human trafficking network is increasing day by day. For instance, in 2011 there were only 95 networks of human trafficking that reached to 132 in 2012, and reached to 141 next year in 2013. Most of these networks are from Gujranwala and Gujarat and some belong to Rawalpindi, Sialkot and AJK[60]. Another report reveals that about one million persons from Bangladesh and two hundred thousand from Barma have been trafficked only in Karachi. Law enforcing agencies such as Police department are offered heavy bribery by the traffickers to provide them protection[61]. The traffickers use threat, violence, psychological and physical, seize travel documents and force the trafficked persons to comply their instructions[62].

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55 Catherine, and Sarah. *Domestic and Sexual Violence and Abuse.* p.377; Obokata. *Trafficking of Human Beings from a Human Rights Perspective*. p.99.

56 See, Federal Investigation Agency. "Red Book 2012: The Most Wanted Traffickers involved in Human Trafficking/Smuggling. p. 177. Available at http://www.fia.gov.pk/en/redbooktriff.pdf. Last visited on Sunday, 19-06-16.

57 Michelle Foster. (2011). International Refugee Law and Socio-Economic Rights. Cambridge: Cambridge University Press. pp.233-8.

58 *Admin. (October 31, 2015) . Menace of human trafficking in Pakistan – Its causes and preventive measures. Available at http://www.lawsofpakistan.com/human-trafficking-in-pakistan/Last visited on 16-06-16.*

59 See, www.lhrla.com.pk/upcoming_proj.html. Last visited on Monday 20-06-16.

60 See, Federal Investigation Agency. Red Book 2012. p.23

61 See, www.lhrla.com.pk/upcoming_proj.html. Last visited on Monday 20-06-16.

62 News published in "The Nation" daily newspaper on 02-May-2016.

As far as concerned the issue of state legislation with respect to human trafficking and bonded labor, the Constitution of Pakistan 1973 contains some important provisions in this regard. For instance, Article 9 of the Constitution provides security to each person by stating: "no person shall be deprived of life or liberty saves in accordance with law." In the same manners, Article 15 protects the right of freedom of movement of the entire citizen equally and in accordance with law. The most relevant article to bonded labor is Article 11 that provides protection from bonded labor and slavery categorically[63]. In the same manners, sections 359 to 372 of Pakistan Penal Code 1860 deals with the issues of kidnapping, abduction, slavery, forced labor, and declared them as offences and subjects for punishment[64]. The most significant legislation regarding elimination of trafficking in person from Pakistan is "The Prevention and Control of Human Trafficking ordinance 2002." It is consisted of 12 sections. Section 2 (h) of the Ordinance defines the human trafficking in the meaning of "obtaining, securing, selling, purchasing, recruiting, detaining, harboring or receiving a person by use of coercion, (deception/fraud), kidnapping, abduction, or by giving or receiving any payment or benefit for such person's subsequent transfer out of or into Pakistan for the purpose of attaining any benefit or exploitative entertainment including inhuman sports, slavery, forced labor, or adoption in and out of Pakistan." All these offences are cognizable, non bail able and non-compoundable. Section nine of the Ordinance states that "the investigation will be held by the agency authorized by the Federal Government." Sub clause (i) of the same section (2) covers the issue of "inhuman sports" that include all sports involving, as a matter of normal course, infliction of physical or mental injury on a person against his will, intention or reasonable expectation. It (2 (j)) also defines the term "organized criminal group" as a "structured group of two or more persons, existing for a period of time and acting in concert with the aim of committing any offence under this Ordinance. It further explains that organized criminal group includes that person who in order to obtain, directly or indirectly, any financial or other material benefit and includes a person knowingly receiving or disbursing benefits accruing from the commission of any offence in relation to human trafficking by an organized criminal group[65]." Another important section of the Ordinance is section 3 that prescribes different phases of punishment in the light of the severity of the offence. It describes that in case where a person just plans human trafficking and if known shall be punishable with five years imprisonment and fine. If the trafficker succeeds to execute the plan, he will be punished with seven years of imprisonment and a fine in or out of Pakistan. In case if a person sale, harbor or transport a child or a woman by way of coercion or abduction shall be liable for a punishment of ten

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63 See, The Constitution of Pakistan 1973. Lahore: Mansoor Publications 2014. Articles 8-28.

64 See, Pakistan Penal Code 1860. Lahore: Mansoor Publications 2009, sections 359-374.

65 See, "The Prevention and Control of Human Trafficking ordinance 2002. Available @ https://pakistanilaws.wordpress.com/tag/human-trafficking/. Last visited on Monday, 20-06-16.

years with fine. If attempting kidnapping or abduction then fourteen years of punishment with fine will be awarded to the trafficker. Section four of the ordinance states that if the offense of trafficking is committed with an organized crime then it will be liable for imprisonment not less than 10 years that may extend to fourteen years if victim is trafficked for exploitative entertainment. Section 5 imposes a punishment of fourteen years in case of repetition of offence[66]. In this way, this Ordinance is the first and the most comprehensive legislation of the state on the issue of human trafficking that covers almost all the aspects of the issue and prescribes a severe punishment for the culprit. In the same manners, Pakistan has signed the "Protocol to Prevent, Suppress and Punish Trafficking in Persons, Especially Women and Children, Supplementing the United Nations Convention Against Transnational Organized Crime" on 14 December 2000 and yet did not ratify it[67].

After becoming a signatory and passing of the Ordinance 2002, the status of Pakistan at UN Convention Tiers has improved by one-step. Until 2002 Pakistan was count in Tier 3 (lowest level) of the UN Convention that leads Pakistan was among those countries where the issue of trafficking in person is higher and greater in degree and that do not care for the international standard and norms. In 2002, the "US Department of State Report 2002" declared Pakistan as a country of improved status raised from Tier 3 to Tier 2 that leads that Pakistan could not undertake satisfactory measures to combat the issue of trafficking in persons and is under UN watch list. However, the report (2002) counted Pakistan as a "country of source, transportation and a safe destination for human traffickers and that the trafficked persons are exploited and are forced to do bonded labor. It also shows that Pakistan is facing all types of trafficking both at internal and external levels. Internally, women and children are kidnapped, abducted and brought from remote areas to the large cities for sexual exploitation and bonded labor. It also noted gender disparity as a widespread phenomenon and as traditional and legal constraints that led many issues for women. Violence against women and children is very common. It also pointed out debt slavery as one of the most critical issues of the society. Internationally, Pakistan is considered as a safe transit for human traffickers as the law enforcing agencies facilitate the traffickers in the transportation of persons in trafficked. The report further elaborated that the men, women and children are trafficked from Bangladesh, Afghanistan, Iran and Central Asia to the Middle East transit through Pakistan. The traffickers bring women as their wives or sisters. The persons in trafficked are first transported from Bangladesh to Dhaka, then to New Delhi and then onto the Indian border and finally into Pakistan. Once they arrive in Pakistan, the most favorable route is from Lahore to Karachi where the market condition is relatively profitable for the slave trade. Here, organized prostitution gangs prepare all necessary documents for the transit of the persons in trafficked. Pakistan

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66 See, "The Prevention and Control of Human Trafficking ordinance 2002. Available @ https://pakistanilaws.wordpress.com/tag/human-trafficking/. Last visited on Monday, 20-06-16.

67 Report US State Department. (2015). Available at , http://www.unodc.org/unodc/en/human-trafficking/global-report-on-trafficking-in-persons.html

is also a destination of the victims[68]. In this way, legislation and state efforts to eliminate trafficking in person could not improve the situation and the status of Pakistan in the UN Tiers as Pakistan is still count in Tier 2 of the watch list since 2002[69]. It leads that Pakistan is facing acute problem of human trafficking however, at the same time, it is making efforts to overcome the issue[70]. A recent report reveals that every month about 200-400 Bangladeshi women are trafficked to Pakistan and in the last ten years, almost two hundred thousand women have been trafficking to Pakistan. These women are sold in the slave trade[71]. If some women are rescue by the law-enforcing agencies are sent to jail. A report (2014), shows that about fifteen hundred Bangladeshi women are in jails of Pakistan.

It is also an alarming situation that the current US State Report (2015) shows that the government of Pakistan does not fully comply with the minimum standards for the elimination of the trafficking in persons. The report throws a light on the contemporary condition of human trafficking in Pakistan by pointing out that "in Pakistan children as young as five years old are kidnapped and sold for forced labor in brick kilns while some kiln owners are the government officials or politicians who protect and facilitate traffickers by using their power. It declares that Pakistan is a source, a transit and a destination for women and children. It also points out forced labor as the biggest problem associated with trafficking in person where the people are exploited in terms of job or work or loan. It also discusses the role of law enforcing agencies particularly, the police that in case if some victim escapes and tries to seek help from police, it returns him to the traffickers who then victimize such person badly and inhumanly and hold them in their private jails[72]. The report thus, suggests the authorities to investigate and prosecute vigorously, all those who are suspected or involved in human trafficking. It also calls for an anti-trafficking law that prohibits and penalizes all forms of human trafficking, including internal trafficking. There are certain causes of the failure of the government regarding control of trafficking in person. Poverty and illiteracy are two main causes due to which all efforts of the government have failed. Due to poverty, people are forced to think to let their children go outside home and find some labor that make the children an easy prey for the traffickers. The most critical reason is the lack of the government concern with respect the implementation of the laws concerned. Despite the legislation 2002 and signature on UN Convention, the government and the law enforcing agencies are

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68 Report US State Department. (2002). Available at , http://www.unodc.org/unodc/en/human-trafficking/global-report-on-trafficking-in-persons.html

69 Tier 2 is an indicator to indicate the status of the state party with respect to its efforts and result against trafficking in person.

70 See,Report US State Department. (2015). p.267.

71 See, Report CATW (2014). Asia Pacific Trafficking in Women and Prostitution in the Asia Pacific (Excerpts taken from the Fact book on Global Sexual Exploitation, published by the Coalition Against Trafficking in Women.

72 Report US State Department. (2015). P.269.

least bothers towards the issue while the state can only be bound in international law to the extent of their consent if the states accept the need for human right protection and agree to regulate human right standards[73]. At present, the application of international standard of human rights law at domestic level has become a subject of intense debate over a long period, addresses to the issues from the contemporary perspective and the challenges of the state at the domestic level. Further, there is lack of the use of standardized methodology for collection the data on behalf of the state agencies that is why reliable data is not available on this issue[74]. Moreover, people are not satisfied with the present system of justice dispense and access to justice to all is not available everywhere. Most of the victims if get release by any means try to shut their mouth up with the fear of the organized mafia as in most of the cases, the police appears as a party to that mafia[75]. However, to overcome the issue, the government has constituent an "Anti Trafficking Unit" to combat trafficking in person with the coordination of GOs and NGOs. The Unit is working under the direct control of the "Director General FIA". It coordinates all its activities with the national coordinators in the ministry of interior[76].

**Conclusions and Recommendations**

This study thus, concludes that trafficking in person is an inhuman activity yet a widespread phenomenon around the globe. It is also concluded that it was Islam, which led to abolish the system of slavery and bonded labor from the world yet in later period the Muslim governments showed least concern towards the issue of the slavery and no significant steps could be taken to ban or to protect the rights of the slaves or against trafficking in persons. Further, the modern Muslim states did not participate actively in the efforts of the UNO to abolish slavery from the world. Pakistani society is facing many critical issues of its survival and the issue of the human trafficking is one of them that is destructing the lives of the many people on the one hand and as well as defaming the image of an Islamic Republic state on the other. It is also concluded that the issue of the trafficking in person is an intense issue of the society and is increasing day by day due to poverty, illiteracy and lack of the government concerns. The government and the law enforcing agencies showed least political will and capacity to address the issue as some government officials and politicians are involved to protect the traffickers. It is also concluded that access to justice to all is not available everywhere and victims feel themselves helpless. It also leads that law-enforcing agencies do not comply the measures recommended to overcome the issue.

This research thus recommends bringing a substantial reform around the country. It recommends reducing poverty, illiteracy on emergency basis. The issue cannot be overcome unless a series of awareness program is launched. Creating an understanding

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73 David. The Internationalization of Human Rights. p. 247.

74 Admin. Menace of Human Trafficking In Pakistan. p.22.

75 Ibid.

76 See, http://www.fia.gov.pk/en/redbooktriff.pdf. Last visited on Sunday, 19-06-16.

about the bad and destructive effects of trafficking on the lives of the human beings is very much necessary. To achieve this purpose, electronic and print media may be utilized. All educational institutions should be made bound to arrange seminars, meetings and workshops regarding destructive effects of human trafficking. Access to justice and speedy trial should be ensured. It also recommends fully complying concerned legislation. The traffickers should be punished with sever punishments. International cooperation and exchange programs should be arranged among the states of transit and destination.

# Paper No. 342

## EMPIRICAL ANALYSIS OF PERSIAN AND PASHTO LOAN WORDS IN URDU FOR ENHANCED LANGUAGE LEARNING

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**Abstract**

*The word Urdu is derived from Turkish language and it means "swarm". Urdu borrows most of its vocabulary from Arabic, Persian, Turkish, Pashto and other regional languages. In order to arrive at an appropriate teaching of Urdu language, a contrastive analysis and comparative study is imperative. The influence of actual meaning in Urdu may not be possible unless the root word and the borrowing traces are studied. The understanding of Urdu is better achieved when the connection of Urdu, Persian and Pashto is drawn on scientific basis. This research paper deals with the loan words of Persian and Pashto in the present-day Urdu vocabulary. No language is exempted from vocabulary and linguistic borrowings. In terms of loan words Urdu is a considered to be a child of Persian. A large number of Persian and Pashto words are used in Urdu. We used a general genre Urdu corpus of size 1.8 million words for experimentation of this research study. We collected this corpus from different news agencies, because the language used in newspapers is considered to be the contemporary and simple communicative language of society. We identified, extracted and calculated frequency distributions for computing the weightage of these loan words. Based on our experiments and analysis, our research quantifies that a large number of Persian and Pashto words are now part of Urdu with significantly frequent use. The findings of this study are expected to be helpful in the Urdu language classrooms, especially for teachers in teaching Urdu vocabulary systematically on scientific basis.*

**Key words**: Loan words, Corpus based Language learning, Vocabulary borrowing, Code switching.

## Introduction

Urdu is the national language of Pakistan, and it is used as medium of teaching in most of the institutions, in mass print and electronic media. It is not only spoken in Pakistan but also in India, Bangladesh Afghanistan and Nepal [1]. It is said that Urdu is a nice composition of Persian, Arabic, Pashto and Turkish words, which emerged as a result of connection with the Muslim travelers, armies and the local Hindi- speaking community in the medieval India. In Asia Urdu is considered as a language which we use to communicate in our daily life [2]. Urdu belongs to Indo-Aryan language family. Urdu is spoken by more than 100 million people around the world. Based on the number of native speakers, Urdu is ranked 19th among the languages of world[1]. It is one of the most spoken language in South Asia [3]. Most of native speakers belong to the densely populated parts of Pakistan and India [4]. Urdu is a relatively free word order language. Urdu is written in Arabic script from right to left [5]. The word Urdu is derived from Turkish language and it means "swarm". It takes most of its vocabulary from Arabic, Persian and Turkish [6]. In order to arrive at an appropriate teaching of Urdu language a contrastive analysis and a comparative study is imperative. The influence of actual meaning in Urdu may not be possible unless the root word and the borrowing are studied. The understanding of Urdu is better achieved when the connection of Urdu, Persian and Pashto is drawn [7].

## Literature Review

Word-borrowing/code-mixing is a common linguistic phenomenon. In word-borrowing, pieces of one language are embedded in other language while speaker is basically using the other language [8].The process of loan words from other languages is a sign of a living and progressing language. Urdu is one of such languages. Discussing the phenomenon of word borrowing in Urdu asserts, that it is not new as linguistic process; it pre-dates partition. Through this process new languages are emerged from the old ones [9]. Today word borrowing is common and frequently used in almost all spheres of life. The case of Persian and Pashto in Urdu is also no exception. The interaction of Muslim army, Arabs, Iranians, Turks and Afghan etc. resulted into arrival in the Indian Territory which later became the basis for an emergence of a language like Urdu, which etymologically means an "army". The presence of groups of lexical borrowings from different languages especially Persian, Arabic, Turkish, Hindi, Pashto etc. is evident from the historical development of Urdu vocabulary and its contextual use [10]. Linguistically, a language has four major components i.e. sound system also called phonology; vocabulary also called lexicon; meaning also called semantics; and structure also called morphology. The most important aspect of a language is vocabulary, which is basically due to the reason that it is commonly affected by the cultural exchange and social interaction [11]. The borrowing from Persian and Pashto to Urdu language basically depends on the urgent need and importance. In addition, borrowings to Urdu are not limited to Persian and Pashto language, rather a lot of words were borrowed from Arabic and Hindi language as well. And, if the needs were not fulfilled, Urdu borrowed certain words from Turkish language [12].

## Materials & Methods/ Methodology and Data Collection

Urdu corpus was selected for the purpose of collecting words. Corpus was studied thoroughly and all the words of Persian and Pashto are being highlighted. And then all the

highlighted words were discussed with different subject experts of Urdu, Persian and Pashto languages. The results are shown in the Table 1 and Table 2.

**Findings**

**Table-1. Persian borrowed words in Urdu language**

| S.No. | Words | Frequency |
|---|---|---|
| 1 | خاک | 111 |
| 2 | تخت | 93 |
| 3 | نیک | 82 |
| 4 | کار | 63 |
| 5 | یاد | 57 |
| 6 | چشم | 51 |
| 7 | پسند | 44 |
| 8 | بار | 36 |
| 9 | صدف | 31 |
| 10 | لب | 23 |
| 11 | دل | 21 |
| 12 | جلوه | 19 |
| 13 | کاروان | 18 |
| 14 | زیبا | 14 |
| 15 | فریاد | 12 |
| 16 | بد | 9 |
| 17 | رخسار | 7 |
| 18 | خنده | 6 |
| 19 | زلف | 5 |
| 20 | سبزه | 3 |

Present research finding shows that, there exits many Persian words which are now used in Urdu language. Analysis of 20 words is recorded in Table 1. In Table 1, words column shows the sample which are taken for the purpose of research and frequency column shows that how many times the sample is repeated/used in the Urdu corpus.

**Table-2. Pashto borrowed words in Urdu language**

| S.No. | Words | Frequency |
|---|---|---|
| 1 | جرگہ | 35 |
| 2 | ارزان | 29 |
| 3 | ہوا لہ | 25 |
| 4 | گرانی | 24 |
| 5 | بار | 19 |
| 6 | توپ | 19 |
| 7 | تلوار | 16 |
| 8 | تے وزل | 11 |
| 9 | تے چاوہ | 9 |
| 10 | ملا | 9 |

Similarly some Pashto words are also borrowed, which are now used in Urdu language. Analysis of 10 words is recorded in Table 2. In Table 2 words column shows the sample which are taken for our research purpose and frequency column shows that how many times the sample is repeated/used in the Urdu corpus.

Present research finding shows that, there exits many Persian words which are now used in Urdu language. Analysis of 20 words are recorded in Table 1. In Table 1, words column shows the sample which are taken for the purpose of research and frequency column shows that how many times the sample is repeated/used in the Urdu corpus.

**Discussion**

Based on the findings, personal experience and related literature review, it has been found that there are many aspects of linguistic borrowings are available in the case of Persian, Pashto and Urdu. The result of the research revealed that Urdu language is rich in vocabulary, although having some shortage in the vocabulary related to science and technology. The reason is that the research is in progress in the field of science and technology.

**Conclusion**

The present research concludes that there are many words of Persian and Pashto language which are now actively used in Urdu language. Meanings of borrowed words are almost similar in Persian, Pashto and Urdu languages, but some Pashto words are different in meaning from Urdu words. Their origin belong to Persian and Pashto and also found in Urdu. Naturally speaking, that no language is made up of itself. It is the combination of different languages as we see mostly that Urdu language is originated from Persian, Arabic, Sanskrit and Pashto.

The advantage of knowing the meanings of borrowed words of Persian and Pashto languages will facilitate the teacher to enhance the student's competence and performance by teaching different branches of language.

This research also concludes that Urdu as a language is abundantly affected by other languages.

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# Paper No. 374

## ANALYZING THE ROLE OF MANUFACTURING SECTOR IN FOREIGN TRADE OF PAKISTAN; AN EMPIRICAL ANALYSIS

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**Abstract**

*The major emerging power and economic strength of any developing economy is its exports, as they are the main source of foreign exchange earnings which are necessary for financing imports of a developing country with deficient capital. Similarly imports are also indispensible for establishing local infrastructure and capital formation of an emerging economy as well as necessary source of input for manufacturing of exportable. This study attempts to analyze the role of manufacturing sector in foreign trade of Pakistan using time series data for the period of 1980-2016. The empirical results obtained from the regression analysis of NLS and ARMA model indicates that manufacturing sector has significant and significant role in foreign trade of Pakistan. The study concludes that As far as trade partners are concerned, no considerable efforts have been done to explore new markets in direction of Pakistan's foreign trade since its independence. The key trading partners of Pakistan in the beginning were the developed countries of West and still they are main trading partners of Pakistan.*

**Key Words:** Foreign Trade, Manufacturing Sector, NLS & ARMA Model, Wald Test

### 1.1. Background of the Study

The manufacturing sector is the most important catalyst for the economic development of any country. It is generalized that Globalization and especially high level of export earnings are crucial for the economic development of developing economies. Pakistan's exports are largely concerted in textile and semi-manufactures, therefore to improve balance of trade accounts and earn foreign reserves it is essential to fortify this sector. For developing economies international market operates like perfect market where prices are determined for exports in terms of foreign currency by market forces, therefore foreign exchange earnings are greatly determined by the amount of sales or exports. If a country don't have enough exports deterioration in terms of trade shakes foreign exchange earnings. It is therefore vital to avoid the decrease in output of manufacturing, not only to maintain but also to raise the export earnings and thus to achieve competitiveness.

The estimated share of manufactured products in total exports is about seventy-five percent but the facts for the period 1974-2003 are not satisfactory illustrating that real growth in manufactured exports has decreasing trend and large fluctuations throughout the data. The value added share of manufacturing sector to GDP and general GDP also shows corresponding trend over the period. On the other hand, there appears a bit enhancement in

the expansion of manufacturing output and GDP, however exports of manufactured goods remains decreasing.

Prosperity of manufacturing and industrial sector is deeply connected with agriculture sector developments. Improved agriculture sector is base for modification of primary product industry and encouragement of superior industry. Pakistanis abundant in cotton crop, which setup the base for textile industry. For several years textile Industry was the main source of export earnings and foreign exchange reserves. In Pakistan overall industrial sector has been transformed and developed due to advancements in textile industry. In 1960s, Pakistan initiated its 5-year developmental plans to revitalize its industrial sector by upgrading agricultural sector as basic priority, exercise the external economies, establishing infrastructural and basic facilities, modern scientific and technological knowhow, encouraging domestic investment and foreign co-operation in utilizing resources and raising the significance of manufacturing industry.

An indispensible call for economic and structural reforms was felt to accomplish the growing demand of dense population for energy and other necessities keeping in view the manufacturing and infrastructural drawbacks of the economic system. Pakistan has to efficiently utilize its resources according to the world standards of development through advance regulations and modification of its economic and industrial structure. This can be achieved through intensification the agriculture base, advancing small and medium enterprises; efficient allocation of resources on necessity basis and to develop in accordance with development standards of the world.

The relationship between output and input at several industrial stratums shows the industrial structure. To determine optimum level of resource utilization and to identify the level of specialization or capability of that industry the ratio and combination of factors of production in various industries is very crucial. As well as it identifies the most important determinants of the growth and development of the industrialized economy. Modern economies or developed economies are frequently distinguished by structural adjustments and modifications in their nature and organization of investment and development. In the beginning of 21$^{st}$ century various socio-economic and political issues badly affected the industrial structure in Pakistan shaking the overall structure investment and macroeconomic environment of the economy. Political decisions and international incidences like of twin tower attacks and involvement of Pakistan in war against terrorism since 2001 has traumatized and demise the foundations of economy domestically and globally.

Pakistan is lacking efficiency and specialization in production resulting in higher cost per output despite intense efforts for export progression; therefore Pakistani products lacking demanded from both local and international markets due to high prices. Economic stagnation and recession leads to inefficient production process and thus lesser exports. Pakistan is facing shortage of foreign direct investment due to which new industries can't be flourished and established. Pakistan is obsessed with the dilemma that exports are concentrated with just few specific items and trading partners. Historical evidence shows that exports of Pakistan are greatly concerted in five merchandise items and to seven nations only. Furthermore, trade deficit increased due to minor value addition and exports of conventional goods. Fluctuating exchange rate due to financial instability also influence the quality and quantity of exports.

In spite of major structural reforms and capital formation, Pakistan's manufacturing sector's exports still consists of low value added, resource based, labor intensive and agro-based commodities. These facts show the inadequate performance of Pakistan's industrial transformation and slow rate of specialization of exports in terms of technology. During 2000-2006 the trend in technology intensive goods and technological transformation in industry was slowdown. In 2006, ten percent of total products i.e. thirty-six commodity lines were identified as threatened products, where these products being capable of comparative advantage but at the same time were faced with strict competition from the international market and their share in world market kept on decreasing with the passage of time. Among these eighteen product lines that is 50% of total threatened product lines are related to textile and clothing industries, which in Pakistan's exports structure have been the most prominent and major industry. While one hundred and forty-seven product lines were appeared to be emerging products, despite of comparative disadvantage of these products they exhibit significant trends in contributing towards competitive products category. One hundred and twenty-nine product lines of this group belong to production sector. One hundred and fifteen goods were classified as weakly positioned commodities, in which eighty-six products belongs to diversified manufacturing sector.

### 1.2. Objective of the Study

The main objectives of this study are

1. Has the manufacturing sector has momentous effect on foreign trade of Pakistan?
2. Does manufacturing sector of Pakistan have considerable role in minimizing persistent trade balance?
3. Is manufacturing sector performance experiencing upward trends?

## 2. Literature Review

Islam et. al. (2013) attempted to empirically examine the role of textile manufacturing sector in growth of Bangladesh using time series data for the period of 1990-2012. The study concluded that textile manufacturing sector beside its significant contribution to trade of Bangladesh also facing sever challenges and problems includes financial recession, unfavorable foreign trade policies, high production cost, internal instability and insecurity. In order to bring an efficient increase in contribution of this sector government of Bangladesh needs special attention to this sector.

Alam (2011) attempted to explore the problems and challenges associated with textile manufacturing sector of Pakistan via Faisalabad. The study used primary data collected through pilot survey from of twenty-five firms located in Faisalabad (Pakistan). On the basis of survey data the study concluded that Pakistan textile manufacturing sector has facing sever downward trends that leads to decrease in contribution of this sector in to growth, development, poverty and employment in Pakistan. The study also concludes that the main reason of this decline is high financial shocks in world economies, too much flexibility and volatility in Pakistan's exchange rate, low quality and demand of this sector products and high cost of production.

Filippini and Molini (2003) attempted to determine the trade flows among industrializing countries, East Asian countries including China and with some other developed countries. The study used panel data covering the period of analysis from 1970-2002. In the

methodology of the study Trade Gravity Model was applied to examine the impact of bilateral trade flows among industrializing, East Asian and developed countries. The study found positive and significant impact with true expected signs of the entire hypothesis to be tested and for estimator too. Further, the study found that China played a dual important and significant role as an exporter and importer too, showing bursting effect and getting more advantage from bilateral trade.

Ahmad and Dutta (2004) empirically analyzed the impact of international trade, exports, imports on economic growth of Pakistan with reference to the industrial sector contribution and policies. The study used time series data for the period of analysis from 1973-1975. The co-integration and Error Correction Model (ECM) were applied in the methodology for the estimation and regression of the variables. The results obtained from the study showed significant and positive long run effect of real exports, capital stock, industrial value added and import tariff on economic growth of Pakistan.

Dutt and Gosh (1996) studied the causal relation between international trade and economic growth for Turkey, Israel and Morocco using panel data from 1953-1991. In methodology they used Error Correction Model (ECM) based on causality relation test and the results obtained from the regression analysis of the study revealed that causal relation exits between economic growth and international trade as well as international trade plays a key role to increase the exports of these countries. Dutt and Gosh (1994) studied the export-growth and growth-export co-integration for Low, Middle and High Income Countries including some New Industrialized Countries. After the critical insightful on the previous studies they argued that most of these studies used Granger Causality test that contains certain flaws, therefore co-integration with fully modified OLS techniques were used in their study. The results obtained showed that in most of the country's export-growth and growth-export are highly co-integrated.

Ellahi, Mehmood and Ahmed (2010) attempted to empirically examiner the causal relationship between trade openness, industrial value added and economic growth of Pakistan. The panel data was used in the study covering the period of analysis from 1980-2009. In methodology of the study Granger Causality technique and unit root tests for the estimation of variables and checking of stationary and unit root in the data were applied. For regression analysis of the variable data simple Ordinary Least Square (OLS) method was used as an analytical technique. The results obtained from the study showed that trade openness, exports and imports had positive and significant causal relation with economic growth of Pakistan. In recommendation they suggested that developing countries need to must adopt the liberalization policies for their long run smooth and sustain economic growth.

Lardy (2003) analyzed the impact of trade liberalization policies and trade openness on economic growth of China taking Manufacturing Sector using time series data for the period 1980-2002. In methodology of the study Johnson co-integration and Granger Causality tests were applied. The study found that trade openness had positive and significant impact on the economic growth and manufacturing sector of China.

Ahmad, Alam and Butt (2004) empirically examined the causal relationship among exports, imports, Foreign Direct Investment (FDI), domestic production, Domestic Output, trade openness and economic growth of Pakistan applying Johansen Co-integration, Vector Auto Regressive (VAR) model and Granger Causality test. The study found the

causal relation among the included variables, i.e. Exports, Manufacturing Production, Domestic Output, Foreign Direct Investment (FDI), Foreign Income and exchange rate as well as of these variables with economic growth of Pakistan for the period of 1972-2001.

## 4. Empirical Model and Data Description

Pakistan inherited a feeble industrial base with no significant large industry of manufacturing. Due to little share from the industries at the time of partition and distribution of assets among Pakistan and India, the resource base of Pakistan for large-scale industrialization was inadequate and unfeasible, the phenomenon was further fortified by lack of reserves, industrial and natural raw material and lack of commercial and industrial groups.

Soon after independence the policy makers and economists of Pakistan's economy decided to build the economy on independent lines with united Indian economy which was previously incorporated, manifested by the non-devaluation decision in September 1949. The non-devaluation decision was defended on the basis that Pakistan's exports generally contained agricultural raw material, with uncertain less elastic supply and inelastic demand from world. This initiative supported import substitutions industrialization.

Keeping in view the importance of manufacturing sector, this study aims to analyze the role of manufacturing in foreign trade of Pakistan as it experiencing persistent trade deficit in its foreign trade since independence. In order to empirically assess the role of manufacturing sector in foreign trade of Pakistan an econometric model is developed followed from the basic idea of Santos-Paulino and Thirlwall (2004), Wacziarg and Welch (2008) and Ju et. el. (2008).

The demand for manufacturing sector goods of Pakistan in international market (international trade) will be depends on the assessment of comparative prices of goods, relative prices of the currencies of both the trading countries and demand for goods in the world countries and in international market. If world income, elasticity of world income and the proportional price of goods in the world countries assume as determinants of trade than foreign trade equation can be expressed as;

$$F.T_t = A(X_t)^{\alpha_1}(M_t)^{\alpha_2}(Y_t)^{\alpha_3}(ER_t)^{\alpha_4} \quad \text{..... (4.1)}$$

Here, small "t" represents the nature of data (time series), $F.T_t$ is the foreign trade, $X_t$ is the exports, $M_t$ is the Imports, $Y_t$ is the World Income and $ER_t$ is the exchange rate in time period "t".

In equation (4.1) $\alpha_1$ is the price elasticity of demand for exporting goods , $\alpha_2$ is the price elasticity of demand for Importing goods, $\alpha_3$ is the Income elasticity of demand for both exports and imports goods and $\alpha_4$ is the price elasticity of exports and imports from Country "i" to country "j". In other words $\alpha_4$ is the price elasticity in relative currencies of both countries.

To formulate equation (4.1) to linear form, the logarithmic is taken on both side of the equation (4.1).

$$Ln(F.T_t) = Ln(A) + \alpha_1 Ln(X_t) + \alpha_2 Ln(M_t) + \alpha_3 Ln(Y_t) + \alpha_4 Ln(ER_t)$$

……..(4.2)

Now, by taking the derivative on both side of the equation (4.2), with respect to time "t" the growth rate in international trade with respect to exports, imports, world income and exchange rate be determine. The equation (4.2) will become as;

$$(\dot{F.T_t} / F.T_t) = (\dot{A}/A) + \alpha_1(\dot{X}_t / X_t) + \alpha_2(\dot{M}_t / M_t) + \alpha_3(\dot{Y}_t / Y_t) + \alpha_4(\dot{ER}_t / ER_t) \quad .. \quad (4.3)$$

In the econometric form for the empirical regression the equation (4.3) be articulated as

$$FT_t = \alpha_0 + \alpha_1 x_t + \alpha_2 m_t + \alpha_3 y_t + \alpha_4 er_t + \mu_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4.4)$$

In the above equation (3.4), $FT_t$ (=$F.T_t^*/F.T_t$), $x_t$ (=$X_t^*/X_t$), m ($M_t^*/M_t$),$y_t$ (=$Y_t^*/Y_t$) and $er_t$(= $ER_t^*/ER_t$). $\alpha_0$ (=A*/A) and taken as constant i.e. technology, shocks etc. $\alpha_1$ and $\alpha_2$ are the price elasticity of demand for exports and Imports of goods, $\alpha_3$ is the Income elasticity of demand for both exports and imports goods and $\alpha_4$ is the price elasticity of trading goods in relative currencies for both the countries. μt is the error term or the white noise error stochastic term. The random error term is assumed to be normally distributed through the subsequent restrictions,

$$[E(\varepsilon_i) = 0], [E(\varepsilon_i)^2 = \sigma^2], [E(\varepsilon_{i,}\varepsilon_j) = 0]$$

This process is known "White noise process".

Apart from resource scarcity Pakistan has been lacking bargaining power in trade transactions with developed economies due to non-membership of any significant free trading zone or trading block manufacturing sector has playing a significant role in foreign trade of Pakistan as well as to employment, reduction in poverty and development. Observing the importance of manufacturing sector this study is an attempt to analyze empirically the role of manufacturing sector in foreign trade of Pakistan. For that the foreign trade (FT) is taken as dependent variable and Exports of manufacturing sector (Xm), Exports of Textile manufacturing sector (XTM), Imports of manufacturing Sector (Mm), Exchange rate (ER), balance of trade (BOT) and terms of trade (TOT) as independent variables. The theoretical model that can express the relation between agri-sector and foreign trade of Pakistan is

$$F.T = f(Xm, XTM, Mm, ER, BOT, TOT) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4.5)$$

The econometric model of the above theoretical model (4.5) can be formed as;

$$F.T = \alpha_0 + \alpha_1 X_m + \alpha_2 XTM + \alpha_3 M_m + \alpha_4 ER + \alpha_5 BOT + \alpha_6 TOT + \varepsilon_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4.6)$$

The expected sign of the co-efficient is

$$\alpha_1 > 0, \alpha_2 > 0, \alpha_3 > 0, \alpha_4 < 0, \alpha_5 > 0, \beta_6 > 0,$$

### 3.2. Data Description and Sources

This study aiming to empirically analyze the role manufacturing sector in foreign trade of Pakistan as manufacturing has remains an important contributing sector to Pakistan's economy taking annual time series data covering the period of analysis from 1980-2015.

The data is collected from different sources includes Federal Bureau of Statistics, State Bank of Pakistan, Agriculture Development Bank of Pakistan (ZTBL), Cooperatives and Commercial Banks, Trading Economics, International Financial Statistics (IFS), National Accounts of Pakistan, Federal Board of Revenue (FBR) Pakistan, Ministry of Trade and Commerce Pakistan, World Development Index, World Bank, World Economic data Indicator, Global Economy, World Development Index (WDI), Ministry of Finance Pakistan, Economic Affairs Division Pakistan, World Trade Organization (WTO) Statistics Database and Economic Surveys of Pakistan.

## 5. Methodology, Results and Discussion

This study applied Augmented Dicky-Fuller unit root test to find out the stationary, order of integration and spurious relation among the variables data. Most of the economist and researchers recommends unit root test before going to regression analysis especially in time series data to know the integration and suitable method of regression in the light of unit root test. The results of ADF unit root test of this study are integrated in below table (1).

**Table: 1: Augmented Dicky-Fuller Unit Root Test Results**

| *Variables* | *Acronyms* | ADF Values (At Level) | *ADF Critical Values* |
|---|---|---|---|
| Foreign Trade | FT | -3.490232 | -2.951125 |
| Exports of Manufacturing Sector | Xm | -3.666249 | -2.951125 |
| Exports of Textile Manufacturing Sector | XTm | -4.546685 | -2.951125 |
| Imports of Manufacturing Sector | Mm | -5.302627 | -2.951125 |
| Exchange Rate | ER | -4.370893 | -2.951125 |
| Terms of Trade | TOT | -5.443426 | -2.951125 |
| Trade Balance | BOT | -4.978477 | -2.951125 |

*The critical value of ADF is selected at 5% significance level.*

The above results of ADF test shows that all variables are stationary at level means at order of integration is I(0). In this circumstance the recommended technique for regression analysis of variables data is Ordinary Least Square (OLS) model. Therefore, this study applies NLS and ARMA to regress the variables for empirical relation among manufacture sector exports, imports, other related variables and foreign trade of Pakistan.

It is fact that manufacturing sector plays an important role in foreign trade, development and growth of the country. The world developed countries are witnessed that the main cause of rapid growth and development is the progress of their manufacturing sector. This study also endeavors the role of manufacturing sector in foreign trade of Pakistan empirically applying NLS and ARMA model for the period of 1980-2016 and the regression results of variables data are incorporated in table (2).

**Table: 2: Regression Results of Variables Data**

| *Variables* | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.263132 | 0.370688 | 0.709847 | 0.4849 |
| Xm | 0.290204 | 0.108274 | 2.680267** | 0.0134 |
| XTm | 0.181163 | 0.051808 | 3.496775* | 0.0000 |
| Mm | 0.157279 | 0.086099 | 1.826715*** | 0.0808 |
| ER | -0.124235 | 0.113528 | -1.094310 | 0.5580 |
| TOT | 0.148383 | 0.119105 | 1.245812 | 0.3880 |
| BOT | 0.173671 | 0.046659 | 3.722123* | 0.0000 |
| Lag of FT | 0.103561 | 0.039926 | 2.593826** | 0.0162 |
| R-squared | | 0.933610 | Durbin-Watson stat | 1.790397 |
| Adjusted R-squared | | 0.913405 | Prob(F-statistic) | 0.000000 |

The above results show that model is highly significant and satisfactory as the prob. F-stat value is highly significant. Further, the Durbin-Watson value indicates that the model is free from spurious and auto-correlation relation, while the R2 value shows the goodness of fit of the model and explains successfully more than ninety percent variation among the included variables.

The empirical results of coefficients obtained from NLS and RMA regression analysis incorporated in table (2) indicates that exports of manufacturing sector, exports of textile manufacturing sector, imports of manufacturing sector, trade balance and lad value of foreign trade has noteworthy and encouraging effect on foreign trade of Pakistan indicating the influential role of manufacturing sector in Pakistan's foreign trade. This study also regress the role of exchange rate and terms of trade but found insignificant role of these two variables in foreign trade of Pakistan with reference to manufacturing sector.

This study also applied the stability and diagnostic test to check the sensitivity, reliability and specification of the model. The results integrated in table (3) shows that the model is free from serial correlation and spurious relation. The results integrated in below table (4) showing that variance in the model as well as among tha variables is constant and the variables included in this study didn't suffers from Hetroskesdacity problem. Further, the Ramsy RESET test is also applied to check the specification of the model and the results incorporated in table (5) of Ramsey test indicating that the model didn't showing any sign of mis-specification and biasness. Further, the CUSUM test is also applied to check the robustness and sensitivity of NLS and ARMA regression analysis equation and the results integrated in graph (1) showing the significance and stability at 5%. The results of these tests proving that the model is highly stable and acceptable as it free from any sever econometric problems.

Table 3 Breusch-Godfrey Serial Correlation LM Test

| | | | |
|---|---|---|---|
| F-statistic | 0.297153 | Prob. F(1,22) | 0.5912 |
| Obs*R-squared | 0.413135 | Prob. Chi-Square(1) | 0.5204 |

Table 3 Heteroskedasticity Test: Breusch-Pagan-Godfrey

| | | | |
|---|---|---|---|
| F-statistic | 0.561430 | Prob. F(7,23) | 0.7791 |
| Obs*R-squared | 4.523958 | Prob. Chi-Square(7) | 0.7178 |
| Scaled explained SS | 0.964831 | Prob. Chi-Square(7) | 0.9954 |

Table 3 Ramsey RESET Test Results

| | Value | df | Probability |
|---|---|---|---|
| t-statistic | 0.930953 | 22 | 0.3620 |
| F-statistic | 0.866674 | (1, 22) | 0.3620 |
| Likelihood ratio | 1.197781 | 1 | 0.2738 |

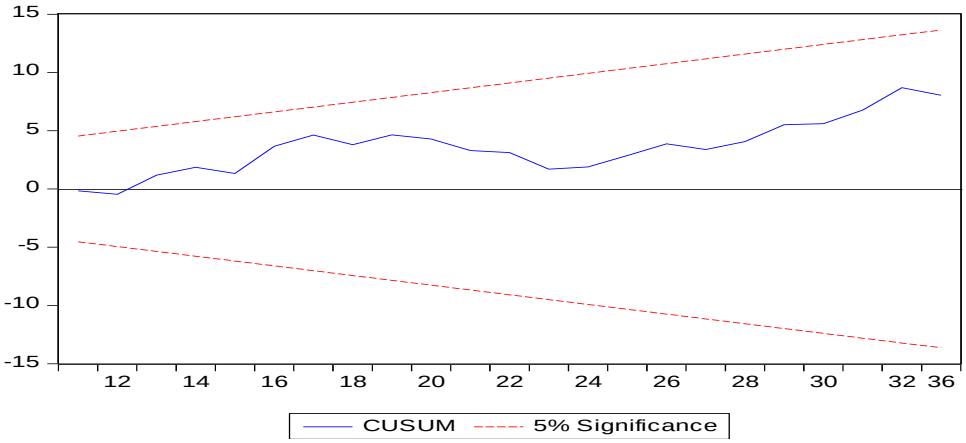
**F-test summary:**

| | Sum of Sq. | df | Mean Squares |
|---|---|---|---|
| Test SSR | 857044.0 | 1 | 857044.0 |
| Restricted SSR | 22612597 | 23 | 983156.4 |
| Unrestricted SSR | 21755553 | 22 | 988888.8 |

**LR test summary:**

| | Value | df |
|---|---|---|
| Restricted LogL | -253.2376 | 23 |
| Unrestricted LogL | -252.6387 | 22 |

Graph: 1: CUSUM Test Results (For Recursive NLS & ARMA)




To check the long run relation among the variables, this study applied Wald test to test either there is short run or long run relation exists. The Null hypothesis is that there is short run relation among Exports of manufacturing sector, exports of textile of manufacturing sector, imports of manufacturing sector, exchange rate, trade balance, terms of trade and foreign trade of Pakistan. The estimated forms of coefficients are C(2)=C(3)=C(4)=C(5)=C(6)=C(7)=0. The results integrated in table (6) indicate rejection of Null hypothesis. Further, the Ramsey RESET test results incorporated in table (5) also showing that there is long-run relation exists among the variables included in the model.

**Table: 6: Wald Test Results** *(Null Hypothesis: C(2)=C(3)=C(4)=C(5)=C(6)=C(7)=0)*

| **Test Statistic** | **Value** | **df** | **Probability** |
|---|---|---|---|
| F-statistic | 7.015074 | (6, 23) | 0.0002 |
| Chi-square | 42.09044 | 6 | 0.0000 |

## 6. Conclusion

Pakistan got independence with no industrial base to manufacture and export commodities. Faced by tough competition to survive and maintain its position in world economies, it just had surgical industry with few minor industrial firms as key source of income, besides that agriculture sector was main support to Pakistan's international trade as East Pakistan was producing 75% of worlds Jute and while cotton was also produced in country. For a new economy with such progress, it doesn't seems to have great hurdles in making its stand in international trade at that time but many factors contributed to the adversities of Pakistan's economy day by day and the economy didn't flourished as was expected.

With passage of time the structure and pattern of Pakistan's export has been transformed significantly, from the exports of raw materials to exports of manufactured and semi

manufactured merchandise. But still these manufactured commodities are lacking value added production as well as their nature has not been modified.

The major emerging power and economic strength of any developing economy is its exports, as they are the main source of foreign exchange earnings which are necessary for financing imports of a developing country with deficient capital. Similarly imports are also indispensible for establishing local infrastructure and capital formation of an emerging economy as well as necessary source of input for manufacturing of exportable. Therefore, trade is a most important determinant of economic growth. Trade pattern and development progression are reciprocal, nature and pattern of trade transforms with phases of development. On the road of development, in beginning an economy typically exports primary commodities and imports consumer goods, however with progression, exports transformed to manufactured goods and imports to machines and technological equipments. Pakistan also experienced the same pattern since 1980's and so on.

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# Paper No. 378

## RELATIONSHIP OF PERSONALITY TRAITS WITH SOCIAL ANXIETY IN ADOLESNCE

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**Abstract**

*This study investigated the relationship between personality traits such as extroversion, agreeableness, neuroticism, conscientiousness and openness and social anxiety in adolescence. The sample consisted of 200 participants (n=100 female, n= 100 male) both male and female with a mean age of female 17.43 and male mean age 17.43. Convenient sampling was used to gather the data. The sample was collected in from different colleges and universities of Lahore, Pakistan. The big five inventory scale (BFI) and social interaction anxiety scale (SAIS) was administered on the participants. The data was analyzed using chi square and descriptive statistics. The result revealed that there is positive relationship between conscientiousness, agreeableness, and neuroticism and there is negative relationship with extroversion and openness.*

**Key words:** Social anxiety, big five personality

### Introduction

This study will explore relationship of personality traits with social anxiety. The study tends to assess which personality traits play a vital role in social anxiety for instance extroversion, agreeableness, conscientiousness, neuroticism, and openness in adolescence. Personality is the mixture of characteristic that make an individual different from to another individual (Engler, 2009). Personality is defined as a forceful organization within the person of those psychophysical systems that define characteristic attitude and thought (Allport, 1961). Personality traits have eminent qualities which belong to one person (Morris, 1998).Researchers believe that big five core personality traits like Extroversion, Agreeableness, Conscientiousness, Neuroticism, and Openness encompasses the whole personality (Golodberg, 1993). Extroversion Include traits like talkative, energetic and assertive. A study shows that women score higher than men in extroversion (Lynn, Martin, 1997). Agreeableness Include traits such as sympathetic, kind and affectionate. Women are more agreeableness rather than men in one research (Feingold, 1994). Conscientiousness is includes traits like organized, thorough and painful. Feingold (1994) conducted the study on 175 sample in U.S to compare conscientiousness between male and female. Female scored higher than male on the scale of conscientiousness. Neuroticism is includes traits like tension, mood swing and anxious. Costa, Mccrae (2001) conducted the study on gender difference in personality traits across the culture. The result shows that women have high score in neuroticism rather than men. Openness is includes traits like having a wide interest being imaginative and insightful. According to the research women have higher score in feeling and men have higher score in ideas facet. The sample size of this study was 175 male and female and conducted in U.S (Feingold, 1994). The research was conducted in different countries the sample sates that women have obtained higher mean rather than men on neuroticism in 4o countries and men have higher

mean on extroversion in 30 countries (Lynn, Martin, 1997). Now a day social anxiety (SA) creates many problems in our personality. It is an anxiety disorder in which a person has an extreme and unreasonable fear of social situation (Jacobs, 2013) Anxiety arises in form of a fear of being closely watched, judged and examined by others. Social anxiety is a highly harming disorder (Rio Cederlund, 2013).

**Hypothesis**

1. Conscientiousness is a positive correlate of social anxiety
2. There is positive relationship between neuroticism and social anxiety
3. Extroversion is a negative correlate of social anxiety.
4. Openness is a negative correlate of social anxiety
5. There is a positive relationship between agreeableness and social anxiety.

**Methodology**

**Research design**

In the present research correlation design is used. The research design is used to find out the relationship between social anxiety and big five personality traits in adolescence.

**Participant**

In May 2016 surveys were started on different school, college and university on both genders male and female. There were almost 200 participants in our sample (100 male, 100 female) from different area in Lahore with the mean age of 17.43.

**Tools**

**Big five inventory (BFI)**

The BFI is used to assess big five personality traits (John, Donahua & Kentle, 1991). This scale is 44 items scale. For each items on BFI, participants response was 1(strongly disagree) 2 (disagree a little) 3 (Neither agree nor disagree) 4 (Agree a little) 5 (Agree strongly). In the BFI scale will be consist 8 items for extroversion. 9 items consist to assess the agreeableness. The 8 items of BFI will be measure neuroticism. There are 10 items of the scale will be measure the openness. In this scale 9 items to assess the conscientiousness. Items number 2, 6, 8, 9, 12, 18, 21, 23, 27, 31, 34, 35, 37, 41, 43 are reverse coded.

**Social interaction anxiety inventory (SIAS)**

The SIAS is used to assess social anxiety in different situation. This scale is 20 items scale. The response was 1 (Not at all) 2 (Slightly) 3 (Moderately) 4 (Very) 5 (Extremely). Items number 5, 9, 11 are reserve coded. All items of SIAS scale to measure a social anxiety. The cut off score of social anxiety was 43 or above them.

**Demographic information questionnaire**

A demographic information is consisted the participant information related to their age, gender, education, family, socio economic status , marital status and socio economic problem, history of psychological disorder and physiological disease in family.

**Procedure:**

Research will be taken from participants and was assess their confidentiality. All the participants were being informed about the purpose of research. Participants were taken to 15 minutes to fill the form. Informed consent form was attached at the beginning of the survey. Students were informed the nature of survey. The questions were approximately 44 items of one scale and 20 items of social anxiety.

**Statistical analysis**

Chi-square and descriptive statistics was used to analyze the gathered data.

**Results**

**Table 1** Chi square

| | V | Df | p |
|---|---|---|---|
| Extroversion | 42.0 | 1 | .000 |
| Agreeableness | 23.4 | 2 | .000 |
| Neuroticism | 28.2 | 1 | .000 |
| Conscientiousness | 28.2 | 1 | .000 |
| Openness | 17.6 | 1 | .000 |

The result shows that there is significant relationship between social anxiety and big five personality traits.

**Discussion**

The aim of the present study was to explore the relationship between social anxiety and big five traits in adolescent. As the result shows that there is significant negative relationship between social anxiety and extroversion, Kaplan, Levinson and Weeks (2015) explore the social anxiety and big five personality traits in undergraduate participants. The sample consisted of 698 participants from Washington. The study revealed that extroversion personality trait has significantly negative relationship with social anxiety since the sample scored low of emotional intelligence and high on social anxiety and vice versa. Bienvenu, Hettema and Neala (2007) the study investigates the low extraversion and high neuroticism as indices of genetic and environmental risk for social phobia, agoraphobia. The sample was consist 780. The result indicates that there is negative relationship between social anxiety and extroversion. Gainey, Watson, and Markon (2009) conducted a study to explore the differential Relations of Depression and Social Anxiety Symptoms of the Facets of Extraversion and Positive Emotionality. The sample consisted of 350 individuals. The result of this study indicates that there is positive relationship between social anxiety and extroversion. The hypothesis is that there is significant negative relationship between agreeableness with social anxiety was supported by the result of this study. In line of present study Glinski and Page (2010) investigated the

relationship between social anxiety disorder and extroversion, neuroticism and agreeableness. The sample consist 212 participants. The result of this study revealed that there is negative relationship with agreeableness. The hypothesis is that there is positive significant relationship between openness and social anxiety. In the line of preset study Farrugia, Deborah (2013) was exploring the relationship between social anxiety and personality traits in university of Malta. The sample were consist that 316 participants both genders. Person correlation and multiple regressions were used to analysis the data. The result indicates that there is no significant relationship between openness and social anxiety.

The hypothesis is that there significant positive relationship between neuroticism and social anxiety. In the line of present research conducted by University of Buffalo, Kashdan, (2002) was explored Social Anxiety Dimensions, Neuroticism, and the Contours of Positive Psychological Functioning. The sample was consist 204 college students. The result of this study indicates that there is no relationship with neuroticism. Caballo, Salazar and Arias (2009) explore the relationship between social anxiety and personality traits styles. 214 participants were university student. The result indicates that social positive correlated with neuroticism and negative correlated with extroversion. Our result shows that there positive correlated with neuroticism. The hypothesis is that there is positive significant relationship between conscientiousness and social anxiety. According to the research conducted by University of Groningen, Karsten, Ormel and Nolen (2012) explore the effect of depressive and social anxiety disorder on big five personality traits: A longitudinal study. The sample consists of 2981 youngster participants. Researchers were used Composite International Diagnostic Interview (CIDI) and (NEO-five factor inventory) was used to analysis the data. The result and finding indicates that social anxiety was small effect on conscientiousness. Kotov, Gamez and Waston (2010) was conducted the research the Lowa University. This research investigates social anxiety, depressive, social phobia, obsession compulsive disorder and substance disorder effect in big five personality traits. The sample size range was (1,076 to 75, 229) in adults. Researchers were used Eysenck's Personality Inventory (EPI) examined mental disorder was strongly linked in personality traits. The result and finding indicates that all diagnostic groups were low on conscientiousness in many disorders included social anxiety.

**Conclusion**

The study shows significant relationship between social anxiety and big five personality traits in adolescences. Study also revealed that there is positive relationship of social anxiety with neuroticism, conscientiousness agreeableness and negative relationship with openness and extroversion if the extroversion and openness is high social is also low.

**Limitations**

Convenient sampling was used but the sample size was small so the result cannot be generalized.

The sample was specified in this study.

The study did not include genetic and environmental factors.

English language tool were used on population.

**Recommendations**

Urdu translated tools of social anxiety and big five personality traits need to be used for better participant's opinion. Random sampling can be used for the better representation of population. Moreover large sample needs to be better generalized to population. A comparative study can be designed to check the genetic and environmental factors in adults.

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# Paper No. 379

## A COMPARATIVE STUDY OF EMOTIONAL INTELLIGENCE, SELF ESTEEM AND PERCEIVED STRESS AMONG SMOKERS AND NON SMOKERS

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**Abstract**

*The current exploration was aim toward explore the difference between emotional intelligence, self-esteem and stress among smokers and non-smokers. Purposive sampling technique (define) is used in the research for collecting data. For the present research sample of 250 was taken i.e. (N=125 smokers) and (N=125 nonsmokers) was taken from two different cites universities and colleges of Lahore and Sheikhupura with age range 19-25 years. Scale of emotional intelligence (Roohi & Bano, 1994), Rosenberg self-esteem Statute (Rosenberg, 1965) and Perceived stress scale (Cohen, Kamarck, & Mermelstein, 1983) was utilized as evaluation measure. T-test was performed to find out difference on smokers and non-smokers. Pearson product moment correlation was performed to find out correlation in self-esteem, emotional intelligence and stress among smokers and non-smokers. The results revealed that there was major difference between emotional intelligence, self-esteem and stress among smokers and non-smokers and that there is high level of emotional intelligence and self-esteem among non-smokers then smokers and high level of perceived smokers then nonsmokers.*

**Key Words**: Emotional intelligence, self-esteem, stress, smoking

### Introduction

The recent study aims to investigate Smoking effect on emotional intelligence, self-esteem and stress. Salovey and Mayer (1990) said emotional intelligence for instance the level to show personal and others feelings, to separate side between them and to apply this data to organizer ones intellectual and events'. Tare three important EI models. EI is defined by different models such as ability model, personality model and mixed model. Ghent (1961) the proposed final concept of the ability model to also includes attitudes such as relaxation

with hesitation, frankness to change, and trust worthiness. Goleman (2006) define the Character Model tested five main areas: conscious, working own emotions, self-inspiration, sympathy, and management outside relations. The last model in this study is the mixed model of emotional intelligence which motivated on the significance of emotional communication and the outcome of emotional and social activities. Leary and Baumeiste (2000) define Self-esteem is "separate assessment of his or her worth". Rosenberg, Schooler and Schoenbach (1989) defined self-esteem as "the complete of an personality's views and emotions almost self" (p. 1008). Self-worth is to assessment the change between their image of self and ideal self.

Stress is a reaction by both of good and bad experience that disturb of physically and mentally. Due to stress thinking pattern, behavior and emotion change. Lazarus (1999) produce that stress can be perceived as any form of stressful events an individual's ability to cope. Cigarette smoking is one of the most unusual types of human practices. Smoking is the animate of the smoke of warm tobacco safe in cigarettes, piping, and cigars. Smoking is the important cause of death (Center for Disease Control and Prevention, 2002). Pakistan is a young country and develop it need its young population to be mentally and physically healthy. Mostly people include in smoking. The research was conducted differences on emotional intelligence, self-esteem and stress among smokers and non-smokers so that different psychological intervention can be applied to decrease smoking. Through this research the youth nation and the people belong to every age group was be awarded about the conditions that why people become smokers and conceptualize well about the causes behind smoking. Further study will provide platform for further research on it in Pakistan as very few researches have analyzed this variable on Pakistani population.

**Hypothesis**

1. There is a negative relationship between emotional intelligence and smoking.
2. There is a negative relationship between self-esteem and smoking.
3. There is a positive relationship between perceived stress and smoking.
4. Emotional intelligence is higher in non-smokers as compare to smokers.
5. Self-esteem is higher in non-smokers as compare to smokers.
6. Perceived stress is higher in smokers as compare to non-smokers.

**Method**

Purposive sampling technique (define) is used in the research for collecting data. For the present research sample of 250 was taken i.e. (N=125 smokers) and (N=125 nonsmokers) was taken from two different cites universities and colleges of Lahore and Sheikhupura. The participants from age range 19-25 years were included in the study.

A**ssessment Measures**

**Scale of emotional intelligence (Roohi & Bano, 1994)**

It's a 56 item scale with 4 point Likert scale from (1) Never true; (2) sometimes true of me; (3) frequently true of me; and (4) constantly true of me. Item number seven, nine, thirteen, seventeen, twenty six, thirty, forty two, forty seven, forty eight, forty nine are reverse coded items. Test-retest reliability of this scale was .95.

The scale involves of 10 factors: personal skill, self-interest, assertiveness, empathy emotional self-awareness, impulse controller, suppleness, badly-behaved solving, pressure tolerance, and hopefulness.

**Rosenberg self-esteem scale (Rosenberg, 1965)**

It's a 10 item scale with 4 point Likert scale from (1) strongly agree; (2) agree; (3) disagree; and (4) strongly disagree. Items number two, five, six, eight, nine are reverse coded.

**Perceived stress scale (Cohen, Kamarck, & Mermelstein, 1983)**

It's a 10 item scale with 4 point Likert scale from (1) Never, (2) nearly never, (3) sometimes, (4) fairly frequently (5) very frequently. Item number four, five, seven and eight are reverse coded items. Test consistency for the PSS was .85. The PSS has a series of scores among 0 and 40. An upper score shows more stress.

**Procedure**

First of all**,** proceeding to the data collection approval was taken from concerned authorities assemble data. Sample of students were recruited from different two different Universities and colleges to Lahore and Sheikhupura.

**Statistical Analysis**

T-test was performed to find out difference on smokers and non-smokers. Pearson product moment correlation was performed to find out correlation in self-esteem, emotional intelligence and stress among smokers and non-smokers**.**

**Results**

Table 1 *Comparison between Emotional intelligence, Self-esteem and Stress among smokers and non-smokers (N=250)*

| | **Smokers** | | **Non smokers** | | | |
|---|---|---|---|---|---|---|
| **Variables** | **M** | **SD** | **M** | **SD** | **t** | **P** |
| Emotional intelligence | 1.33 | 0.55 | 2.25 | 0.77 | 10.83 | 0 |
| Self-esteem | 1.19 | 0.39 | 1.79 | 0.4 | 11.81 | 0 |
| Perceived Stress | 1.8 | 0.4 | 1.16 | 0.36 | -13.13 | 0 |

Note: M= Arithmetic Mean of Variables, SD= Standard Deviation

Results display that there is a significant difference among smokers and non-smokers on Emotional intelligence, Self-esteem and Perceived stress.

Table 2 *Pearson Product Movement Correlation between Emotional intelligence, Self-esteem and Perceived stress among smokers and non-smokers (N=250)*

| Variables | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1. Smoking | 1.00 | | | |
| 2. Emotional intelligence | -.57** | 1.00 | | |
| 3. Self-esteem | -.60** | .63** | 1.00 | |
| 4. Perceived stress | .65** | -.56** | -.87** | 1.00 |

**p<0.01

Results show that there is a significant relationship on smoking, emotional intelligence self-esteem and perceived stress. There is a significant negative relationship smoking with emotional intelligence and self-esteem its mean that emotional intelligence and self-esteem is decreased among smokers than non-smokers. There is a significant positive relationship smoking and perceives stress its mean that is increased among smokers than non-smokers.

Table 3 *Comparison between Psychological disabilities, Physiological disabilities among Families of smokers and non-smokers* (N=250)

| | Smokers | | Non smokers | | | |
|---|---|---|---|---|---|---|
| **Variables** | **M** | **SD** | **M** | **SD** | **t** | **p** |
| Psychological disabilities | 1.8 | 0.4 | 1.29 | 0.46 | 9.25 | 0 |
| Physiological disabilities | 1.64 | 0.48 | 1.25 | 0.44 | 6.59 | 0 |

Note: M= Arithmetic mean of variables, SD= Slandered deviation

Result indication that there is a significant difference among families of smokers and non-smokers on Psychological disabilities and physiological disabilities. Result shows that there is a significant difference among families of smokers and non-smokers on Psychological disabilities and physiological disabilities.

**Discussion**

The aim of the current study was to explore the relationship of emotional intelligence, self-esteem and perceived stress between smokers and non-smokers and also to investigate the differences emotional intelligence, self-esteem and perceived stress among smokers and non-smokers.

As result shown that there is significant negative relationship emotional intelligence and smokers. Maggi and Hill (2011) explore the relation among emotional intelligence and smoking in young majority. Unpredictably, a greater score on personal skills existed related through random smoking (associated to non-smoking) between men, significant that this group can involve of some social smokers. Our outcomes advocate that emotional

intelligence could include gender specific defensive and possibility issues used for random and regular smoking, which in chance would be measured in the progress of smoking inhibition platforms.

As result revealed that here is incomparably destructive association self-esteem and smokers. Srivastava (2015) conducted a study to explore the difference between self-esteem and locus of control among undergraduates with and without smoking habit. The results revealed external locus of control and minor self-esteem in smokers as compared to non-smokers. Shaniya (2012) purpose to explore the level of life happiness and self-esteem among adolescents with and without tobacco use. Results exposed that Tobacco users has low self-esteem, low life fulfillment in assessment to non- users .Saari, Jukka Kentala and Mattila (2014) discover to think about whether weaker self-regard in immaturity is related with smoking attitude in adulthood. Weaker self-esteem amid the puberty was not altogether related with smoking in adulthood. In any case, that respondent show weaker self-regard in a youth had expanded danger of having been smoking routinely although not all of them were smokers at the time of the development.

As result revealed that there is significant positive relationship among smokers. Parrott (1999) conduct the study to observe the relationship between occupational stress and smoking, the level of occupational stress among smokers and non-smokers. Do high level of Occupational stress is related with binge smoking. As probable, a positive significant relationship was producing between Occupational stresses and smoking among employees of private organization. Results of t-test analysis suggested smokers have high level of occupational stress as nonsmokers. Normally, the current study highlights the significance of stress among smokers and nonsmokers at organizational level. Arnett (2000) explore the Smokers regularly explosion that cigarettes benefit release spirits of pressure. Though, the pressure facts of adult's smokers are a quantity of upper than persons of nonsmokers, youthful smokers report aggregate level of pressure such as they recover fixed designs of smoking, and smoking ending clues to reduced pressure. Therefore, the outward relaxant outcome of smoking merely reveals the contrary of the tension and irritability that develop during nicotine depletion. Poor smokers require nicotine to hold on feeling ordinary. The message that tobacco utilize does not enhance stretch but rather really expands it should be much more by and large known. It could help those grown-up smokers who wish to stop and may keep some school kids starting. Kontos, Ryff, Ayanian, Albert & Williams (2013) explore the study variety of psychosocial stressors and smoking. Consequently great pressure at together estimations was related with more chances of insistent smoking for strain connected to relatives, finances, effort, perceived difference, previous -year private difficulties, and a precipitate slash.

Result show that there is high level of emotional intelligence and self-esteem among non-smokers then smokers and high level of perceived smokers then nonsmokers. Srivastava (2015) conducted a study to explore the difference between self-esteem and locus of control among students with and without smoking habit. The results revealed external locus of control and minor self-esteem in smokers as compared to non-smokers. Parrott (1999) conduct the study to observe the relationship between occupational stress and smoking, the level of occupational stress among smokers and non-smokers. Do high level of Occupational stress is related with binge smoking. As expected, a positive significant relationship was creating between Occupational stresses and smoking among employees of private organization. Results of t-test analysis suggested smokers have high level of

occupational stress as nonsmokers. Normally, the current study highlights the significance of stress among smokers and nonsmokers at organizational level.

Saravanan (2014) conducted a study, aimed to identify the prevalence of cigarette smoking amongst undergraduates in Malaysia, generation dissimilarities in nicotine requirement between recent smokers, difference in mental problems for compare(sadness, nervousness and stress) established arranged the position of smoking cigarettes (recent, previous and non-smokers) and level toward which producing issues (stress decrees, habit, automatism, management, public communication, desire, and motivation) guess the smoking attitude between present smokers. The outcomes displayed that 14.7% (n=106) of the students were smokers. Present smokers showed more mental issues (sadness, tension and stress) related to previous and non-smokers. Habit, pressure diminishment, joy and automatism were indicators of smoking conduct among the present smoking students. Stage wise descent investigation displayed that smoking attitude was extremely guess by nicotine .Smoking students were inspired to smoke cigarettes such as they thought that it reduced their pressure and boost desire. Consequently, there is a requirement for wellbeing advancement and hostile to tobacco stoppage as cigarette smokers practice extra-mental difficulties. Nicotine reliance or expansion was one of the main reasons behind smoking attitude between the understudy populace in Malaysia.

Durazzo, Meyerhoff and Nixon (2010) conduct a study contrasted with the significant capacity of research on the overall well beings values linked with persistent smoking, tiny study has been exactly committed to the exploration of its consequences for human neurobiology and neurocoginition. Persistent smoking may likewise be related with an expanded risk for different types of neurodegenerative illnesses. The present literature is constrained by problematic representing perhaps bewildering biomedical and psychiatric circumstance, attention on cross-sectional trainings with central aged and more seasoned grown-ups and the nonattendance of studies simultaneously assessing neurocognitive, neurobiological and inherited considers a similar associate. Longitudinal reviews are expected to decide vulnerability the smoking-related neurobiological and neurocognitive irregularities increment after some time or potentially demonstrate recuperation with supported smoking end. The result of present study is revealed the family history of psychological and physiological disorder that more existed among smokers than non-smokers.

**Conclusion**

The present study was aim to explore the difference between emotional intelligence, self-esteem and stress among smokers and non-smokers. Majority of the people start smoking in early adolescence. Adolescents from families with a profession educated parents. The results revealed that there was significant difference between emotional intelligence, self-esteem and stress among smokers and non-smokers and that there is high level of emotional intelligence and self-esteem among non-smokers then smokers and high level of perceived smokers then nonsmokers.

Educated participants included in the research. Face was some difficulties during date collection.

**Limitation**

The present research has following limitation:

1. Due to limited resources, the sample size was taken small.
2. Research is on the topic and it takes much time but the time limit actual small.
3. Questioners were use in English linguistic thus difficulty for some people.

**Recommendations**

Much research has been done on smoking but every culture has different beliefs and norm values. Accordingly, more studies should be conduct in Pakistan to find how they can be helped in this respect. For future purpose, sample should be large in size further correct results. In this research youths were included but in future study teenagers should be included.

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**Paper No. 381**

# THE RELATIONSHIP OF EMOTIONAL INTELLIGENCE WITH SLEEP DISTURBANCES AMONG UNIVERSITY STUDENTS IN LAHOR, PAKISTAN

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**Abstract**

*The intention of the learning was on the road to question the bond linking Emotional brainpower (EI) then catnap fighting happening Adolescence. A section of 158 folks (n= 86 females; n=72 males) was calm commencing diverse universities of Lahore. Handy sampling was second-hand en route for get together the data. Middle get older of the test was 20.74 by SD 1.58. Participants were administered. The magnitude of emotional intelligence, Pittsburgh siesta trait guide with Epworth lethargy Scale. In the direction of dissect the records separate t-test, life-force quadrangle was used. In attendance was thumbs down big change concerning emotional acumen of guy otherwise female. Rejection variant was institute fashionable emotional aptitude of the appraise next to the foundation of age, birth tidy then socio economics status. Moreover, Emotional brainpower has confirmed correlation together with forty winks condition furthermore drowsiness stylish the near study.*

Keywords: Emotional Intelligence, Sleep Quality and Sleepiness

## Introduction

Emotional astuteness represents a capability toward accurately purpose together with emotions as a consequence near draw on emotions near recover thought. Emotional brainpower denotes on the road to an aptitude toward acknowledge the senses of emotion along with their relationships, along with on the way to begin as well as problem-solve arranged the core of them. Emotional brains is complex taking part in the role on the way to perceive emotions, integrate emotion-related feelings, appreciate the in order of folks emotions, next accomplish them (Mayer, Caruso, & Salovey, 1999). at home this classical emotion refers toward a feel chaos (including physiological responses afterward cognitions) with the purpose of conveys in rank all but relationships used for example, happiness is a gist nation so as to what's more carries in turn around relationships with the aim of lone would resembling on the way to go in with in the company of others. Similarly, apprehension is a suspicion pomp with the intention of corresponds in the direction of a relationship, the urge in the direction of fly others furthermore brainpower refers near the post on the road to analyze truly as regards in turn (Mayer, Salovey, & Caruso, 2000). Slumber has two extents: duration (quantity) as well as strength (quality). Whilst people pack up headed for attain satisfactory duration before eminence of sleep, daytime attention sandpaper occupation suffer. Dressed in rejoinder just before catnap deprivation, nap is consistently equally longer moreover deeper. Modish lots of cases, however, have a lie-down might preserve replace not including core changes participating in snooze duration. Catnap duration solitary is accordingly not a useful gesture of how a good deal be asleep is wanted on the way to stroke relaxed indoors the sunup next meeting

appropriately (Ohayon, Carskadon, Guilleminault & Vitiello, 2004). nap deficiency exists while slumber is insufficient in the direction of sustenance adequate alertness, performance, in addition to health, whichever since of cut-rate full have a lie-down age (decreased quantity) or else destruction of slumber through short-term provocations (decreased quality) (Matricciani, et al., 2013). undecorated be asleep denial refers en route for nix doze or else a drop into the habitual equal nap time, frequently lasting single or else two days. Everlasting snooze deficiency (also called doze restriction) occurs while a special routinely sleeps minus than the sum compulsory pro preeminent functioning (Watson, Badr, & Belenky, 2015). Snooze trouble are not illnesses; they are symptoms of physical, mental, moreover spiritual problems. The causes of sleeplessness and insomnia can be physical ailments, mental imbalance, or spiritual one sidedness. Sleep deprivation was measured in: Long term total sleep deprivation (continuously awake more than 45 hours), Short term total sleep deprivation (continuously awake for up to 45 hours), Partial sleep deprivation (sleeping less than 5 hours in 24 hours) (Liu, Wheaton, & Chapman, 2016).This research was conducted to see the sleep quality of students and to see association of sleep disturbance with EI. This topic has been chosen to illustrate the importance of sleep and how it can effect students. In this research students are the target population. If students will have 7-8 hour sleep they can be performed better and can be more productive in the community. Pakistan being developing country needs its every individual at his best performance and students being the future of this country need to maintain good health in order to become a productive citizen of this country. Emotional intelligence along with good health could lead to better understanding of the environment as well as adjusting with a diverse work force, thus enhancing productivity.

## Methodology

### Sample

Through convenience sampling data was collected from 158 students (n=72 Male students, n=86 Female students). Sample was collected from different universities of Lahore. Further, data collection was blocked on age.

### Sampling strategy

Convenience sampling was a non-probability sampling technique where subjects were selected from population members who was conveniently available to participate in the study for data collection. Participants were selected randomly and each participant had an equal chance.

### Research Design

Correlational research design was used to correlate Emotional Intelligence with Sleep disturbance in adults. Correlational study was a quantitative method of research in which two or more quantitative variables from the same group of subjects and try to determine the relationship between variables.

**Tools**

**Pittsburg Sleep Quality Index (PSQI)**

Buysse and Reynolds developed a scale which is Pittsburg Sleep Quality Index (PSQI) in 1988. The scale consist of 19 items. It is self-reported questionnaire. It assesses sleep quality and sleep disturbances over a 1 month time interval. Items generate seven component scores: sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications and daytime dysfunction. Every item is rated on four points ranging between 0 to 3 Not during the past month, Less than once a week, Once or twice a week, Three or more times a week. Reliability of this scale is .87 and validity is > 5.

**Scale of Emotional Intelligence (SEI)**

SEI is developed by Batool& Khalid in 2009. It is a 56 individual items self-report measure, based on the social and EI model of Bar-On (1997, 2000 & 2006). This scale consists of 10 factors: interpersonal skills, self-regard, assertiveness, empathy, emotional self-awareness, impulse control, flexibility, problem solving, stress tolerance and optimism. Participants use 4 points Likert type response options ranging from 1-4 never true of me, sometimes true of me, often true of me, always true of me. Reliability of this scale is .69 and validity < .01.

**Demographic Form**

A self-constructed demographic form was employed to get personal information such as student's name, age, gender, birth order, no of siblings, education, marital status, family type, socio-economic status, physical and psychological disease in the family.

**Procedure**

Initially, written permission was taken from heads of institutes to carry out research. They had been briefed about the aim and the nature and procedure of the study. Further, a written consent was obtained from the participants (male & female students) to participate in the study. Moreover, they was assured about the confidentiality of their information. Participants were informed about their right to withdraw from the study at any point in time. Individual testing was also done. Participants were administered demographic from, Scale for Emotional Intelligence and PSQI respectively. Participants took approximately 15-20 minutes to fill the questionnaire.

**Statistical analysis**

Chi square was employed. Demographic variables were depicted through Bar graphs and Pie charts. Descriptive statistics including Mean, Standard Deviation, Frequencies and Percentages was used. Data was analyzed by using SPSS version 21.

**Results**

**Table 1:** Gender differences with emotional intelligence (N= 86 females; N= 72 males)

| Gender | | *N* | *M* | *SD* | *SEM* | *t* | *df* | *p* |
|---|---|---|---|---|---|---|---|---|
| Emotional Intelligence | Male | 72 | 1.29 | .458 | .054 | -.762 | 156 | .447 |
| | Female | 86 | 1.35 | .479 | .052 | | | |

Note: M= Arithmetic Mean of Variables, SD= Standard Deviation

Results show that there is no significant difference between Male and Female on emotional intelligence.

**Table 2** Birth order with emotional intelligence (N= 86 females; N= 72 males)

| Birth order | | *N* | *M* | *SD* | *SEM* | *t* | *df* | *p* |
|---|---|---|---|---|---|---|---|---|
| Emotional Intelligence | Middle born | 50 | 1.24 | 0.43 | 0.06 | -1.31 | 113 | 0.19 |
| | firstborn | 65 | 1.35 | 0.48 | 0.06 | | | |

Note: M= Arithmetic Mean of Variables, SD= Standard Deviation

Results show that there is a significant difference between first born and middle born on emotional intelligence.

Table 3 Socio-economic status with emotional intelligence (N=86 females; N= 72 males)

| Socio economic status | | *N* | *M* | *SD* | *SEM* | *t* | *df* | *p* |
|---|---|---|---|---|---|---|---|---|
| Emotional Intelligence | Upper | 8 | 1.38 | 0.52 | 0.18 | .32 | 156.00 | .75 |
| | Middle | 150 | 1.32 | 0.47 | 0.04 | | | |

Note: M= Arithmetic Mean of Variables, SD= Standard Deviation
Results show that there is no significant difference of Socio economic status on emotional intelligence.

**Table 4** Chi square between Emotional intelligence, sleep quality and sleepiness (N=158)

| | v | df | P |
|---|---|---|---|
| Sleep quality | $6.141^{a}$ | 1 | .013 |
| Sleepiness | $10.132^{a}$ | 4 | .038 |

The data was analyzed using a chi square goodness to fit test for sleep quality, the null hypothesis was rejected $X^2(1) = 6.14$, $p < 0.05$ for sleepiness their null hypothesis was rejected also $X2(1) = 10.13$, $p < 0.05$, there is a positive correlation between emotional intelligence and sleep quality.

The above tables shows a significant positive relationship between emotional intelligence, sleep quality and sleepiness among university students. Results shows that a person who have good sleep was more intelligent than the other who had poor sleep or sleepiness problem. Emotional intelligence was also compared with demographic variables, results shows that gender $p < 0.44$ and socio-economic status $p < 0.75$ does not have any significant relationship with emotional intelligence but there was a significant relationship with birth order $p < 0.19$.

**Discussion**

The present study rejected the hypothesis that there is no significant difference in emotional in accord with gender difference where as there is a significant difference shown in the results of the present study. Males are higher on emotional intelligence as

compared to females. In line of the present findings the Charbonneau & Nicol (2002) the relationship between emotional intelligence and sex differences among 134 adolescents involved. Results revealed that girls scored somewhat but not significantly higher than the boys on emotional intelligence. In another study by Mishra and Ranjan (2008) was the gender difference affects emotional intelligence of 80 adolescents (n=40 male; n=40 female). The results presented that adolescent boys and girls vary significantly on emotional intelligence and boys were found to be significantly higher on emotional intelligence than the girls.

Emotional intelligence is higher in second born as compared to first born was also analyze in the sample of the present study which revealed there is a significant difference in emotional intelligence according to birth order. Especially first born and second born are considered to be having high emotional intelligence as compared to last born. In line of the present research Dean (2008) explored the relationship between emotional intelligence and academic achievement with birth order with a sample of 115 individuals in USA. Their study stated that birth order is significantly related with emotional intelligence.

There is no significant difference between emotional intelligence and socio-economic status was supported by the current research while analyzing the data. The present results have also been supported by the study of Emotional intelligence and socio economic status conducted by Jacques (2009) among 221 college students and the study reported that socio economic status did not predicted emotional intelligence.

The present study results show that positive relationship between emotional intelligence, sleep quality and sleepiness. Afsheen N, Arooj M, Madiha F, (2013) this study was quantitative and cross sectional method was used to measure sleep deprivation among university students. In which 250 students were participants of Lahore Universities, the age was between 17-25 years. They used to complete the questionnaire on Socio Demographic and Pittsburg sleep quality index (PSQI). Result shows that majority of students were sleep deprived and sleep deprivation greatly effects health and emotional intelligence. Minkel J, Htaik O, banks, S &dinges, D (2011) emotional expressiveness in sleep-deprived healthy adults shows that this is another an increasingly convincing research suggesting emotional intelligence is greatly influenced by the quantity and quality of sleep we get on a nightly basis. Researchers have also discovered going without sleep for a day or longer also affects the ability to make moral judgments.

**Conclusion**

The study concludes that emotional intelligence, sleep and sleepiness play a vital role in the human life. Study also revealed that there is a significant positive relationship of emotional intelligence with sleep quality. If an individual had a good sleep quality then she had high emotional intelligence. Sleepiness also had a significant relationship with emotional intelligence. With high emotional intelligence individual had a normal sleep. Results also revealed that gender and socio-economic status was not significant.

**Limitations**

Convenient sampling was used. The sample size was small so the results could not b generalized. The tools were used in English language. The study could not include all the ages and environmental factors. Lastly, the data was only collected from urban city.

**Recommendations**

Urdu translated tools of emotional intelligence, sleep quality index and sleepiness needs to be used for better depiction of participants; random sampling can be used for the better representation of the population; large sample can be used for the generalization of the study. Moreover, it is suggested that for future studies a balanced proportion of all three socioeconomic classes needs to be taken for better representations. A comparative study can be designed to check all the ages and environmental factors for emotional intelligence.

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# Paper No. 386

## EVALUATING MONETARY PERFORMANCE OF BANKING SECTOR: A CASE STUDYOF AFGHANISTAN BANKS

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**Abstract**

*The purpose of this study is to empirically examine the financial performance of four Afghan private commercial banks. The financial performance is measured by evaluating the banks' financial ratio analysis that plays an important role in measuring firm performance. Return on Asset is undertaken as dependent variable and a measurer of internal performance of banks while Bank size, Liquidity, Operational efficiency and Asset management are asserted as explanatory variables. The study employed the correlation and multiple regression analysis of annual time series data from 2008-2014.The financial performance is measure to discover a good-fit regression model and predict the future internal financial performance. The study rejected the hypothesis claiming that Bank size, liquidity, Operational efficiency & Asset management have no impact on internal based performance (ROA) of Afghanistan Private Sector Commercial banks. The result of the study further conclude that ROA is negatively correlated to Operational efficiency and liquidity while a weak positive relation is found between ROA with that of bank size and asset management.*

**Key words**: Monetary ratio analysis (FRA), Return on Asset, Asset, liquidity

### Introduction

People work to earn money to fulfill their routine expenses taking food, clothing, education, family savings, travel, entertainment to enjoy their life. Some time they need bigger amount to overcome the social norms, tradition and religious activities, an individual must consider multiple saving plans (if possible) must be implemented to control financial aspect of his life. In this case, a part of his income is saved out for the future economic or financial plans accomplishment. The practice seems well promising if a suitable place is identified where there wealth is safe of theft and other losses. An institution called "Bank" is designed to serve the particular theme of the state and their people. It is a lawful organization which accepts deposit on low rate of return and lends them on high rates. Banks involve in various other activities like short term investment, agency work and state related affairs.

Banking sector play a very vital role in the economic expansion of a country, they are not just money leader but consider as a major player in the development of a nation

The Afghanistan banking system was first founded with the (commercial) institution, Bank Millie Afghan (BMA) in 1933 (1312, HS) with initial capital of Af9.6 million, 72% of the BMA shares were held by the private shareholders and the remaining 28% owned by government, it was a mix-ownership financial institution. BMA was the managing

bank who deals the banking affairs of the country. It was functioning as the central bank of the state like printing money, monetary policy and supervise the state related financial obligation affairs. The country's first Central bank was established in 1939 (1318, HS) with initial capital of Af120 million which take over the central bank responsibility and authority to handle all the banking system affairs relative to the country's financial sector.

The Afghan private commercial banks include AIB, Arian Bank, AUB, Azizi Bank, Miwand Bank, Bakhtar Bank, Ghazanfar Bank. Foreign bank branches include National Bank of Pakistan (NBP), Bank Alfalah Pakistan and the Bank of Punjab India (BOP). The government banks are BMA, NKB and Pashtany Tijaraty Bank. Da Afghanistan Bank (DAB) is the central bank of the country which regulates and monitors the overall banking system. The core objective of DAB is to ensure stability of price. The other functions DAB involve in are devising, implementing and adopting of monetary policies, printing money, foreign currency policy, foreign exchange dealer, issue license and supervise banks. Housing loan for the housing projects or for their own house construction.

Overdraft facility, SME financing(SMEs) need financing for their day to day operations and to reduce the gap of liquidity risk. Islamic banking in Afghanistan almost all of the commercial banks offer the Islamic modes of finance to avail the Islamic oriented fund opportunities. Islamic banking provides these four basic modes of financing Musharakah, Ijarah, Mudarabah and Murabiha.

***Objective of the study***

The main objective of research is to analyze performance of Afghanistan commercial banks through applying financial ratios on financial statement of the said banks. Researcher also want to determine whether the size of bank, Liquidity, operational efficiency and asset management have statistically significance impact on the internal-based Performance (ROA) or not.

***Problem statement***

There are no past studies on measuring the financial performance of Afghanistan commercial banks using financial ratios to equip Executives and Managers of Afghani Banks, investors, Government policy makers and Officers to on Banking sector performance and reforms needed to face economic challenges of their Country.

**Literature review**

To evaluate performance of a bank following Two approaches were used such as; Accounting Approach and Econometric Approach. The Accounting method utilizes several financial ratios such as profitability ratio, capital ratio and efficiency ratio. The FRA can create a better opportunity for investors because it analysis the fundamental elements and measure financial performance of the company (Gopinathan, 2009).

In general term, the mixture of FRA, benchmarking, or a mix of these practices are used to measure the financial performance of banks and other financial Institutions (Avkiran, 1995).

Ratio analysis has being considered a very important element in the decision phases of the stakeholders. Madhura (2009)consider the ratio analysis as a fundamental tool for decision making. The FRA is used to identify poor and satisfactory areas of performance (James,

2013). Luckham (1982) recommended that financial statements are keen to be investigated through ratios. Ratio analysis includes several elements such as calculation and interpretation to analyze; monitor firm's performance. The enterprise's balance sheet and income statement are basic inputs for ratio analysis (Gitman, 2009). Ratios show a very vital part in identifying the choice of action with comparative pre and pro results. It helps management to recognize good/bad performances, strength and weakness and the future effective direction is laid down (Payne, 2011).

The bank quality of earnings and profitability support the recent and coming setups of a bank (Shar, et.al, 2011). The resources efficiency lead to increase in the profitability of a firm, it is the best way to extend the owner wealth in to the surplus (Panwala, 2009). Baral (2005) argue that the quality of assets retain by a bank on the management of definite risks, non-performing loans and profitability of bank debtors. Weak asset quality caused bankruptcy in Kenya in the 1980s (Olweny & Shipho, 2011). Low level of liquidity and weak asset quality are the two main factors causing failures. One of the essential functions of a bank is 'liquidity'; the firm will face loss if the funds are not efficiently dispersed (Sangmi & Nazir, 2010). Ho and Zhu (2004) have discovered that the analysis of a company's operational effectiveness and efficiency have a direct impact on the survival of the particular company.

Medhat, (2006) Measured the commercial bank of Oman, Return on Asset and It II were taken as dependent variables while Size of bank, AM and OE as explanatory variables. The multiple regression and Correlation analysis were used as measuring approaches to find the relationship between variables. The study revealed a strong positive Correlation between OE and financial performance and a normal Correlation between size of bank and Return on asset. The ANOVA results found the F-stat significant and below 5% which claim that, financial performance is under the impact of those independent variables.

Specified banks of GCC countries have shown related efficiencies for the period 2000-2004, a significant increase is seen in CRS for the year 2000-2001 (Ramakrishnan, 2007).

Abdus et.al. (2006) evaluated the performance of Commercial banks on their respective bank size (small, medium, large) in Utah State for the period of 5 years (2000-2004). Profits and quality of loans were the two measures of performance. The three categories of banks were scrutinized to find whether there is a major difference in performance among them, T-test and Kruskal-Wallis tests were employed. ROA, Return on equity, Loan loss reserve ratio and loans past due 30-89 days as a percentage of total loan were the performance measures used in the study. The results displayed between the year 2000-2004 shows no significant change in performance between small & large, while there was a major variance between small and medium, medium and large in Return on Asset, the particular ratio of medium bank was higher than the small and large banks.

Salamouris (2001) demonstrated the financial performance of the Greek banking sector specifically "efficiency ratios" are used to measure the time period 1997-1999, A DEA is used to measure efficiency. The particular model implemented in the study compare the inefficient with the efficient banks. The particular analysis claim that increase in the revenue resulting from the Greek stock exchange market which ultimately increase the efficiency ratios and help the total improvement of the banking sector.

Ansari (2009) held a study on the financial performance of Islamic and conventional banks in Pakistan from 2006-2009. Eighteen ratios were utilized to find out the banks liquidity, profitability, risk and bankruptcy, deployment and OE and capital adequacy. An independent sample t-test and ANOVA employed to know about the mean differences of financial ratios among banks. The conclusive remarks of the study showed conventional banks less liquid, less efficient and more risky than Islamic banks.

A negative correlation is shown with return on asset and bank size while strong positive correlation is found between return on asset and asset management. OE has weak negative correlation with return on asset (Ahmed, 2011).

Ali et.al. (2011) concluded a broad study about banks' profitability in Pakistan, the result of the study showed a significant relation between AM, capital, and economic growth with Return on asset. The study also argue that the OE, AM and economic growth are significance with Return on equity.

Tumin (2011) inspected the commercial banks of china and Malaysia, with aim behind the study was to explore factors such as operative expenses, credit, liquidity and size of commercial banks with the performance measure ROAA and ROAE. The findings revealed that ratios used in this particular research explain diverse effects on both countries. Operating ratios didn't influence Malaysian banks performance while influence is there for Chinese banks. The conclusive remarks of the study stated that variable of credit risk is negatively related to return on average asset for both countries; while in ROAE credit risk is negatively related only with Malaysian's banks profitability. The capital had moderate effect on the performance of banks. The china's capital strength and Return on average equity had positive and significant relation. However, it is not true in case of Malaysian banks. Both countries banks performance have negative relation relative to Operating expenses when performance is measured by ROAA, The relation of operating expense remains true only for china when ROAE applied as performance measure.

Ally (2013) conducted a comprehensive study from the year 2006 to 2012 on financial performance of Tanzanians CB. Profitability and liquidity of banks have been measured through financial ratios. The profitability means between peer banks is being tested using Analysis of Variance (ANOVA).

Alam (2013) observed the financial performance of Bangladeshi private commercial banks (five) from 2008 to 2012. Several Financial ratios were utilized such as liquidity gap analysis, credit growth, liquidity ratio, ROA, ROE, non-performing loan position. Three indicators applied to measure the monetary performance of the known selected banks.

Zia (2014) devaluation means decrease in its value against foreign currencies and especially US dollar. When Afghani depreciates, the exchange rate (Afghani price of other currencies) raises and more Afghani would be needed to purchase foreign currencies. The existing data show that Afghani has experienced almost stable exchange rate for the period of ten years as the average annual exchange rate of Afghani to dollar was 48.7 between 2002 and 2011 and 47.67 in 2012. As a result of the uncertainty created by withdrawals of NATO forces after 2014 and delay in approval of the bilateral security agreement by Afghan government, Afghani depreciated against US dollar and exchange rate reached 58 Afghani against one US dollar in December 2013.

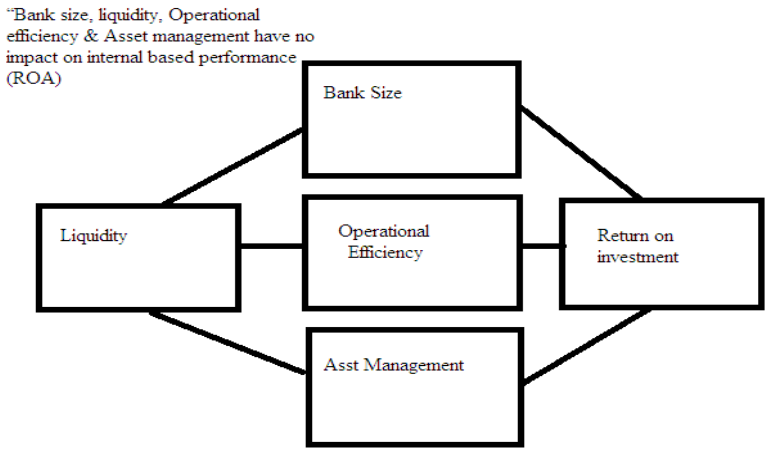
Karimi (2015) Afghanistan modern banking industry is in its initial stages with total experience of not more than 10 years which is being considered a challenge and an opportunity as well. When we are evaluating the achievements of 16 private and public banks in Afghanistan after 10 years of operations, according to Measuring Financial Inclusion The Global Findex Database, Asli Demirguc Kunt Leora- Klapper, we find a total portfolio of $4.52 billion with 5% of financial inclusion.

Monger, (2015) one of the challenges faced by banking and microfinance organizations in Afghanistan is the development of ancillary facilities. These facilities include services that are needed to manage risk to an acceptable level.

**Methodology**

Since the objective of this study was to measure the internal performance of Afghanistan Private Commercial banks' this makes the study descriptive. The Deductive approach has been and five variables were selected for the model, Return on Asset as dependent variable (Financial performance indicator) while Bank size, Liquidity, Operational efficiency and Asset management as independent variables.

**Theoretical Framework**




The Quantitative technique used to analyze the data. The Data for this research has been collected from Secondary source, the yearly reports of Private Banks taken from their respective websites. The balance sheet and income statement studied to extract the desired data from:

- www.aib.af
- www.arian-bank.com.af
- www.aub.af
- www.azizibank.af

A total of 28 sample size derived from four Afghani Private Commercial banks AIB, Azizi Bank, AUB & ARIAN Bank for the period of 7 years. The balance sheet and income statement were investigated to extract the Annual Time Series data for both independent and dependent variables from period 2008-2014.

***Hypothesis's of the Study***

It is necessary to construct a suitable hypothesis for this research in order to achieve the research aim. The following null and alternative hypothesis being proposed:

$H_0$: Bank size, liquidity, Operational efficiency & Asset management have no impact on internal based performance (ROA) of Afghanistan Private Sector Commercial banks.

$H_A$: Bank size, liquidity, Operational efficiency & Asset management have impact on internal based performance (ROA) of Afghanistan Private Sector Commercial banks

**Analysis and interpretation**

This chapter, concern to find/deliver a logical answer to the hypothesis stated earlier. Different tools will be used to display the required result. Our analysis starts with the application of linear multiple regression analysis over the particular sample size. The model summary in table 1 shows two essential elements, R and $R^2$ values. The R which also called the multiple correlation coefficients is a measure to know strength of the relationship between dependent and independent variables. Here in our case R is 0.583 which indicates a moderate-to-strong relationship between ROA (dependent) and LTA, NLTA, OE; AM (independent) variables.

**Table 1**

| Dependent Variable | Description | Independent Variables | Description |
|---|---|---|---|
| ROA | Net Income / Total Asset | Bank Size | LOG (Total Asset) |
| | | Liquidity (NLTA) | Total loan/ total assets |
| | | Operational Efficiency (OE) | Total operating expense / net interest income |
| | | Asset Management (AM) | Operating income / total asset |

*Note***:** List of the Variables to Be Studied

***Application of Regression Model***

To find out the financial performance of the Afghani private sector commercial banks, a model has been developed which has one dependent variable and four explanatory variables as displayed in table 1. Return on Asset used as an internal financial performance indicator, SPSS 20 has been applied to process and analyze the data. Several

tools like Regression analysis, correlation matrix and ANOVA have been used to appraise and infer the data accurately. The parameters studied at 5% level of significance.

Table 2 *Model Summary*

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .583[a] | .340 | .225 | .95392 |

a. Predictors: (Constant), AM, OE, LTA, NLTA

The second essential element is the square of R, also called coefficient of multiple determinations. Referring to the above table it value is (.340), which tell us the percentage of explain variation in ROA from the four predictors. Thus we say that 34% of variation in ROA is accounted for the joint linear effects of the predictor variables. To know the contribution of each predictor variable, it is important to study the level of significance.

**Table 3** *ANOVA*[a]

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 10.784 | 4 | 2.696 | 2.963 | .041[b] |
| | Residual | 20.929 | 23 | .910 | | |
| | Total | 31.713 | 27 | | | |

a. Dependent Variable: ROA
b. Predictors: (Constant), AM, OE, LTA, NLTA

The F-ratio in ANOVA shows measure of probability of chance departure from straight line. It shows whether the overall model have statistically significant predictive capability. F is the ratio of the model mean square to the error mean square. As shown intable 2 the value of F is 2.963 and is significant as the significance is less than 0.05 (F=2.963, P=.041). Therefore, the model seemed to have a good predictive capability.It further adds the scenario that the null hypothesis is rejected while alternative is accepted due to P< 0.05. Hence it is concluded that size of bank, Liquidity, OE and AM have impact on internal financial performance of private commercial banks measured by Return on Asset.

Table 4 *Correlation Matrix (N=128)*

| | | ROA | LTA | NLTA | OE | AM |
|---|---|---|---|---|---|---|
| Pearson Correlation | ROA | 1.000 | | | | |
| | LTA | .182 | 1.000 | | | |
| | NLTA | -.134 | .237 | 1.000 | | |
| | OE | -.468 | -.002 | -.034 | 1.000 | |
| | AM | .176 | .254 | .658 | -.197 | 1.000 |

*Note*: correlation and sig. 1-tailed of ROA, LTA, NLTA, OE, AM

As stated earlier it is vital to know the predictors level of contribution and it significance to the explained variation in ROA. There are two parts to a correlation matrix, the first part is the sign of the number, positive sign specifies that both variables increase and decrease together while negative sign indicates that as one variable increases so the other decreases. The second part is the number of the correlation matrix, usually from (0 to 1) zero indicates a no linear relationship while 1 shows a perfect correlation. The above table 3 shows various types of association but we will only brief ROA related correlation. The size (LTA=.182) and Asset management (AM=.176) have weak positive correlation with ROA, while the level of significance is (.177 and .185 > p= 0.05) is less significance respectively. The Liquidity (NLTA) and Operational Efficiency (OE) have negative effect on the ROA of banks. The NLTA seems to have a (-.134) negative weak correlation at a .246 significance level. OE value is (-.468) which indicates a moderate negative relationship with significance level of (.006). OE is the only explanatory variable which shows a more contribution.

***Correlation and regression Results for model***

Indicating to the correlation matrix table 4 the following correlation presented with ROA

- A weak positive correlation between the dependent variable ROA and the independent variable banks' size about (+ **0.182).**
- A weak negative correlation was found between ROA and liquidity (-**0.134**).
- A negative correlation was found between ROA and OE of about (- **0.468**).
- A weak positive correlation with Asset management of (+ **0.176**).
- As shown in table 5 there is no problem of multicolliniarity amongst the explanatory variables as the values of VIF is less than 5.

Regression lineis constructed from the beta value of coefficients model. Thus, the analysis predicts the average ROA by the following model:

ROA = -3.805 C+ .530 LTA + -.029 NLTA + -.010 OE + .243AM + e

To consider the significance of each independent variable on the dependent variable Return on asset, the constant value is shown in negative and is the mandatory expenses

whether bank generate income or not they have to pay them. In case of afghan commercial banks Operational Efficiency is the only variable which contributes much to explained variation of ROA at significant level of .024 < P. the second rating goes to NLTA which is close enough to the P value and is consider too important. Asset management and Size is significance at .208 and .272 respectively. The least significance coefficient of all is the $B_0$ constant which is at t-sig .428.

Above all the variables play a constructive role in contribution to the explained portion of the model. The conclusive remarks regarding the hypothesis being studied is: As shown in table 3 the ANOVA sig .041< P= 0.05, therefore the null hypothesis is rejected and it is accepted that size, liquidity, OE and AM have significant effect on internal financial performance of this indicates that the null hypothesis is rejected and alternative hypothesis is accepted.

**Conclusion**

Banking sector plays a very dynamic role in the economic growth of a country, they are not just money leader but consider as a vital player in in the development of a Country or nation in all. Commercial banks(CB) accept deposits and lend them further to third parties with intention to earning interest and profit for itself and hence the economy of the Country. This Banking sector is pillared by Commercial banks; whether they are small or large in size, it plays a significant role in the financial motivation of a specific industry or sector at all.

Commercial Banks does not Prefer long term credit due to liquidity issue but encourage the short term credit needs to avoid bankruptcy. These funds belong to public and withdrawn on their choice time. Hence, CB prefers to provide credit for a slight period of time backed by tangible and easily marketable securities. Before granting loan, CB considers different factors, such as nature and size of business, financial status and profitability of the business, and its ability to repay loans.

The major focus of the study is to determine whether the size of bank, Liquidity, OE and AM have impact on the internal-based Performance (ROA). To reach the stated objectives of the study, the performance of four Afghanistan commercial banks for the period of seven years were taken a sample size. Financial ratios were used to measure the financial performance of banks. Linear multiple regression analysis were applied to draw predicted capability of regression line, to explain correlation matrix and F value to test the significance; hypothesis of the model.

The ANOVA showed that the overall model was statistically significant as sig< P, from here on the null hypothesis being rejected due to the significance accuracy of the particular model.

The correlation matrix of ROA with LTA, NLTS, OE and AM showed a weak positive correlation with size and Asset management while The Liquidity (NLTA) and Operational Efficiency (OE) have negative correlation on the ROA of banks. OE is the only explanatory variable which showed a moderate to strong negative correlation in respect to ROA.

The finding of this research discovers logical answer to the research objectives. The bank management of private commercial banks Afghanistan must consider operational

efficiency as it is the most significant of all other variables. The negative sign is logically true for OE as it shows that the ROA goes down as the operational efficiency ratio on rise, it is vital for managers to review this ratio for a positive shift in financial performance. For example let assume is concern to look for the ratio correlation to predict the optimal future decisions. If OE ratio is 1 it means the bank is at risk not maintaining proper efficiency. In my opinion it should be less than 1, the more it decreases the most ROA will increase. Investor can too find answer related to their investment and risk behind them. The government is the main stakeholder in this whole process, the major source of their revenue generated from these banks and is directed to control and monitor the financial performance of the commercial banks.

The remaining independent variables too need consideration from the management. While it is assumed that all of explanatory variables have an influence on the financial performance of private Afghani Banks. AM and LTA has a positive sign which must be monitor properly to increase the level of internal Performance.

The correlation among the explanatory variables, such as the size (LTA) has positive weak correlation with all explanatory variables except OE which has a very weak negative correlation with LTA. The NLTA is positively correlated with LTA and AM while negative downhill with OE. The OE showed negative correlation with all the variables in the model with a maximum strong with ROA. The AM is negatively correlated with OE while positively correlated with the rest of model, with a maximum strong positive relation to NLTA.

The regression line from the result showed a very strong authentic sign and numbers. One can predict the future status of the commercial bank performance in regards to the given variables.

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ANNEXTURE

Raw data for Regression model applied on Annual report of Afghanistan Banks :

| Bank Name | Year | ROA % | SIZE | Liquidity % | Operational efficiency % | Asset Management % |
|---|---|---|---|---|---|---|
| AIB | 2010 | 1.66 | 10.29 | 18.06 | 108.19 | 4.97 |
| AIB | 2011 | 1.14 | 10.51 | 15.41 | 107.04 | 4.07 |
| AIB | 2012 | 1.01 | 10.66 | 9.87 | 97.87 | 3.51 |
| AIB | 2013 | 0.45 | 10.68 | 8.74 | 133.65 | 3.99 |
| AIB | 2014 | 1.04 | 10.75 | 5.14 | 116.70 | 3.35 |
| Azizi | 2010 | 0.38 | 10.41 | 41.42 | 193.45 | 6.04 |
| Azizi | 2011 | -1.40 | 10.40 | 41.14 | 204.97 | 3.44 |
| Azizi | 2012 | 0.71 | 10.51 | 37.22 | 132.21 | 4.21 |
| Azizi | 2013 | 2.05 | 10.48 | 49.40 | 89.99 | 7.29 |
| Azizi | 2014 | 0.68 | 10.47 | 40.10 | 149.77 | 6.42 |
| Arian | 2010 | 0.88 | 9.28 | 14.86 | 93.99 | 5.05 |
| Arian | 2011 | 0.65 | 9.75 | 39.22 | 89.16 | 2.68 |
| Arian | 2012 | 0.01 | 9.67 | 0.95 | 168.68 | 2.04 |
| Arian | 2013 | 0.12 | 9.68 | 0.33 | 291.99 | 2.48 |
| Arian | 2014 | 0.27 | 9.89 | 1.36 | 145.52 | 1.81 |
| AUB | 2010 | 0.07 | 10.10 | 32.63 | 102.32 | 4.34 |
| AUB | 2011 | -2.07 | 9.94 | 35.18 | 159.69 | 5.21 |
| AUB | 2012 | 0.97 | 10.09 | 32.63 | 115.92 | 6.21 |
| AUB | 2013 | 4.15 | 10.28 | 24.47 | 103.51 | 4.22 |
| AUB | 2014 | 1.05 | 10.26 | 29.46 | 81.60 | 5.73 |
| AIB | 2009 | 1.66 | 10.29 | 18.06 | 108.19 | 4.97 |
| Azizi | 2009 | 0.38 | 10.41 | 41.42 | 193.45 | 6.04 |
| Arian | 2009 | 0.88 | 9.28 | 14.86 | 93.99 | 5.05 |
| AUB | 2009 | 0.07 | 10.10 | 32.63 | 102.32 | 4.34 |
| AIB | 2008 | 1.26 | 10.47 | 14.12 | 104.31 | 4.16 |
| Azizi | 2008 | 0.07 | 10.43 | 40.10 | 180.14 | 4.90 |
| Arian | 2008 | 0.50 | 9.55 | 19.99 | 104.33 | 3.12 |
| AUB | 2008 | -0.09 | 10.06 | 33.11 | 118.07 | 5.00 |

# Paper No. 403

## A PROPOSED STRATEGY FOR IMPROVING QUALITY OF EDUCATION AT SECONDARY LEVEL

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**Abstract**

*A study was descriptive by nature and its main focus was on to develop a strategy for improving quality of education in Government girls' high schools in Peshawar city Khyber Pakhtunkhwa. 16(100%) head mistresses of government girls' high schools was the population of the study. Sample of the study included all 16(100%) headmistresses. Structured interviews were designed for all the headmistresses. The study used mixed research. The data were given both qualitative and quantitative treatment. For data analysis tables, graphs and simple percentages were used. The conclusion of the study revealed that the present situation of education in schools was not very encouraging. The major causes identified by the study were untrained and lack of commitment of teachers, no criteria for admission, communication gap between school and community, lack of physical and instructional facilities, gender discrimination, lack of planning, weak academic back ground of students, favoritism and victimization in the education department, insufficient funds for sports and other co-curricular activities and defective system of examination etc. were the major causes of deterioration and not much work has been for the improving quality of education. It has now becomes an alarming issue for higher authorities. Based on the identification of causes a couple of recommendations were made to improve the current status of schools and to raise the standard of schools. Those included trained and committed teachers, democratic environment in educational institutions, involve staff in school based decision, principals having leadership qualities, active participation of all stakeholders, frequents visits by EDO and efficient principals could improve the situation. Conclusively, much effort was needed to bring improvement in schools. A viable strategy was developed by the study for improving quality in schools.*

**Key words**: Secondary level, quality education & strategy

### Introduction

Dr. S.A. Ghaffar (2001) stated that civilized nations have always been looking for the institutions of learning for the training of leaders of all walks of life. In view of the `present state of scientific and technological explosion, dramatic changes in humanistic disciplines and even changes in the study of man himself, his hopes, his aspirations and his striving for the fulfillment of his destiny, education is expected to play effective role to meet the changes. Other aspects of education are the training of persons in specialized fields. Furthermore, an effective system of education not only serves the present needs of societies but also assists to give direction and impetus to the course of human progress.

The policy (1992) suggested that for the improvement of the quality of education we need to modernize our curriculum, introduce new electronic technologies especially in the field of science and research in order to make our teaching more attractive and interesting. It further discussed that educational institutions play important role in the progress of the country. There is a correlation between higher level and at school level. One of the major concerns of the stakeholders is how to improve quality of education in schools. Relevant governing bodies are only paying attention on paper work but the results are not encouraging and need proper attention.

**Quality Education**

According to Imran (2008) quality of education is the outcome of efforts made by all stakeholders. It also included availability of human and physical resources for better students' gains. A report by Carter, Macdonald & Martin at the first International Conference of National College for School Leadership in Nottingham (2002) documented that school improvement during the last of couple of years owing to the interventional role of effective principals by ensuring high standards and quality in school programs. It is through successful leadership that continuous improvement in school system can be made possible.

Khan (2012) stated that quality improvement in education has also remained the priority of the government of Pakistan during the last two decades. The educational goals could be correctly achieved by improving quality of schools to meet the expectations of students and other stakeholders. Educational institutions were expected to play this role without discrimination in students, as they were supposed to provide equal opportunities to all of them. Excellent schools were considered those which focused on maximum and better learning of pupils.

The Center for Comprehensive School Reform and Improvement (2009) identified quality indicators for highly effective schools. Those indicators act as guide lines for effective teaching and high students' gains. Beed & Burnham (2011) mentioned different phases, in their article through which the schools could improve their performance. These phases included quality of processes, finding best teachers and developing distributed leadership, focusing on performance, innovative and focus on global learning. There was a demonstration on cooperation and human relationship, which contributed to improve quality education.

**Indicators for improving Quality**

Iftikhar (2013) made some recommendations for improving education in Pakistan in which he suggested declaration of urgent need for educational development by involving all the stakeholders in this endeavor and making utmost efforts for the eradication of illiteracy as well as giving top priority to the development of education by the government. He also suggested that curriculum should be updated and procedures should be adopted of licensing of teachers for improvement of quality education.

A report of Human Development Foundation (2007) documented that a couple of measures could improve education system in Pakistan which included de-centralization at all levels; autonomy for schools; better supervisory support; strengthening linkages of the school system with district and provincial levels; encouraging decision making on the

basis of educational needs and expanding the research-base education for improving educational processes, management and administrative decisions.

Bergeson (2003) suggested different steps for maintaining quality which included development of a culture which should be based on human relationship of all stakeholders in education; holding positive views for staff members and promoting professionalism in schools. It was also needed to promote consensus on decisions and adopt a procedure by involving all stakeholders. However, there should be focus on updating the school norms, curriculum and rules from time to time.

Hall & Hord (2001) suggested that, for quality education, it was necessary to formulate policies that encouraged mutual cooperation; clear communication; friendly cooperation and on community welfare. In order to bring positive change in any organization, it was imperative that each member of the organization accepted change and the leader anticipated and facilitated it at the individual level.

**Measures of Quality Education**

A report by Colby et al. (2000) at international meeting of Working Paper Series discussed some of the measures which could ensure quality improvement in education. Those included learners who are involved in learning process with the support of their parents and teachers, conducive school climate; utilization of available resources; up- dated curriculum; child-centered process that help in acquisition of knowledge.

The National Plan of Action of Pakistan (2001) documented quality improvement could be maintained through committed and competent teachers. Different seminars and workshops should be arranged for concerned teachers in order to improve their pedagogical skills. Head of institutions should be trained and teachers should be awarded for their good performance. It was further suggested that equal opportunities should be provided to students so that they could participate in all activities that take place in educational institutions. In order to maintain quality in schools, the role of head cannot be ignored.

**Problems in the Education System of Pakistan**

Rehman and Khan (2011) identified following problems in educational system which included lack of physical and human resources; dropout rate; ineffective examination system; no uniformity in education system; misinterpretation of religion; transferred of teachers; lack of planning; weak administration and supervision; and communication gap between school and community.

Arong and Ogbadu (2010) found that quality deterioration in education owed itself to many factors such as principals' having no clear vision; no check and balance mechanism ; non-availability of properly trained and qualified teachers; inadequate library facilities; inadequate chances for coordination between head and staff; and schools in remote areas.

According to Shakir (2008) main obstacles of low quality of education in Pakistan were lack of political will; the politicization of education; lack of support to education by religious, social and political circles, out-dated teaching methods, some of the newly established universities were not up to the required mark, emphasis were given to quantity not to quality, lack of discipline and punctuality.

Memon (2007) documented that education system in Pakistan suffered considerably as due to many reasons. Scientific and technological education is neglected in Pakistan as it provide base for strong economic growth; lack of committed teachers and poverty. Saleemi (2010) stated that since independence different policies had been introduced but the results were not very satisfying. The whole system need to be re-shuffled. The major causes were no uniformity in the education system, poverty, no importance to technical education, no check and balance mechanism, lack of resources and low enrollment role and allocation of low GDP by the government.

**Statement of Problem**

The most fundamental problem confronted by the country is the question of improving educational system. Inspite of all the efforts made by the government toward qualitative improvement at all levels of education, the situation is getting worst. There are still many tasks which require immediate attention, but the most important is to improve quality of education. Different policies and plans have been introduced from time to time, however, no improvement has been observed. We can no longer keep ourselves isolated of what happens in the developed world. There appears timely need to modernize the education system of Pakistan. The problems related to quality issues were not adequately highlighted at least in the research carried out in Pakistan. All the efforts make by government of Pakistan, though, commendable but were not based on research. The conclusions and the opinions expressed were not grounded on scientific data. Hopefully, this study, to some extent, will fulfill this need. What we need is to develop a strategy based on sound information. Surprisingly, this strategy seems to have been ignored by most educational researchers with few exceptions.

In the light of all these considerations, it was therefore, considered expedient to develop a strategy for improving quality on the basis of research to be conducted in Government Girls' High School Peshawar City. This would include, beside study of documents, conducting interviews with the principals/headmistresses in the hierarchy to explore the actual causes and formulate suggestions for improvement.

**Objectives of the Study**

- To explore the causes leading to deterioration of quality of education in Government Girls' High Schools in Peshawar City.
- To formulate a strategy for improving quality of education at secondary level.
- Make recommendations for improving quality in Government Girls' High schools.

**Significance of the Study**

The study would be useful for educators, administrators and education policy- makers for formulating policies which could provide guide lines for improving quality of education at the secondary level of education. The proposed strategy is likely to raise the standard of education if implemented in the right earnest.

**Limitation of the Study**

There were apprehensions that study could be faced with problems like non-availability of head mistresses/principals to support the study. The law and order situation in Peshawar City as well as resource constraints may also delay the smooth process of the study.

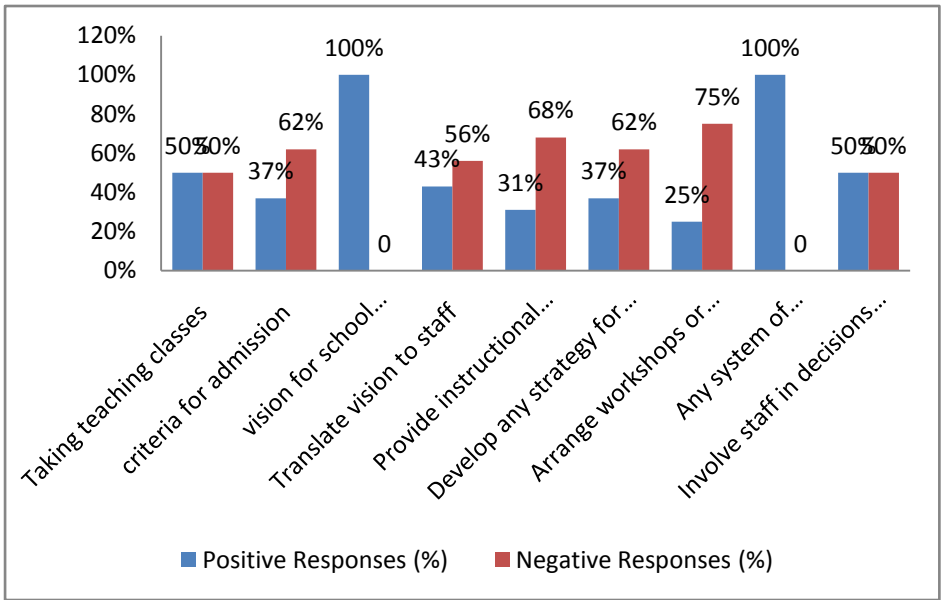
**Methodology**

The study was descriptive in nature. The study used both quantitative and qualitative techniques of research. Structured interviews were held with the headmistresses containing 10 statements. The population of this study included 16 government girls' high schools and 16 headmistresses in Peshawar city. The sample included all the 16(100%) government girls' high schools and 16 (100%) headmistresses.

**Data Analysis**

Table-1: Statistical Analysis of Responses of Headmistresses

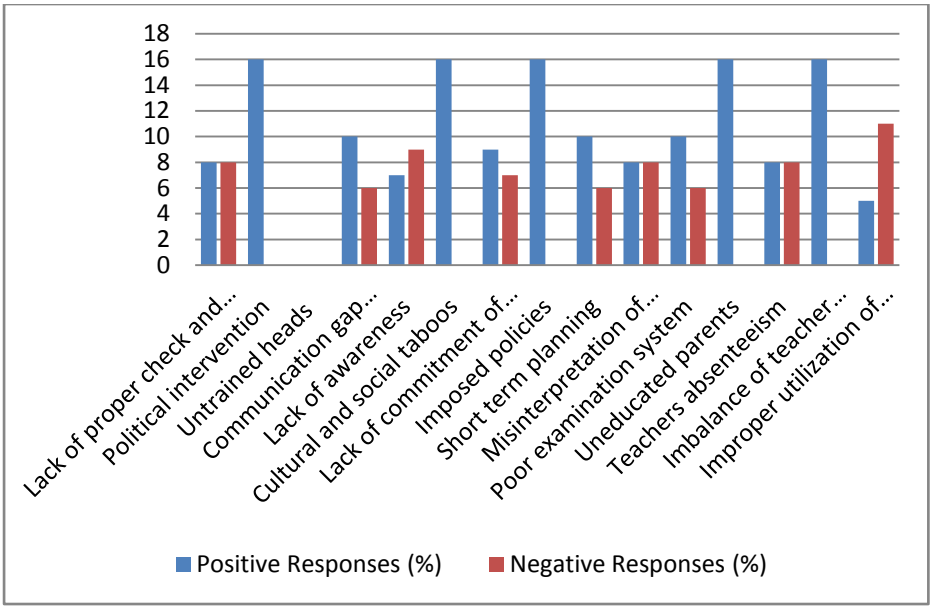
| # | Statements | Total No. of Responses | Positive Responses (%) | Negative Responses (%) |
|---|---|---|---|---|
| 1 | Taking teaching classes | 16 | 08(50%) | 08(50%) |
| 2 | Criteria for admission | 16 | 06(37%) | 10(62%) |
| 3 | Vision for school improvement | 16 | 16(100%) | Nil |
| 4 | Translate vision to staff | 16 | 07(43%) | 09(56%) |
| 5 | Provide instructional supervision to teachers | 16 | 05(31%) | 11(68%) |
| 6 | Develop any strategy for school community relationship | 16 | 06(37%) | 10(62%) |
| 7 | Arrange workshops or seminars for improving pedagogical skills of teachers | 16 | 04(25%) | 12(75%) |
| 8 | Any system of accountability for teachers in schools | 16 | 16(100%) | Nil |
| 9 | Involve staff in decisions about school problems | 16 | 08(50%) | 08(50%) |




The data in table No.1 revealed responses of head mistresses. They stated that quality of education in government girls' high schools was poor. Majority of the respondents were of view that they were taking classes while majority of the subjects regarded that there was no criteria for admission and some of the head mistresses opined that they involved teachers in their decisions regarding their schools. Similarly, vast majority of respondents viewed that they had vision for maintaining quality in their institutions and they introduced accountability system for teachers as well. While some of the respondents were of view that the quality was poor because there was no balance between teacher student ratio, they did not translate their vision to the staff and did not develop any strategy for promoting school community relationship. Vast majority of respondents agreed that they did not arrange any workshops and seminars for their faculty. Figure – 1 further made the data meaningful.

Table-2: *Causes Identified by Head mistresses Lead to Deterioration of Quality of Education at the Secondary Level*

| # | Causes | Total No. of Respondents | Positive Responses (%) | Negative Responses (%) |
|---|---|---|---|---|
| 1 | Lack of proper check and balance mechanism | 16 | 08(50%) | 08(50%) |
| 2 | Political intervention | 16 | 16(100%) | Nil |
| 3 | Untrained heads | 16 | 07(43%) | 09(56%) |
| 4 | Communication gap among teacher, community and parents | 16 | 10(62%) | 06(37%) |
| 5 | Lack of awareness | 16 | 07(43%) | 09(56%) |
| 6 | Cultural and social taboos | 16 | 16(100%) | Nil |
| 7 | Lack of commitment of teachers | 16 | 09(56%) | 07(43%) |
| 8 | Imposed policies | 16 | 16(100%) | Nil |
| 9 | Short term planning | 16 | 10(62%) | 06(37%) |
| 10 | Misinterpretation of religion | 16 | 08(50%) | 08(50%) |
| 11 | Poor examination system | 16 | 10(62%) | 06(37%) |
| 12 | Uneducated parents | 16 | 16(100%) | 0 |
| 13 | Teachers absenteeism | 16 | 08(50%) | 08(50%) |
| 14 | Imbalance of teacher student ratio | 16 | 16(100%) | 0 |
| 15 | Improper utilization of funds | 16 | 05(31%) | 11(68%) |




The data reflected in Table –2 pointed out the causes of deterioration of quality of education at secondary level. Majority of the respondents identified some of the causes that lead to deterioration of education which included political intervention, untrained heads and imbalance teacher student ratio while some of the subjects were of the opinion that other major factors were communication gap between teacher, parents and community, teachers absenteeism, lack of planning, misinterpretation of religion and social and cultural taboos were the major causes of deterioration in the schools. The graph presentation in figure –2 further elaborated the data.

**Conclusions**

The conclusion drawn from the study revealed that the current status of quality of education in schools was not satisfactory The major causes identified by the study were untrained and lack of committed teachers, no criteria for admission, communication gap between school and community, lack of physical and instructional facilities, gender discrimination, lack of planning, weak academic back ground of students, favoritism and victimization in the education department, insufficient funds for sports and other co-curricular activities and defective system of examination etc. were the major causes of deterioration and not much work has been for the improving quality of education. It now becomes an alarming issue for higher authorities.

**Recommendations**

A couple of recommendations were made to improve the current status of schools which included in-service teacher training programs, incentives to the teachers based on their performance, active participation of the parents and community, frequents visits by EDO and efficient principal could improve the situation. Conclusively, much effort was needed to bring improvement in schools. In order to develop strategy for improving quality of

education different suggestions were given, which included qualified staff, good building and availability of basic and physical facilities, proper allocation of funds, teachers parents counseling, friendly environment, controlled strength, constructions of more classes, amendments in educational policies, no pressure on principals during admission, coordination among all the stakeholders, setting objectives, recruitment of more staff and evaluation of the whole program. A viable strategy was developed by the study for improving the quality of education at the secondary level of Government Girls' High Schools in Peshawar city. A proposed strategy was given in Figure-3.

**A Model of proposed strategy for Improving quality of education**

| Principal | | First Phase | | Senior Teachers |
|---|---|---|---|---|
| | → | A clear understanding of current status of organization | ← | |
| | | Revise the past and present strategies | | |
| | | Setting objectives for the organization | ← | |
| | → | Assessment by professionals committee | | |
| | | **Second Phase** | ← | |
| | → | Identify the appropriate factor leads to strategy development | | |
| | | How to supervise and monitor the performance | | |
| | | Assessment by professionals committee | | |
| | | **Third and Final Phase** | | |
| | | How to coordinate efforts towards school improvement | | |
| | | How to improve the learning outcome of students | | |
| | | How to solve school problems | | |
| | | Assessment by professionals committee | | |

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# Paper No. 405

## DEVELOPMENT ADMINISTRATION, HUMAN RESOURCE DEVELOPMENT, AND THE PROSPECTS OF PAKISTAN'S PUBLIC SECTOR REFORM: THE NEEDS VS. CHALLENGES

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**Abstract**

*Keeping in view the complexity of work environment in the changing organizational environment caused by advancement in technology on the one hand and the diverse needs of the a rapidly growing population on the other hand, the role of training and development becomes more stark in terms of quality and quantity both. The purpose training and development is to enable organizational members to have the essential skills and knowledge for performing their assigned task efficiently and effectively. This also enables them to take upon themselves new responsibilities and could easily adjust themselves to the ever changing market conditions. Needless to say, this recognition of training by the government and management experts in the country, the existence interest in training and development manpower in the public sector service appears to be more waste and ruse. The current study looks into the depth of this interest of Pakistan Public Services on this very important organizational element with an approach to delve deep to have understanding of the needs and challenges being faced. The study has some recommendations to the effect of ameliorating the existing condition and interest.*

### Introduction

The field of development administration got attention in the 1950 due to the practical needs of administrators and academics who felt the demands for action and explanation in the face of concrete phenomena and operational necessities (Hess, 1995). The phenomenon of globalization of the world economy has necessitated the transformation of societies through the process of development. The traditional approach to development was questioned and the need for a more holistic approach to development was severely felt (Stiglitz, 1998). With this in mind, the conceptualization of development was broadened. From mere infrastructural development it transitioned to development in all aspects. Development, is now, a deliberate effort to build or strengthen institutions, with the end to enable them to manage public services and design good policies (Natsios, 2010). To affect all these, the role of state has got more intensified in terms of both quality and quantity. If state wants to successfully dispense away with this responsibility, the development of administration is essential for it ensures the equitable distribution of public goods and incentives and sustains the economic institutions--the prime tasks of welfare regimes.

Therefore, it is of prime importance to understand the politics—one has to understand that development is a political process and not a technical one. It needs the intervention of a legitimate state with will and capacity to bring it about--which determine how development administration, HR development, and public sector reforms are brought about or hindered.

Administration has a very critical function of facilitating and supporting all the organs of any organization to ensure the implementation of policies in letter and spirit. According to organizational model, organizational mental outputs are the results of bargaining and interactions amongst several players within the organization need to be careful about merely considering them the results of calculated decisions by management. In addition, one has to be aware of the fact that these player posses diverse interests and objectives with, may be, considerable differing degrees of influence. They are the results of conflict and cooperation among these players. Effective administration is the one that helps to minimize the conflict and engender cooperation among the players. However, effective administration can only be manned with experienced and trained personnel which in turn are the output of training institutes in a country.

**The Role of Training Institutes**

The importance of training institutes has widely been acclaimed given the growing complexity of organization environment in the presence of advancement in technology and the relative importance of stakeholders/customer. These institutes are supposed to help organizational HR assets to have the required skills and knowledge necessary for performing their respective jobs effectively, enable them to adapt to the fluid organizational conditions and better dispense away their new responsibilities (Jones, George, & Hill, 2003). In case of Pakistan this need was realized in the very early years of the country life. Being a colonial inheritance of the British, it was realized that the administrative system was unable to meet the needs of an independent nation. The need for "this fundamental reforms in the administrative machinery of Pakistan was expressed in the First Five Year Plan (1955-60)" (Jadoon & Jabeen, 2006, p. 121).

To affect that on the desired lines training of the administrators was thought highly imperative. And in this way the need for in-service training of civil servants and public administration education was recognized. In this regard the United States extended technical assistance in setting up a number of training institutes for education in Public Administration. And by the mid of 1960s some 06 training institutions were fully operational for public administration education.

During this helping process, American professors, consultants, and some American educated Pakistani administrators and academicians got involved and through this way American spirit of public administration got infused in these organizations. This influence can be gauged from the fact that in the 1960s, "public administration was the major category in the technical assistance program of the United States, which aimed at improving the administrative capability of developing countries" (Jadoon & Jabeen, 2006, p. 123).

However, despite the proliferation of universities offering degrees in Public Administration and the establishment of various training institutes for in-job trainings, the service delivery of public sector is as poor as it was. This connotes that despite the

recognition and importance of training institutes and public expenses on these institutes, and the claims by the managements of these institutes in their various reports, the interest in training and developing the manpower in country public sector appears to be more of ruse and waste. Therefore, there is a need to examining this interest in the training and development of public sector manpower in Pakistan with the purpose to understand the seriousness of the problems that this sector has been facing.

**Bureaucracy in the Change Process**

Pakistan has acquired a bureaucratic legacy from the Britain and has since remained a bureaucratic polity. "Both civil and military bureaucracy occupies most powerful position in the political system of Pakistan. Bureaucratic elites, military and civil, have directly and indirectly ruled Pakistan throughout its history as an independent nation" (Jadoon & Jabeen, 2006, p. 133). Countries where bureaucracies rule are subject to stern regulation in knowledge creation and dissemination and do not encourage intellectual endeavors outside state control. It has been noted that not only universities but academicians also are not in concord with the authoritarian and bureaucratic orientation of the state apparatus. Therefore, one can easily conclude that bureaucracy and the authoritarian nature of the Pakistani state is probably the major reason behind to positively affect the change process.

Graham Allison (1969) has defined the Bureaucratic Politics Model (BPM) and is considered one the most prominent decision-making perspectives and has great relevance with change process. The focus of the model, in terms of public sector, can be paraphrased as whatever we see in the bureaucracy is the consequence of interactions and bargaining within the diverse players active in the public sector system. These players have their individual interest and objectives affecting the sector differently. Thus change can only be affected either if one group interest dominates the rest or in ideal case if there happens to be some congruence among the interest group.

Keeping this model in mind one can conclude that the narrow self-interest of the bureaucratic agents or the interest groups dominates the national policy formulation. Consequently, public policies formulated here are not universalistic in nature. In other words, they are different for different states. Notwithstanding, it is easy to understand that with more actors involved in maximize their individualistic (including the state leader) the formulation of national policy is the end result of the state looking inward to figure out a course of action.

**The Politics of the Bureaucracy**

To understand politics of the bureaucracy in terms of implications for development it is essential to recognize the existence of *two distinct but related levels* of this politics. And according to Lindner and Rittberger (2003)politics and political contestation over policy occurs. They are:

a) The level which concerns the *rules of the game* (institutions); and

b) The level at which *games within the rules* occurs.

(a) *Rules of the game:* These rules are formally expressed in office manuals that are fundamental for any decision from minor to major. However, the rules involve much more than the formal office manuals. There exists wider '*informal* institutional aspects expressed in the culture, political culture and ideology which can have a critical part to play in

maintaining, preventing or undermining the consensus and adherence to the formal rules' (Leftwich, 2008, p. 7). For example CSS culture, PCS culture, rank culture, union culture, etc. Researchers (Helmke & Levitsky, 2004; Lauth, 2000) consider them part of the rules of the game. It is to be remembered and one has to recognize that it this level which, in essence, establishes the 'regime' type: here the 'basic processes are constituted which pertain to the formation, maintenance and enforcement of the institutions and standard procedures for conducting politics...administrative and judicial institutions which will facilitate growth and development' (Leftwich, 2008, p. 9). It is here that desired changed is affected. By analyzing bureaucracy in Pakistan it seems to be happy with the status quo as it protects their interest of more perks and privileges with fewer responsibilities. After all what is the need of shaking it and bringing change?

(b) *Games within the rules*: This occurs during the daily debates and contestations over policy and practice (Leftwich, 2008). This sort of bureaucratic politics is predictable in outcomes and does not cause major structure change. This sort of politics can be observed in the red-tapism and the bureaucracy seems to cherish it.

Different researchers have looked into the different features of bureaucracy in Pakistan. For example Kennedy (1987) believes that bureaucracy preference here is for generalists. Accordingly, this generalist cadre (CSP—Civil Service of Pakistan) and the District Management Group (DMG) even after 1973 reforms have consistently enjoyed privileged positions in the public service sector. This group majorly occupies the top slots in the provincial governments, the federal government, and other statutory and state-owned corporations. Some people would have argued in favour of professionalists and this argumentation has peeped into the First Five Year Plan. However, this issue of professionals versus generalists was settled in favour of the latter and was decided not to eliminate the generalists. The preeminent position of generalists however remained intact till now. The professional have not been successful in attaining somewhat equal status in the public sector. It is something very logical that the generalist, being at the helm of affairs in the federal and provincial secretariats would definitely not accord a tool-oriented and professional discipline of Public Administration the status it deserve. And that is why that the discipline of Public Administration has not received proper attention from the bureaucracy. The result is its treatment at par with other professional subjects.

**The Politics of Development**

Development by analysis is a transformative process (Stiglitz, 1998). And "*the politics of development* is about changing not only *how* resources are used, produced and distributed, but also about how decisions are taken about such changes and about the politics which sustain, implement and extend them"(Leftwich, 2008, p. 10). Leftwich (2008) sums up the political nature of development in two simple propositions:

- *"When people change the way they use, produce and distribute resources, they also change their (social and political) relations – relations of power - with each other"*; and
- *"When people change their political and social (power) relations with each other, they usually change the way they use, produce and distribute resources"*(p. 10)

The problem in development countries is the absence of any established rules of the game which encourage making developmental choices and formulating developmental

strategies. Furthermore, the existing institutions do not promote growth and development (Leftwich, 2008).

**What Determines Players' Interests?**

While looking into the difference between what the bureaucratic system was supposed to do and what actually it has been doing since long, one finds an array of disturbing, and at the same time interesting, questions like "what happened"; "why it happened"; and "how it happened". However, if one wants to give one sentence answer to these questions it can be summarized that it is story of good intentions—accountability and transparency—gone bad. The consequences of these counter-bureaucratic trends explain a great deal about why bureaucracy in Pakistan has been designed the way it is. This journey of compliance and bureaucracy "gone bad" is neither a single person's effort nor a one time act. There are a number of players like persons involved, culture, and power structure relationship and the time the journey has taken. They can be summarized below:

- Individual attributes of players
  - Personal goals (including unassociated political considerations)
  - Personalities
  - Views of the "national interest"
- Parochialism – "where you stand depends on where you sit"
  - Concern for welfare/perpetuation of bureau colors goals
- Sense of service to superiors and charges

It will not be out of place to mention Wilson (1989) four types of bureaucracy:

- P**rocedural organization:** In these organizations managers observe only the process and are not concerned with the result or outcome of the process.
- **Craft organizations:** In these organizations the activities of the employees are hard to observe but their outcomes are relatively easy to evaluate. Military Accounts Department is a good example of such organizations which this paper addresses.
- **Coping organizations:** In these organizations the outcomes cannot be observed.
- **Production agencies:** In these organizations there are observable outputs and routine work processes, laws, and regulations.

The story of Pakistani bureaucracy is a history of worse routinization. There hardly seems any development within its rank and file. One can observe diverse forms printed some 50 years back, with the same obsolete working procedure. It appears to be a marvelous example of apprenticeship. The input of officer esp. the CSS cadre can hardly be observed. The lower and lower middle level operators are the de facto decision makers. The higher level bureaucracy is simply a stamp body. The concept of organizational development neither peeped into nor there seems any sign of such change intrusion. It is important to explore how this obsolete system persists? Why routinization is preferred over change/organizational development? It may be called a story of "good intentions" that benefit less and cost the public exchequer more.

**Challenges and Opportunities**

Public administration is, no doubt tasked with a huge responsibility. Public sector universities as well as private sector universities have been offering diverse programs in public administration. At the same time Govt. has been encouraging scholars for research in the field of public administration. In Pakistan, Public administration has been recognized and accepted management discipline. The Higher Education Commission of Pakistan treats Public Administration under the category of management sciences.

Public administration has been facing many challenges. The greatest among them is the restoration of not only diminishing but almost the diminished trust of the common man on its capacity to deliver. This erosion of trust has caused a serious dint in the public-state relationship. The rising militancy, regionalism, sectarianism, unrest within the rank and file of the public are the products of failure of state machinery and public administration is soul of the state machinery. The role of the universities prior to the job stage and training institutes during the job has to be quantitatively and qualitatively strengthened.

The second challenge is the weak moral education and no emphasis on nationalism and statehoodship. No doubt technical education is essential, however, until and unless it is controlled and directed by the moral education, consequences have always been found disastrous.

The third challenge is the existence flaw in the power syndrome. The common adage of power corrupts and absolute power corrupts absolutely happens to be very true. Power thirst is a very common phenomenon within the human psyche. But when one gets unlimited power, its judicious use becomes the test of one's technical and moral nerves. The absence of any control mechanism causes serious damage to the person's integrity, trust, honesty and service delivery responsibility.

The country has a history of experimentations with the devolution plan under which it is generally presumed that power will be shifted to the newly established either basic democracies and local bodies make available a countless opportunity for growth of Public Administration as an academic and professional discipline. Looking into the need of expert public administration experts, one can easily conclude that that these experts with the required skill of management and are fully educated to safeguard and protect the democratic values are able to run the new local government establishments with an unprecedented human resource needed for the effective implementation of the devolution plan. Such a combination of managerial skills and sensitivity to public interest could only be provided if training institutes are strong and up-to the mark for provision of the desired training.

In Pakistan, the increasing non-profit sector can also provide fabulous opportunity for growing and demand of trained personnel. Universities and training institutes are required to design programs which may get ready their graduates for this growing sector. Once the public sector universities and training institutes create their niche in the job market, then private sector universities will be able to definitely respond and will most probably initiate them. To reach this stage, the government has to understand and play its role by recognizing and appreciating the importance of public training for the future success.

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# ENGINEERING PAPERS

# Paper No. 314

## ALTERNATE TECHNIQUE FOR WIDENING ROADS NEAR COMERICAL PLACES

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**Abstract**

*It is well known that as volumes of traffic progressively increase, the need to widen roads becomes increasingly urgent especially near commercial markets. In this paper we will discuss the technique for widening roads; usually roads are widening by clearing nearby buildings. But that is very costly. This paper discuss that usually near commercial or market places there is always horizontal parking space, so if we just shift this parking space underground (under main road) with proper drainage system and stairs at each end of the road we can easily secure 1 or 2 extra lane. That extra lane can be used for bus rapid transit or just for normal traffic. By this arrangement pedestrian can also find easy to cross roads. Also in this paper alternate ways of lighting in underground parking during day and night by solar panels.*

**Key words**: widening roads, underground, lighting.

### Introduction

Rising traffic congestion is an inescapable condition in large and growing metropolitan areas across the world. In big cities traffic situation is worse especially near market or commercial places. This is due to increasing volume of traffic per year with growing population. In order to accumulate this increasing volume of traffic existing roads are widened. Normally the road widening on the section would involve removing the existing emergency lane, prior to installation of a new lane and then lane widening with a new emergency lane. This widening would be laid as a 100 per cent new road by excavating a new formation and then creating the two lanes with exclusively new materials, but it makes more sense to use the materials already in the existing emergency lane [1]. Another method is to clear nearby existing building and making space for extra lane and follow the normal pavement methods. Both methods are very effective but first method cannot be applied near commercial places where roads are packed by commercial buildings. We have to apply second method, which seems very expensive. So we have to find some economical and effective solution to this problem. Basic idea of this paper instead of clearing space we apply alternative technique which is rather less expensive. Usually near market place there is horizontal parking space for cars, then just we swift these parking space underground by providing drainage system and access for cars to go and leave this underground parking plus stairs on each ends for pedestrian to easily move one side to another. By this we can secure one or two extra on each side depending on the space available. This extra lane can be used for rapid transit or just extra lane for normal traffic flow. Also, alternative to this clear PVC pipes be used for drainage from main road, because it will provide sunlight to pass for lightening underground during day and by placing solar panels near the sides of the roads to providing electricity for lightening

during night. Another advantage of this method is it will provide more parking spaces for both commercial and residential usage.

**What is traffic congestion?**

At its simplest, it can be explained in physical terms as the way in which vehicles interact to impede each other's progress. These interactions and their influence on individual journeys usually increase as demand for the available road space approaches capacity or when capacity itself is reduced through road works or closures for example. In addition, one-off events such as bad weather or road traffic accidents can also have a significant bearing on congestion. [2]

Fig 1: Traffic congestion at Price Majed Street Jeddah Saudi Arabia. [3]

Traffic congestion and cities, it seems, go hand in hand. Everyone complains about being stuck in traffic; but, like the weather, no one seems to do anything about it. In particular, traffic engineers, transportation planners, and public officials responsible for metropolitan transportation systems are frequently criticized for failing to make a dent in congestion. [4]

**Effects of traffic congestion**

Increased traffic congestion has both economic and environmental effects, however some of the common effects are:

- Slower speeds
- Longer journey times
- Increased queuing at junctions or bottlenecks
- Increased stopping and starting
- More time spent stationary
- Less predictable journey times. [2]

**Traffic congestion problem near market places**

Traffic situation near markets has been worsening with increasing development, especially during peak shopping hours. During Christmas or Ramadan traffic jam pack near market places. Some of the reasons for this congestion are lack of parking facilities so people parked illegally creating traffic blockade. And also lack of effective parking system near markets that are legal. (See fig 2).


Fig 2: Vehicles being parked in front of the city's New Market which may cause huge traffic congestion in Dhaka.

Another reason for this traffic problem is volume of traffic is large as compare to width of the road.

**Possible solutions**

One of the solutions to traffic congestion is to build overhead bridges at every signals or underpass just like in Jeddah and Riyadh Saudi Arabia (see fig 3). Second is to decrease the vehicles issued per year. Both of the solutions are quiet well but economically first one is too much expensive and is not for long-term and also destroyed the aesthetic of the place and is not pedestrian friendly. Second one is also quiet effective but problem is it will take a lot of time to enforce these kinds of laws in developing countries like Pakistan.

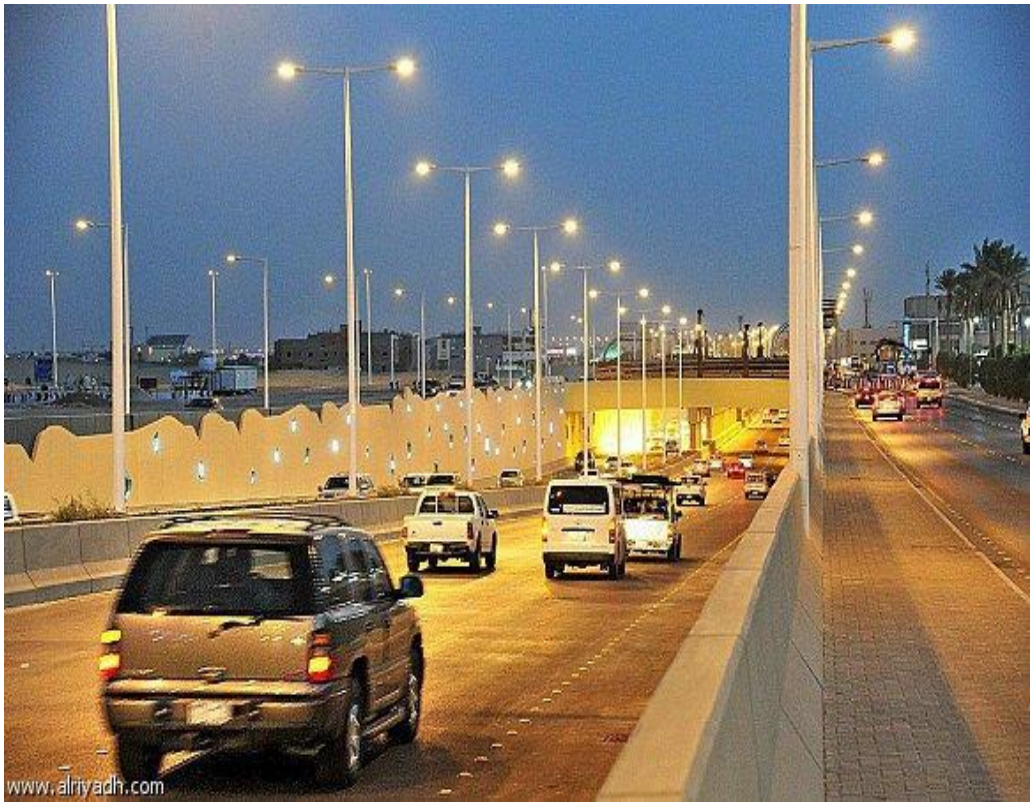


Fig 3: Underpass in Riyadh, Saudi Arabia [4]

**Shifting parking space underground**

Near market places roads are widening by clearing nearby buildings and buying the nearby lands by government or concern authorities. Cost for this method includes land costs plus costs for clearing building plus building pavement for extra lane. This method is also not effective in the sense of cost and a lot of time is required. So, there must be an alternative solution for this problem.

**Basic concept behind the solution**

As discussed before near commercial market places there are usually horizontal car parking slots just adjacent to shops. Basic idea of this paper is to shift this parking space underground by accessing main road to underground parking after intervals (see fig 4). By this concept parking space is doubled and extra 1 or 2 lanes of minimum width of 3.0 meters would be freed up for the vehicle usage. With the road widened from this concept traffic may pass easily and more volume of traffic may pass results in reducing traffic congestions.

**Drainage**

Drainage system uses clear (transparent) PVC pipes from the grates to the column. Then after that normal PVC pipes are used up to the drainage facility. Separate drainage system is preferred means different inlets and pipes connection to drainage facility for both main road and underground area. This is because to provide fast and effective drainage facility both for main road and underground area.

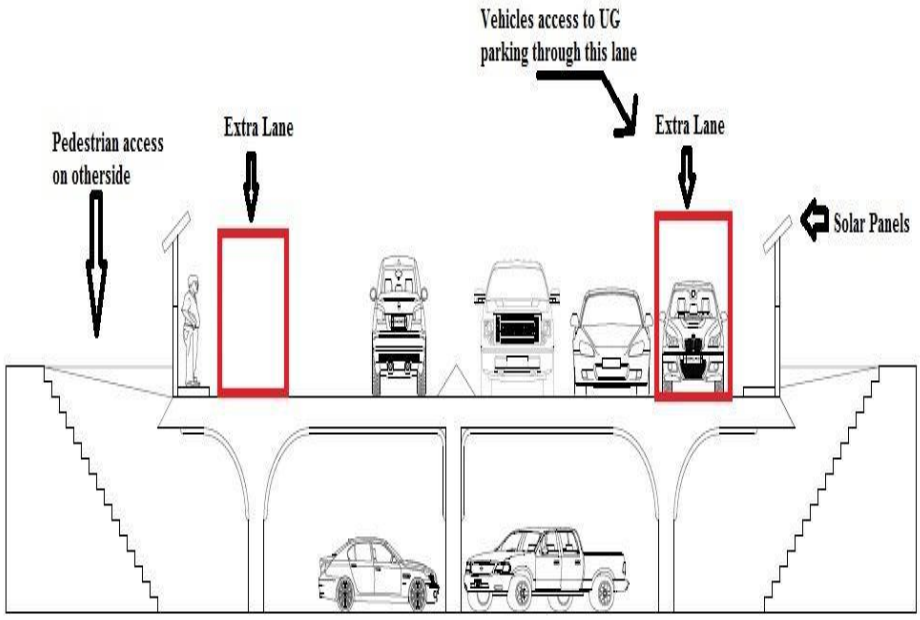


Fig 4: Shows the underground parking + extra lane for vehicles usage + solar panels + stair case on both ends of the road.

**Stair cases**

As shown in fig 4 and fig 6 stairs are provided on both ends of the road. This facility is provided give pedestrian to cross road easily and also provide facility for persons enter or leave who have parked his/her car.

**Extra lane usage**

Once this formula is in use and road is widened thus creating extra lane. Question arises of its usage. It can be put into following use:

1- For increased volume of traffic it can be simply used for vehicular traffic for easy passage of traffic.
2- To increase public transport network by reserving this extra lane for Rapid Transit System.
3- Can be reserved for bike or cyclists for increased safety.

**Lighting**

As mentioned in pervious section that clear PVC pipes are provided. These are provided due to from this Type of pipes light can easily pass and can provide sufficient light during day time to underground facility without requiring extra energy. Solar panel is provided at each end of road (see fig 4 and 6). These are providing to light up the underground facility during night.

Fig 5: Clear PVC pipe

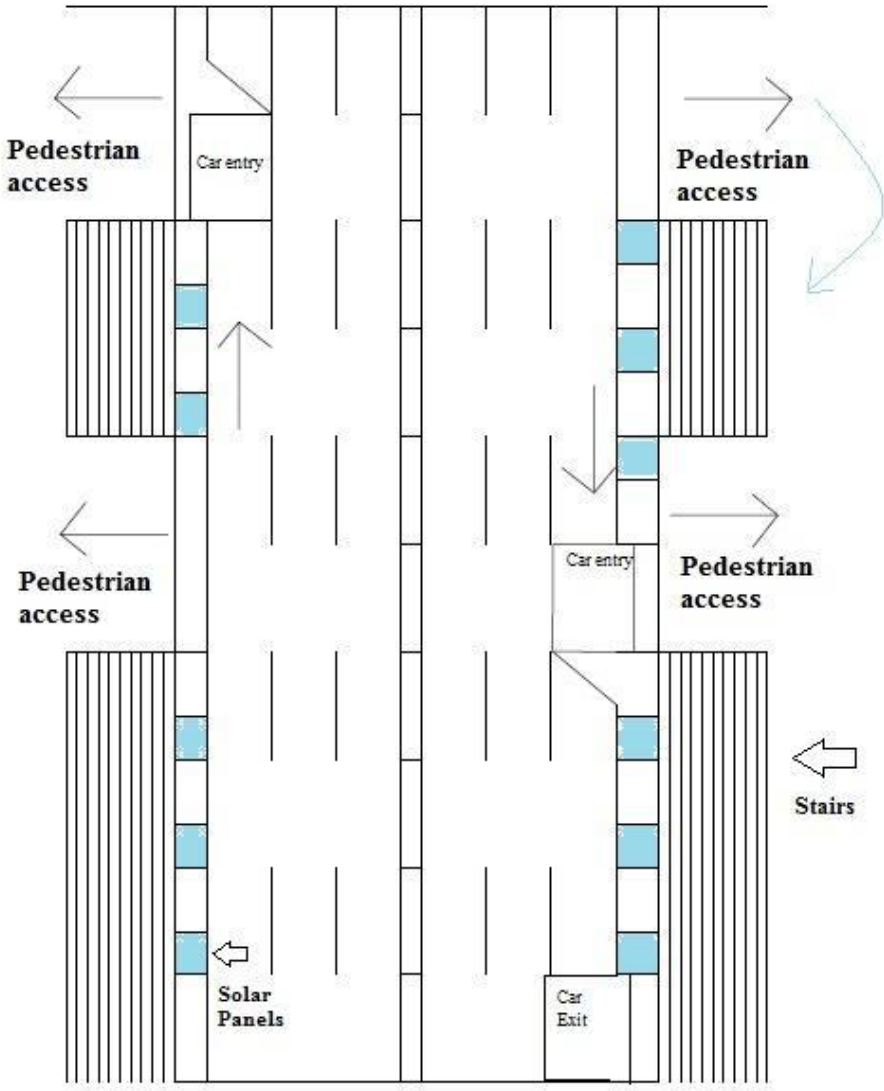


Fig 6: top view with blue color marked as solar panels.

**Advantages**

1- Extra lane pavement cost is saved
2- Electricity costs are saved
3- Pedestrian friendly

4- Aesthetically appealing
5- Market friendly
6- Better parking facility

**Conclusion**

Although this method is very cost effective than other methods but by building an underground facility would create drainage problem. Because no matter how much effective your drainage system underground facilities are flooded when rainfall increased certain limits. But this type of facilities beautifully creates the best possible solution for parking problem near market places.

Also this type of project is aesthetically appealing than all other methods for widening roads. Moreover this method is not only for widening roads near market places but can also be used effectively in other places. So, more research should be conducted to make it more usable.

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[4] Photo courtesy: alriyadh.com

# Paper No. 346

## PERFORMANCE EVALUATION OF DIGITAL GOVERNOR FOR IMPROVING OPERATIONAL EFFICIENCY AND RELIABILITY OF POWER PLANT

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**ABSTRACT**

*In this paper, response of newly installed digital governor of Tarbela Power Station has been checked. During testing different parameter like speed of the hydro generator after load rejection, step response of MW, relief valve timing were checked and comparison of previous installed electromechanical governor is also illustrated. Previously in Tarbela, Electromechanical Governor was installed which was replaced with digital governor in 2014. This newly installed Governor has Mark VIe Control System which is designed by G.E (USA) for retrofitting the turbine control system at Tarbela. The Mark VIe software is easy-to-use for configuration and diagnostic tools aid in the startup and maintenance of the system. Digital governors are more cost-effective in the long haul as compared to the electromechanical governor as they are maintenance free. In case of failure of any electronic component, the replacement process is very simple. Testing of all field devices of the digital governor is very easy to use and can be easily maintain over the years. The accuracy of the digital devices is very high and also plays a pivotal role. It is true that mechanical devices can be reliable and accurate, but the digital ones are definitely superior in terms of accuracy.*

**Key words** Digital governor; load rejection; retrofitting.

### Introduction

The objective of this research is to discuss the technology of new digital governor for maximizing the performance and reliability of the power plants [1]. Governor system controls the turbine servomotor, which in response control the turbine speed and power by regulating the flow of water.

### Background

Tarbela Power Station is the largest Hydro power plant in Pakistan. Units No. 1~4, 5~8 and 09~10 of Tarbela Power Station were commissioned in 1977, 1982 and 1985 respectively. Presently the installed capacity of Tarbela Power Station is 3478MW. Previously in Tarbela, Electromechanical governing system was installed. Due to mechanical wear and tear, prolong maintenance and obsolesce of spares,

electromechanical governor was replaced with digital governor [2]. This project was not a complete replacement rather was a retrofitting. This allows the plant to use the reliable existing equipment e.g. pumps, oil pressure lines etc. In the upgradation/replacement of electromechanical governor process was installation of a controller, speed sensor and to remove the mechanical linkages, PMG and dashpot etc.

**Main Components of Governor**

Governor system consists of different field devices for continuously monitoring the deviation of speed of turbine and converts the speed deviation into change of gate position through the gate servomotor. All devices used in the governor system for controlling of gates and the relevant feedbacks are known as Governing system. For the movement of wicket Servomotor, a pressurized oil system is installed. This system contains pumps, oil tanks, sump tank and piping system for providing the pressurized oil to servomotor for the mechanical movement of the gates.

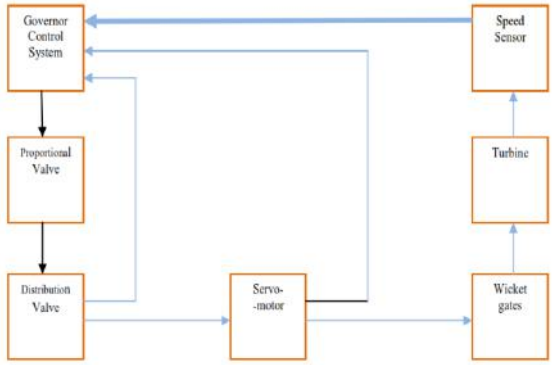


Fig 01: Block diagram of Digital Governor

**Working of Digital Governor**

Governor controller is the brain of the governor system. All the instructions and feedback are sent and received from the controller. Controller gives the electrical signal to proportional valve for opening or closing of the wicket gates. Proportional valve gives a small force oil input to distribution valve which in turns amplifies this small force to large force movement of the servomotor. Distribution valve feedback is also connected to the controller as shown in the fig 01. Servomotor is mechanically connected with the wicket gate which controls the flow of the input water.

For measuring the position of the wicket gate a feedback sensor is installed on the servomotor which continuously monitor and gives signals to the controller. In response controller check the difference between the gate set point and the actual position and give the next instruction. Speed sensors are installed on the top of the turbine shaft for monitoring of the actual speed of the turbine. In previously installed mechanical governor a permanent magnet generator was installed which coupled with the turbine shaft for measuring the speed of the turbine. Digital governor uses zero velocity pickup (ZVPU) which is basically a speed signal generator and provides frequency signal proportional to the unit speed. ZVPU's are also connected with the shaft.

These speed sensors are also used for the creep detection. Creep is the slow rotation of turbine due to water leakage from the wicket gates when the generating unit is in shutdown mode. When this movement is detected by the controller of governor system, it turns on the oil injection pumps for preventing damage of thrust bearing pads.

**Performance Evaluation of Digital Governor**

Governor system performance can affect the generation of the power plant directly or indirectly. Regular periodic testing is required for the analysis of governor performance [3]. New Digital governor of Tarbela Power station is manufactured by G.E (USA).

**1. Start up of generating unit**

Starting of the generating Unit of 175MW capability is presented with a digital governor in the Fig 02. Proper tuning in the governor control software has reduced the overshoot speed which is now less than 1 percent. After giving the start command to the governors, the Unit achieved the rated speed in 70 sec approx and was ready/available for synchronization. Gate position is varying continuously for the keeping the speed of the generating unit in the safe range. The detail of inputs and outputs variables selected is as under:

| Input/ Output | Variable Name | Description |
|---|---|---|
| Input | Auto_Start | Start command for Governor |
| Input | Speed_SP_PERCENT | Set point of speed |
| Output | Servo_fdbk | Actual Gate Position |
| Output | Speed_PCT | Actual response/feedback of speed |

In the fig 02 X-axis shows the time and Y-axis shows the magnitude of speed and wicket gate position in %.

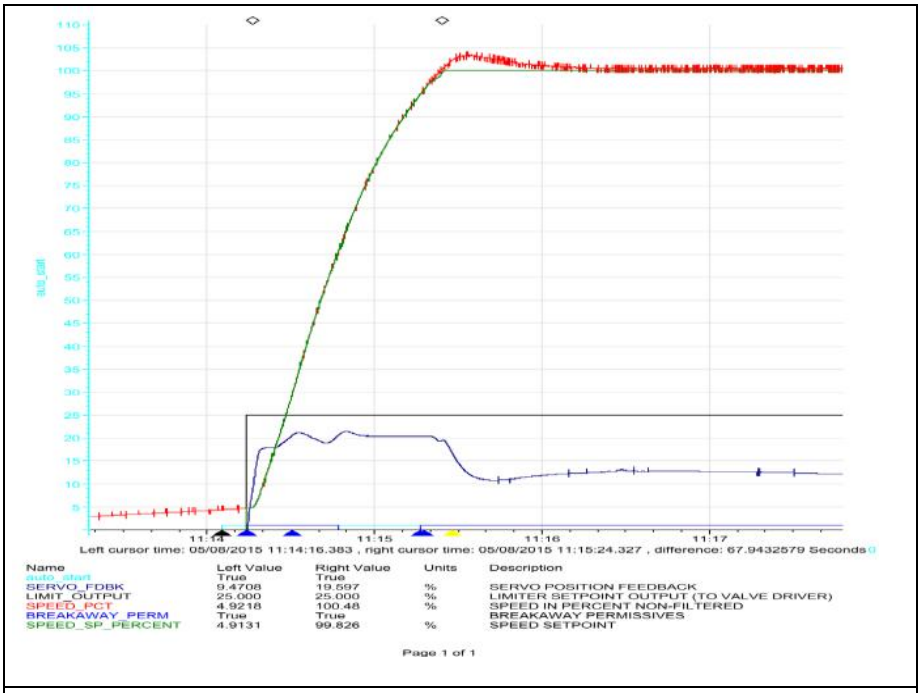


FIG 02: START UP OF GENERATING UNIT

## 2. Load rejection test of generating unit

Load rejection test is carried out for verifying the response of governor for sustaining the load rejection in order to prevent the over speeding and with no adverse effect on turbine and penstock.

For this test first Generating Unit was started and synchronized with the system. When the Unit was operating at full load, the breakers of the Unit was opened thus making it at no load with 100% wicket gate in opening position.

Speed Response of the unit was checked with new governor and found satisfactory. Relief valve was also operated in time to divert the water flow and relieves the pressure from the gates and penstock. The detail of input and output variables are as under:

| Input/ Output | Variable Name | Description |
|---|---|---|
| Input: | MW_FDBK | Feedback of load/megawatt from full load to no load. |
| Output: | Servo_fdbk_1 | Feedback of gate position before and after the operation. |
| Output: | Speed_PCT | Feedback of machine speed after opening of the main breakers. |
| Output: | Bypass_fdbk_1 | Response of relief valve after the load rejection. |

Where in the fig 03 X-axis shows the time and Y-axis shows the magnitude of the above all four variables.

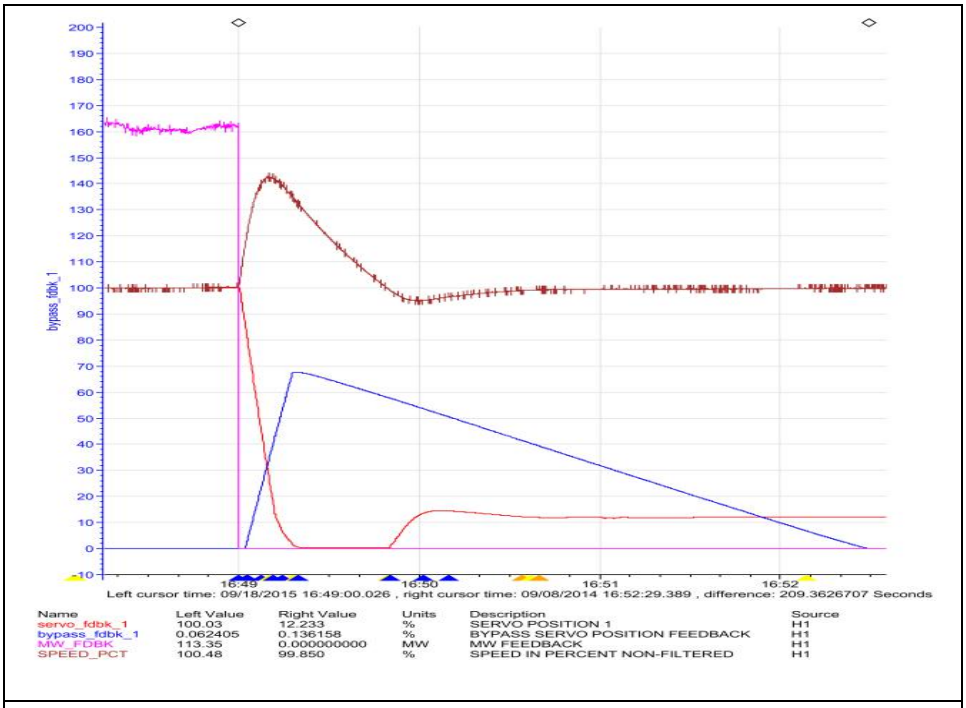


Fig 03: LOAD REJECTION TEST

### 3. Wicket gate opening/closing response

The moving speed of wicket gate has a certain effect on the generator stability. The wicket gate actual opening and closing timing should match the design timing in order to prevent unnecessary wear and tear [4]. In previous governor there was not proper way to evaluate the timing test of the governor. Now through this digital governor the timing test can be performed easily through Mark Vie software.

For checking the response of the gates, Generating unit have to be in maintenance mode. i.e. inlet valve fully closed. Now the wicket gates set point is changed from zero to 100%. Wicket gate started to move towards at 100% position. Then the set point is changed from 100% to 0 for checking the response of closing of wicket gate.

The timing of opening and closing can be easily analyzed from the trend stored in the governor software. The opening and closing time can be adjusted mechanically from the distribution valve. The result of this test is shown in the Fig 04:

The detail of input and output variables are as under:

| Input/Output | VARIABLE NAME | DESCRIPTION |
|---|---|---|
| Input: | LSS_Output | Wicket gates opening/closing set point. |
| Output: | Servo_fdbk | Wicket gates opening/closing position feedback. |

Where in Fig 04 X-axis shows the time and Y-axis shows the magnitude of the wicket gate position.

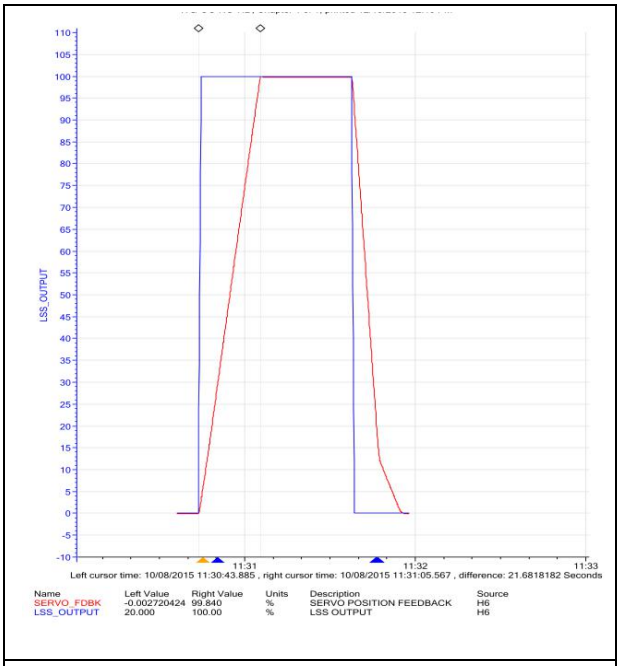


Fig 04: Response of Wicket Gates

| UNIT NO. | Opening Time (Design ) | Actual Opening time | Closing Time (Design) | Actual Closing time |
|---|---|---|---|---|
| Unit 06 | 20 sec | 21.68 sec | 15 sec | 15.5 sec |

## 4. Relief valve opening/closing response

Relief valve is the protection of penstock against the water hammering caused by sudden load rejection or any failure. The opening timing of relief valve should match approx the closing time of wicket gate for relieving the back pressure of water.

For checking the response of the relief valve, Generating unit have to be in maintenance mode. i.e. inlet valve fully closed. Now the relief valve set point is changed from zero to 100%. Relief valve started to move towards at 100% position. Then the set point is changed from 100% to 0 for checking the response of closing of relief valve.

The timing of opening and closing can be easily interpreted from the trend. The opening and closing time can also be easily adjusted from the distribution valve of relief valve.

In fig 05 the response of relief valve is presented.

| Unit No | Opening Time (Design ) | Actual Opening time | Closing Time (Design) | Actual Closing time |
|---|---|---|---|---|
| **Unit 01:** | 15 sec | 15 sec | 180 sec | 181.5 sec |

The detail of input and output variables are as under:

| Input/ Output | Variable Name | Description |
|---|---|---|
| Input: | BYPS_CTRL_OUTPUT | Relief valve opening and closing set point |
| Output: | Bypass_fdbk_1 | Relief valve actual position feedback |
| Where in Fig 05 X-axis shows the time and Y-axis shows the magnitude of the relief valve position. | | |

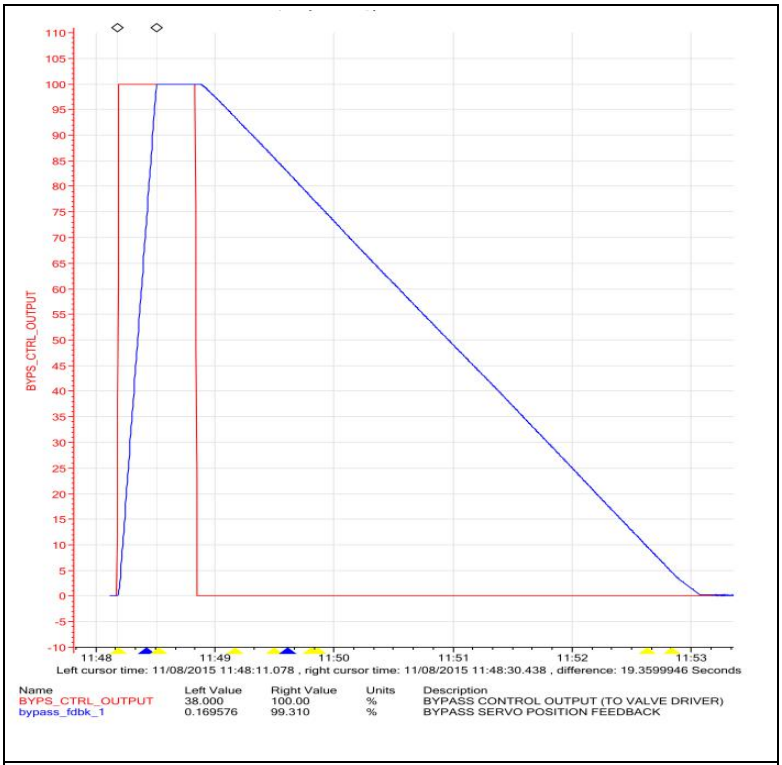


Fig 05 : Response of Relief Bypass Valve

**5. Step response of load (megawatt)**

This response was checked online i.e. unit was synchronized with the power system. Step response of load can be checked by varying a small load by changing the set-point while generating unit is on bar and its behavior is checked in that short time.

Now Tarbela power plant provides load-frequency regulation in an efficient manner through joint load by controlling the load of all the units simultaneously. Governor

control of wicket gate in response to load variations must be checked in detail in order to guarantee the no harmful pressure fluctuations and instabilities.

Step response of load and was checked by changing the respective set-point as shown in the following figure#06 and found satisfactory.

The detail of input and output variables for step response of load are as under:

| Input/ Output | Variable Name | Description |
|---|---|---|
| Input: | MW_SP | Minor/Step change in load set point |
| Output: | MW_fdbk | Actual feedback of the Load |

In Fig 06 X-axis shows the time and Y-axis shows the magnitude of load/megawatt.

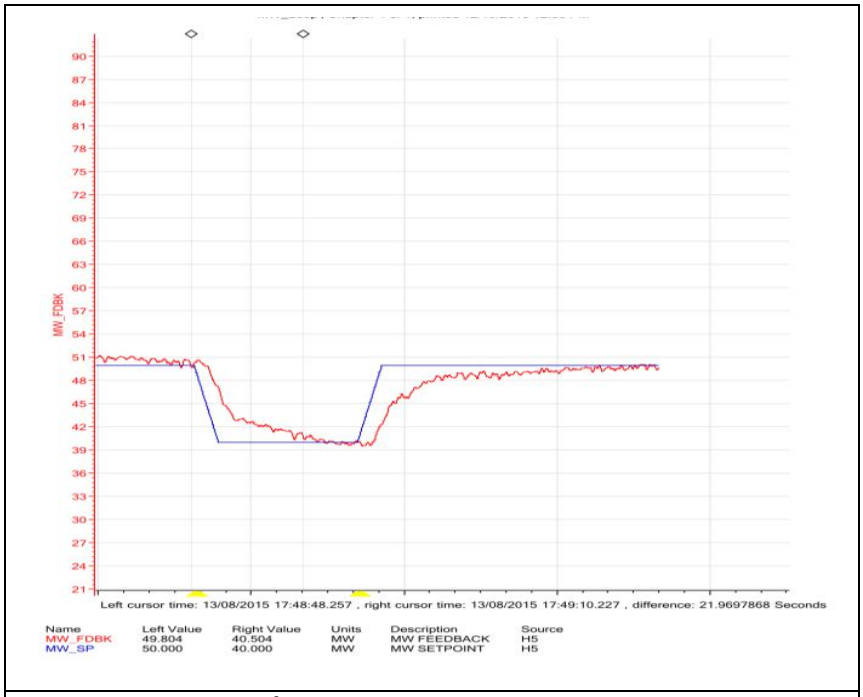


Fig 06: Step response of Megawatt

**Conclusion**

In Tarbela Power Station, after the replacement of Mechanical Governor with the digital governor, several benefits and advantages were added. In the previous installed governor there were many different mechanical movables parts which were susceptible to collapse, thus resulting the outage of the generating unit and causing a high revenue loss

to the Government sector. Moreover, high maintenance costs and longer time periods for major over hauling made the system unreliable and inefficient as compared to the digital governor. Digital governor has no moving parts, so there is no chance of wear and tear that can cause the breakage of any equipment. If the digital governor part breaker/collapse due to any reason it can be replaced easily and effectively. All the governor parts now can easily be maintained over the years. Periodic testing of governor is required for proper checking of the governor performance. These tests may be conducted off-line and online for checking the governor hunting, stable response of frequency [5], feedback sensors of wicket gate and relief valve and test for timing test for synchronization of the generating unit. Good result of these tests can definitely increase the performance of generating unit.

Response of the new governor is also very fast and can be monitored easily through the software. As shown, Software also makes data logging and algorithm development for troubleshooting simple.

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# Paper No 348

## BIO-SOLAR HYBRID ENERGY MODULE FOR A MODEL HOUSE IN VILLAGE OF DISTRICT LARKANA

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**Abstract**

*Reliable supply of electricity in the rural areas of the country has remained a serious challenge for the government in Pakistan since last two decades. A sustainable solution of the problem is utilization of indigenous energy resources; such as wind, solar and Biomass. The villages are rich in solar and biomass resources and these resources if used efficiently and economically could meet the energy requirement of the village. This study proposes an off grid bio-solar hybrid energy system for a village. To develop the bio-solar hybrid energy model, statistical & analytical methods were used to analyze the data and develop an optimum energy system for a house in Karani village near Moen-jo-Daro, Sindh Pakistan, selected as model village. The analysis of the proposed model shows that about 9kWh energy per day can be self-generated at an average using the indigenously available bio-solar potential of the single house. This is adequate for average house of the village. Considering average life of the system as 25 years the average unit cost of electric energy is estimated to be Rs.9/kWh which is comparatively 10% lower than prevailing tariff enforced in the country. The gas generation cost was also evaluated with same consideration as applied for electrical energy calculation and it was estimated to be Rs.16per unit of energy. The present work shows that introduction of such system will address the issue of energy crises faced by the country at the moment and will enable the village residents to get their energy requirements at reasonably lower rates by using animal waste of their own cattle, this will also minimize pollution problem.*

**Key words:** Renewable energy, hybrid energy system, eco-friendly, Indigenous resources.

### Introduction

Energy plays the most crucial role in the economic and social development as it improves living standards and security of any nation. Energy index is considered as a yard scale to compare development rate of any country[1, 2]. Sustainability of the existing energy resources is the key area of research to be focused. In addition to this effect the environmentalists are more concerned about the pollution due to use of these conventional resources.

This has escalated the use of renewable energy resources and the researchers are investigating the potential of various renewable energy resources such as solar, wind and bio-energy etc. More renewable and sustainable sources of energy seem to be an auspicious approach to tackle the problem [3, 4].

Pakistan with a land area of 796,097 $km^2$ is situated between $60^o$ and $75^o$East and latitudes $24^o$ and $37^o$ North [5].Pakistan's unique geographical location offers a large area with high solar insolation. Nearly every part of the country obtains 7-9 hrs/day adequate solar radiations with more than 300 sunshine days in a year[6, 7]. Fig. 1 shows the annual solar radiations profile of Pakistan.

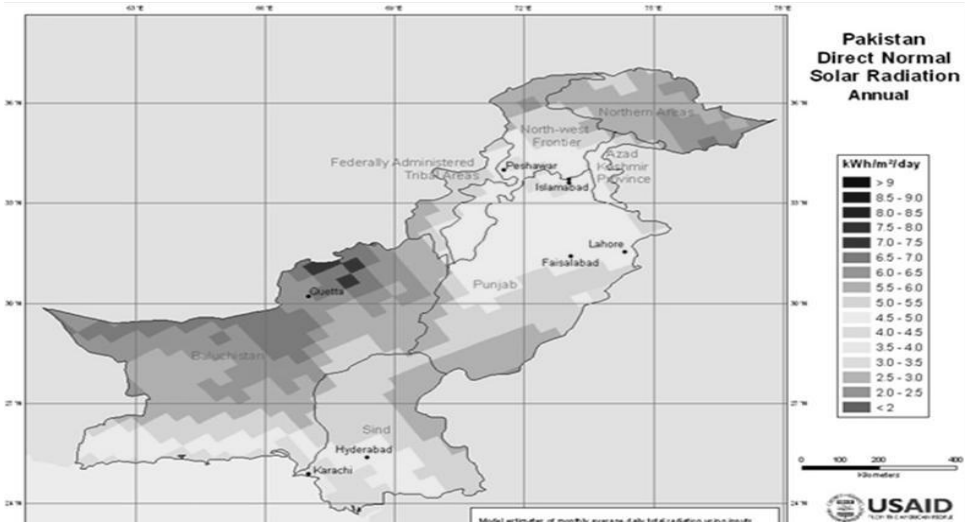



Figure 1. Solar energy profile of Pakistan [8]

In view of the current enormous potential, solar energy presents an auspicious and suitable route of producing power for Pakistan in various commercial applications. This technology needs to consider as an imperative source of energy and promote massive and rapid investments to meet the supply of power in rural regions such as Baluchistan, Thar Desert and Cholistan, where grid connectivity is not accessible [8].

According to USAID and Alternative Energy Development Board (AEDB), Pakistan has potential of 2.9 million MW [9].

Another source for energy is biomass. It is usually resulting from plants, animals and agricultural wastes. It has been exploited for different purposes such as heat, cooking fuel and power, particularly in remote areas. Generally, biomass is categorized into four main clusters; i) municipal solid waste, ii) agro-waste, iii) livestock waste, and iv) forest residue [10]. In addition, agro and livestock are the major sources of biomass generation. Approximately, 220 billion tons of waste is generated annually in the world from these sources, which is capable of generating viable energy without releasing carbon dioxide and other greenhouse gases compared to conventional fuel sources [11, 12].

Pakistan is an agricultural based country, where most of its population (∼70%) resides in rural regions [13]. Thus, the accessibility of biomass is wide mainly from agriculture and

livestock sources, which accounts 225,000 and 50,000 tons/day from both sources [7, 14]. Though, country has high potential of biomass from various sources including rice husk, corn cobs, wheat stalks etc. But they have not been commercially utilized for energy production. Some industries use solid biomass filter for burning purpose of their boilers to generate power. The existing system of burring is not efficient scenario to generate energy from energy conservation point of view. Nowadays developed countries are using various new technologies which help to control temperature and sustain oxygen levels and convert biomass to gas. Sugar industries are one of the sectors of the country where process waste bag gas is presently used for power generation. It has been estimated that more than 1000MW electricity is generated from bag gas [8].

Ho et al. [15] proposed a new concept of biomass and solar town integration. A concept of global smart eco-villages for tropical countries was put forward and based on this concept various linear programming models were applied to develop cost effect design with solar town and biomass [16].Study of a process known as polygeneration for biomass gasification showed that, the process has high flexibility and efficiency in terms of purity, quality and cost on the gas production. Authors concluded that the proposed strategy will help to improve the economic usability and sustainability to utilize biomass via gasification [17]. Ramchandra Pode [18] conducted a study of rural areas and he concluded that millions of people of rural area are deprived from much necessary needs including to clean cooking facilities and electricity. These areas are enriched with livestock dung and solar radiations, abundant resources of energies. Though it is not feasible for these resources to separately meet cooking and electricity requirements, but hybrid plants can meet the requirement. The combinations of these two resources in rural energy planning and their promotion are necessary for their economic growth [19]. Hybrid Renewable Energy Systems (HRES) modeling was studied where software tools/algorithms were employed to optimize the system. Solar and wind energy conversion systems are widely being integrated into hybrid systems as they efficiently complement each other [20].The potential of biomass available in remote village for self-sustainable development was studied. The study was focused on the collection method of all biomass available in village, such as; forestry, agriculture waste and animal dung [21].

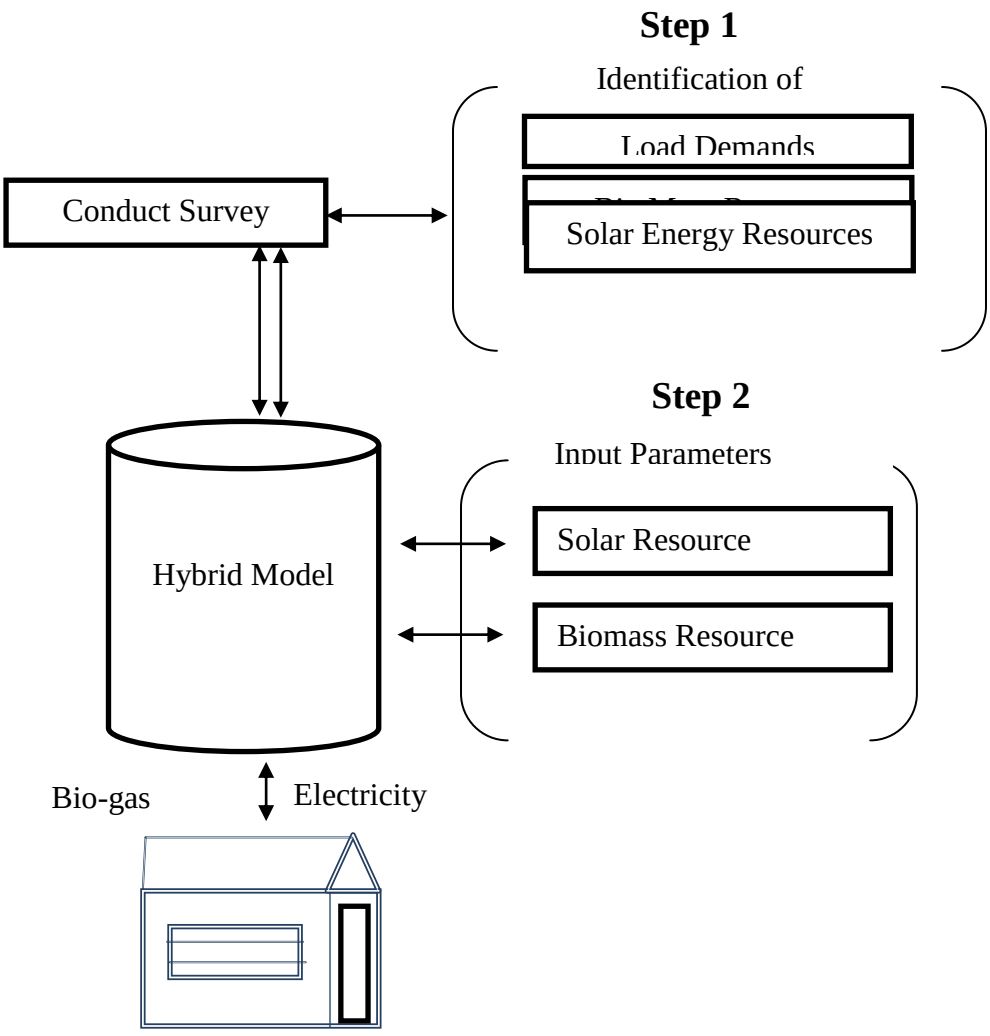
More than 70% of population of Pakistan lives in rural areas, far away from national grid. These areas face acute shortage of electricity due to deficit in supply and demand profile of the country [13].

The present work deals with one of the solution to resolve this problem faced by country, detailed study of Karani village in Larkana district of Sindh province was conducted to analyze potential availability of animal dung and focuses on the viability of a hybrid biomass-solar energy for a model house of the village.

**Model Methodology**

Figure.2 shows the strategies followed to develop the energy model for the village. It comprises of three steps. Step one refers to data collection, step two analysis of the energy resources and development and utilization of the hybrid system.

Figure 2 Flow chart of the proposed energy module



**Study Area**

The residential area of the village is spread over40acresarea. It comprises of houses, shops etc. The village profile is presented in Table1.

**Table 1:** Profile of the village under study

| | |
|---|---|
| Village | Karani |
| District | Larkana |
| Population | 2500 |
| Average Family Size | 8 persons |
| Number of Houses | 210 |
| Livestock population | 2430 |
| Agriculture land | 3000Acres cultivated on tube well and 3500 Acres cultivated on river water) = 6500Acres |

**Village Load Assessment**

The development of any energy system for any area depends upon the load requirement of the area. It is the key part of any energy scheme consideration. Energy requirement assessment of the village was evaluated according to the flow chart shown in Fig.3.

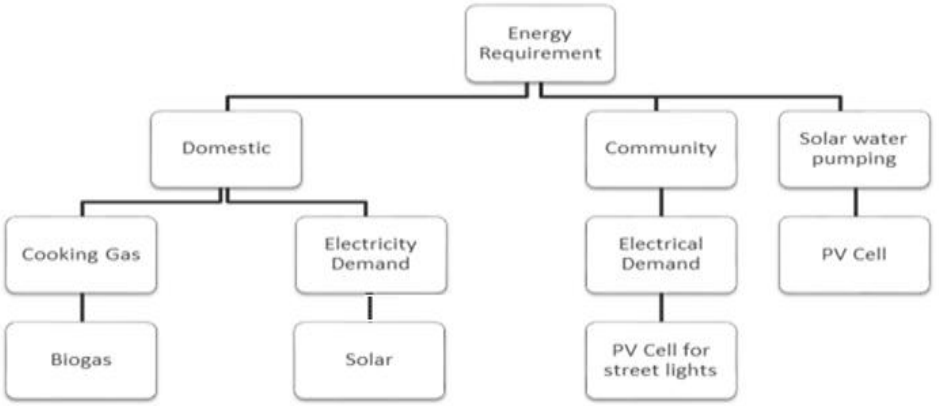



Figure 3 Energy Requirement Flow Chart of the village

A detailed survey of the Karani village selected for the study was conducted and the required data was collected through questionnaires. The summary of the collected data is given Table2. Connected load was evaluated as 1594.94kW and consumption of energy is estimated to be 13989.92kWh

Table 2: *Total electrical load of village*

| # | Load Assessment | Total Load (kW) | Total Power Consumption (kWh)/day |
|---|---|---|---|
| 1 | Domestic Load | 287 | 1107.7 |
| 2 | Commercial Load | 81.5 | 696.5 |
| 3 | Masjid Load | 3 | 11 |
| 4 | Agriculture Load | 1223.44 | 12174.72 |
| Total | | **1594.94** | **13989.92** |

**Resource Assessment**

Two resources i.e. animal dung and solar insolation were considered for the development of the proposed hybrid energy model. Data for both the model was collected through questionnaire and from the metrological department of Pakistan.

**Animal Dung Resources Assessment**

It is necessary to evaluate biomass resources so that total energy potential of this source could be estimated for design of the workable model. Survey of the village revealed that the old traditions of cooking methods are being used by villagers; they used animal cake as a fuel to fire and cook. Open stove are used for cooking purposes. There are hazardous from health perspective, it may cause lungs and other respiratory diseases. Statistics of biomass resources assessment identified six types of animals in study area. The statistics of the animals in the village and corresponding quantity of manure is presented in Table 3.

Table 3: *Available resource of Animal dung in Karani village*

| # | Name Of Animal | Total Number | Waste/Day | Total Manure/Day |
|---|---|---|---|---|
| 1 | Buffaloes | 1000 | 15kg | 15000kg/day |
| 2 | Calves | 95 | 12 kg | 1140kg/day |
| 3 | Bullocks | 185 | 12 kg | 2220kg/day |
| 4 | Cows | 430 | 10 kg | 4300kg/day |
| 5 | Goat | 600 | 05 kg | 3000kg/day |
| 6 | Donkey/Ass | 120 | 02 kg | 240kg/day |

From the Table3, it can be seen that approximately 25900kg (26tons) of manure are generated per day.

**Solar Resources Assessment**

Village Karani is located 27 15' 40"N 68 6' 40" E.As per metrological data average temperature of that village is 40-45℃ in summer and 25-30℃winter. An average sun shine hour per day was noted to be 6hrs/day. Solar flux available is reported to be 5.5kWh/$m^2$/day [8].

**Bio-Solar Hybrid Model**

The strategic development of hybrid system is illustrated in the flow chart presented in Figure4.Design of the model is based on the principle that all heating requirements will be covered by biogas plant and solar energy module will provide electricity for lighting devices and fans.

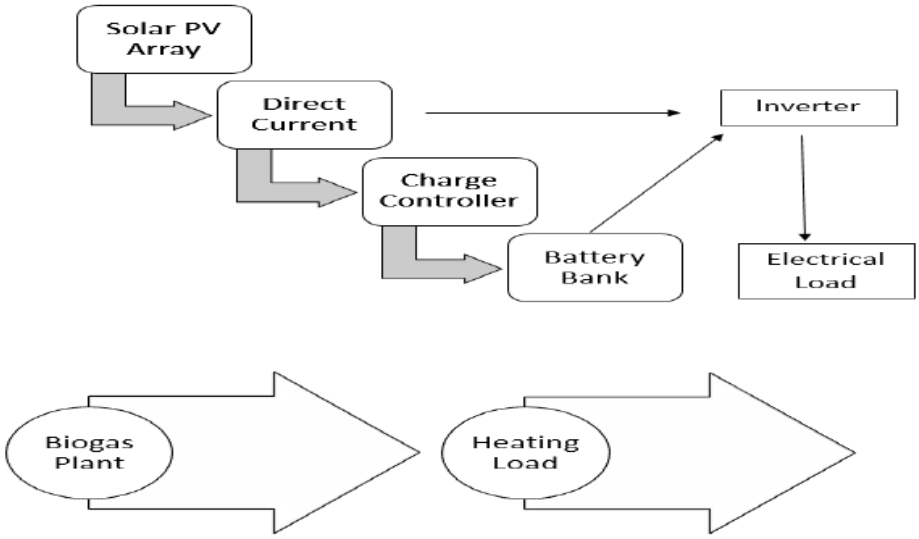



Figure 4 Proposed bio-solar hybrid module

**Single House Energy Model**

Figure5 shows the Google picture of the village. The village could be divided into three sectors, i.e. Residential, Commercial and Agricultural. In residential area houses of varying sizes covering area 1470ft² to 4000ft² are located. Twomodels can be considered to meet requirement of residential area, one model based on average/single house as a separate unit, where as in the other scheme a central plant may be developed to cater requirement of whole village. Inthe present study single family house model is proposed.


Figure 5 Karani village

Line plan of average single family model house of the village is shown in Figure6. The house is for an average family comprising of 8 persons. Detail of animals and estimated quantity of animal dung is presented in Table 4. The energy requirements without considering air conditioning are given in Table 5.

Table 4: Available resource of Animal dung in single family house

| # | NAME OF ANIMAL | TOTAL NUMBER | Waste/day | Total Manure/Day |
|---|---|---|---|---|
| 1 | Buffaloes | 2 | 15kg | 30kg/day |
| 2 | Calves | 1 | 12 kg | 12kg/day |
| 3 | Bullocks | 1 | 12 kg | 12kg/day |
| 4 | Cows | 2 | 10 kg | 20kg/day |
| 5 | Goat | 2 | 05 kg | 10kg/day |

From the Table 4, it can be seen that approximately 84kg of manure are generated in single family house per day.

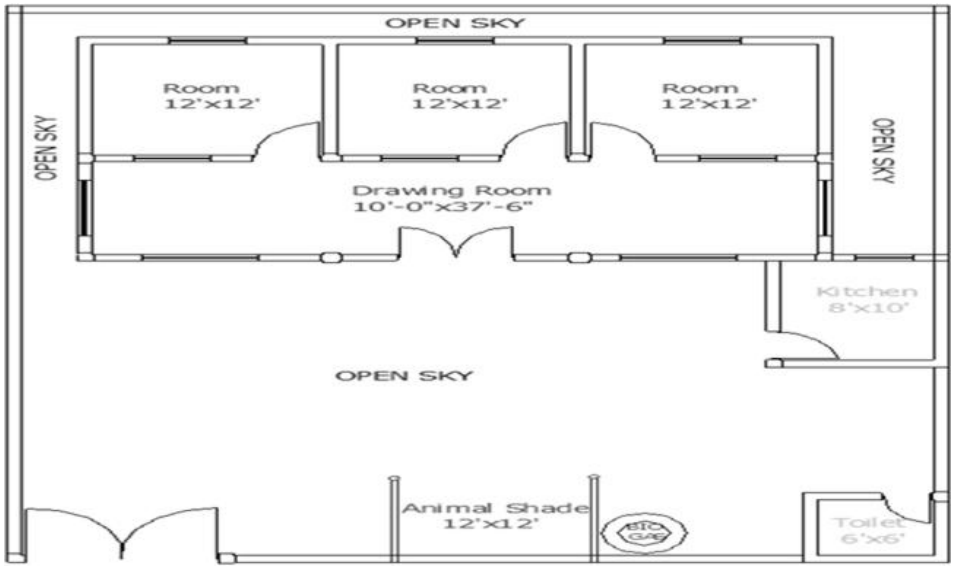



Figure 6 Line plan of the average single family house of Karani village

Table 5 Proposed load of a model house

| Equipment in use | No. of appliances | Load profile | | | |
|---|---|---|---|---|---|
| | | Power of device (Watts) | Total wattage, (W) | Daily appliances use (hrs) | Daily energy required (kW h/day ) |
| Saver | 10 | 25 | 250 | 6 | 1.5 |
| Refrigerator | 1 | 150 | 150 | 24 | 3.6 |
| Washing Machine | 1 | 500 | 500 | 1 | 0.5 |
| TV | 1 | 100 | 100 | 6 | 0.6 |
| Fans | 5 | 100 | 500 | 0-6 | 3 |
| **Total** | | **9.2** | | | |

The average daily demand of the modeled house is estimated to be 9.2kWhd$^{-1}$.The proposed structure of the module is illustrated in Figure4.

Table 6: Sun shine hours load of a model house.

| Equipment in use | No. of appliances | Power of device (Watts) | Total wattage, (W) | Daily appliances use (hrs) | Daily energy required (kW h/day ) |
|---|---|---|---|---|---|
| Refrigerator | 1 | 150 | 150 | 6 | 0.9 |
| Washing Machine | 1 | 500 | 500 | 1 | 0.5 |
| TV | 1 | 100 | 100 | 3 | 0.3 |
| Fans | 3 | 100 | 300 | 6 | 1.8 |
| **Total** | | **3.5** | | | |

Table 7: Batteries/power bank load of a model house.

| | | Load profile | | | |
|---|---|---|---|---|---|
| **Equipment in use** | **No. of appliances** | **Power of device (Watts)** | **Total wattage, (W)** | **Daily appliances use (hrs)** | **Daily energy required (kW h/day )** |
| Saver | 10 | 25 | 250 | 6 | 1.5 |
| Refrigerator | 1 | 150 | 150 | 18 | 2.7 |
| TV | 1 | 100 | 100 | 3 | 0.3 |
| Fans | 2 | 100 | 200 | 6 | 1.2 |
| **Total** | **5.7** | | | | |

**Design of PV Module**

Basic data required for design of PV-module initial load and available solar energy per unit area. The average daily solar energy input ($H_{avg}$) are over the year for a south facing and tilted Surface, and Karani village are 5.50 kW h m-² d-1.The general arrangement of a PV system is illustrated in Fig. 4.

**Design of PV Array**

Total load electricity=2250watts (50% increased actual electrical load due to panel, charging controller, inverter, wiring and battery losses).

The period of the solar panel exposed to the sun=6Hours (Averagely between 10:00am to 4:00pm).

Total unit generate system=2250×6=13500Wh=13.5kWh.

Required total PV array wattage= 2.25kW.

Therefore solar panel of 2250 W will be needed for single house design.

To meet this requirement survey of the local market was conducted to select an appropriate PV panel. The panel 250watt was found to be appropriate to meet 9panel electrical load.

No. of panel=2250W/250W=9 (250W panel available in market so system required 9panel).

**Battery Capacity**

The battery bank required in PV system, the electrical load 5700Wh calculate from table.7.The electrical load of 5700Wh need power bank, which runs appliances after the sunshine hours. The battery bank required to system 12V, 475Ah.The system required 150Ah of 4 batteries.

**Charge Controller**

The battery bank charge controller is connected in PV system to safely charge the batteries and control the risk of overcharging the batteries. The calculation of charge controller 9×8.63 (No of Panel × Isc) = 80A. The single family house required 80A charge controller.

**Inverter**

Peak electrical load of system is 1500W, for the safety purpose inverter should be considered 10% higher than the actual value of requirement. The inverter required in single family house is 1650Watts.

**Biogas Plant**

For a village life heating energy is required mostly for cooking purpose, water heating**.** Single family house of Karani village requirement of bio gas considered the following steps.

Total member of average family of village Karani are eight.

Gas required per person/day is $0.3m^3$.

An average 2.4 $m^3$ units of heat are required on daily basis ($8\times0.3=2.4m^3$/day).

The total quantity of dry matter 10kg/day ($m_{o=10kg/day}$).

Volume of fluid,$V_f=10/50=0.2m^3$/day ($V_{f=}m_{o/\rho m}$).

Volume of digester,$V_d=0.2\times25=5m^3$ ($V_{d=}V_{f\times}t_r$).

Volume of bio gas,$V_b=0.24\times10=2.4m^3$/day ($V_b=cm_o$)

Energy from available digester, $E=0.6\times28\times0.8\times2.4=32.2$MJ/day ($E=\eta H_b f_m V_b$).

Volume of the $5m^3$ biogas digester will adequate to meet the requirements of the Single family house.

**Cost Analysis**

**Solar**

Total installation cost=Rs.847500

25 years maintenance cost of the solar PV plant=Rs.211875

Total cost of PV system =Rs.1059375

Operating life=25years

Per day we can generate=13.5kWh

Per unit cost=1059375/ (25×365×13.5) = Rs.9

**Biomass**

Total installation cost of biomass plant = Rs100000

15 years maintenance cost of the biomass plant = Rs.250000

Total cost (installation and maintenance) of the plant = 100000+ 250000

= Rs. 350000

Operating life = 25years

Per day we can generate = $2.4m^3$

Per unit cost=350000/ (15×365×2.4) = Rs.16

**Conclusion**

- This study presented a hybrid solar-bio model for a model house in rural area, meeting heating and lighting requirements of the house.
- A cost estimate of the system is also provided.
- The proposed model can be applied to develop sustainable energy system for whole village.
- Life cycle of PV panels and biogas gas digester considered to be 25 years.
- Over all payback period for the system was considered to be 20years.
- To make the concept viable, government should encourage the people for adoption of the system by in inhabiting a subsidy to the consumer at initial implementation stage.

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# Paper No. 358

## A SILENCE REMOVAL AND ENDPOINT DETECTION APPROACH FOR SPEECH PROCESSING

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***Abstract***

*In this paper a brief overview of silence removal and voice activity detection is discussed and a new method for silence removal is suggested. The objective of suggested method is to delete the silence and unvoiced segments from the speech signal which are very useful to increase the performance and accuracy of the system. Endpoint detection is used to remove the DC offset value from the signal after silence removal process. Silence removal and Endpoint detection are main part of many applications such as speaker and speech recognition. The proposed method uses Root Mean Square (RMS) to delete the unvoiced segments from the speech signal. This work showed better results for silence removal and endpoint detection than existing methods. The performance of this research work is evaluated using MATLAB tool and accuracy of 97.2% is achieved.*

**Key words:** Digital Signal Processing; Root Mean Square; Noise Removal; Voice Activity Detection

### Introduction

Speech processing is study of human speech signals and its processing methods. Speech signals are normally processed in digital form, so speech signal processing is exceptional case of digital signal processing (DSP). Characteristic of speech processing includes storage, acquisition, manipulation, transfer and output of the speech signal. It contain a lot of information and its classification into voiced, unvoiced and silence regions helps to increase the performance of system. In silence region of speech signal no data is being transferred so it is very necessary to identify and delete the silence region from the speech signal. Once it deleted then it will get ignored from the further processing. For that purpose many algorithms are used such as Voice activity detection (VAD). VAD is used to detect the presence and absence of human voice. VAD mainly used in speech recognition and speech coding, it also used for noise estimation using pitch of speech signal [1]. It deactivate the process of system during the silence region of audio signal. It also avoid the unwanted transmission of silence frames and saves the processing time and bandwidth of system. The bandwidth is amount of data which can be transmitted in particular time duration. Researcher have developed the different type of silence removal algorithm according to computation cost and accuracy of the system [2-4]. Two broadly accepted techniques Zero Crossing Rate and Short Time Energy have been used for silence removal [5], however they have their own pros and cons regarding setting of threshold. While Endpoint detection techniques are mostly used in speaker and speech recognition system in order to increase the performance of system it detect the start and stop point of speech from a noisy signal. It is used to remove DC offset value from the speech signal. In endpoint detection algorithm, the start point is where the signal

magnitude start to increase and exceeds the threshold value and stop point is where the magnitude of signal drops below the threshold value [6].

This research work aims to detect and delete the silence and unvoiced frames from the speech signal using Root Mean Square (RMS). After the deletion of silence frames the system consumes less bandwidth and processing times reduces. That's how this technique helps to increase overall performance and accuracy of system. In proposed method new algorithm and equations are designed to get better results than existing methods.

**Related Work**

Several silence removal techniques that used to remove silence region from the speech signal have been studies. In one of them fundamental frequency, zero crossing rate and short time energy is used for the identification of silence and unvoiced frames. This research work achieved 96.61% accuracy [7].

Similar research work was also studied in which probability density function (PDF) and Z-Score was used for end point detection and silence removal. This algorithms was designed for speaker and speech recognition system it achieved better results than short time energy and zero crossing rate function method [8].

A voiced detection method was also studied in which silence features such as normalization and speech energy maximization were used. According to this method the performance of speech recognition was improved [9].

Similarly, in another research work a composite silence region deletion method was proposed and compared with statistical and short time energy method by increase signal to noise ratio (SNR). It was observed this method increased the performance of speaker recognition by 20% [10].

In A. KInghorn and M. Greenwood research work zero crossing rate and short time energy were used together and it achieved 65 % accuracy [11].

**Methodology**

The suggested method is consist of three important parts: Noise Removal, Silence Removal and Endpoint detector. System gets input signal from the microphone for specific time duration at the particular sampling frequency. The total length of input signal is equal to product of time duration and sampling frequency of input signal.

$$N = Input\ signal_{duration} \times Fs \qquad (1)$$

Where $N$ represents the total length of input signal and $Fs$ is sampling frequency. Flow chart of suggested technique is shown in Figure 1.

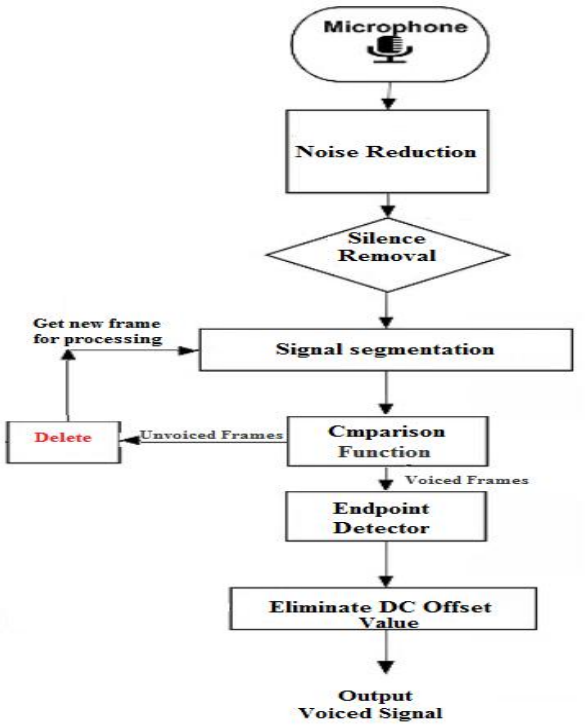


Fig. 1. Flow Chart of proposed methodology

***Noise reduction***

This block aims to remove the background noise from the speech signal. Different types of algorithms and filters are used to remove the noise from the signals. In Digital Signal Processing (DSP) filtering is a process which is use to eliminate the unwanted features and components from the signal. Fundamental frequency of speech signal is lies between 85 to 255 Hz. A usable ranges for voice frequency band is lies between 300 Hz to 3400 Hz. In proposed method a band pass filter is designed to suppress all the frequency contents below 300 Hz and above 3400 Hz without disturbing the voiced portion of signal.

***Silence Removal***

Silence removal block is used to eliminate the unvoiced and silent portion of the speech signal. For this purpose input signal is divided into small segments (frames) and root mean square (RMS) of each individual segment is calculated and compared with a specific threshold value. The total length of each individual segment is equal to product of time duration and sampling frequency of segment.

$$Segment_{lengt\ h} = Segment_{duration} \times Fs \quad (2)$$

Accuracy and performance of silence removal block depend on total number of segments. The total number of segments can be calculated from dividing total length of input signal

by length of individual segment. Equation to find total number of segments is expressed as:

$$Total_{Segmets} = \frac{N}{Segment_{\ lengt\ h}} \quad (3)$$

RMS value of each segment is calculated and compared with threshold value. RMS value of each individual segment can be calculated from equation 4.

$$RMS_{Segment} = \sqrt{mean(Segment)^2} \quad (4)$$

Threshold value for this block is computed from equation (5).

$$R_{th} = \frac{\mu + v}{2} \quad (5)$$

Where $v$ is minimum RMS value of $K$ voiced signals and $\mu$ is mean RMS value of $K$ unvoiced signals. Formula to compute $\mu$ is expressed as:

$$\mu = \frac{1}{K}\sum_{i=1}^{K} RMS_{Unvoiced} \quad (6)$$

If $RMS_{Segment}$ of individual segment is less than $R_{th}$ then eliminate that segment. Similarly all the segments are compared with threshold value and system will delete all the unvoiced portion from the input speech signal. The function of silence removal block is given in equation 5.

$$f(x) = \begin{cases} RMS_{Segment} > R_{th}, \ Voiced\ signal \\ RMS_{Segment} \leq R_{th}, \ Unvoiced\ Signal \end{cases} \quad (7)$$

Where $R_{th}$ indicates the RMS threshold value. Silence removal is very helpful portion of proposed technique to reduce processing time and increase the performance of system by eliminating unvoiced segments from the input signal. A novel idea is used to set the threshold value for silence removal it eliminates 97.2% of unvoiced segments from speech signal.

***Endpoint Detector***

After the elimination of silent segments the new (remaining) signal entered into Endpoint detector block. Length of new signal is always less than the length of original signal. Endpoint detector is used to compute the stop point of signal where the magnitudes of signal drops to zero. After the deletion of silence segments the endpoint of new signal is equal to its length.

$$T = \frac{End_{\ point}}{Fs} \quad (8)$$

Where $T$ represents the time period of new signal. Endpoint detection is important feature of speech processing it plays an important role in speaker and speech recognition for the identification of individuals.

**Results**

The suggested method was tested and analyzed by using MATLAB. For results 50 voiced and unvoiced signals were recorded for 10 seconds at Fs = 11025 Hz. Initially background noise was eliminated by using noise reduction block then signal was entered into silence

removal block where $\mu = 0.00097$ was calculated from equation (6) and $v$=0.0013 was computed from minimum RMS of fifty voiced signal. Threshold value was calculated by following equation 5.

$$R_{th} = \frac{\mu + v}{2} = \frac{0.00097 + 0.0013}{2} = 0.001135$$

Input Signal was divided in 100 segments. According to equation (7) RMS value of each individual segment is calculated and compared with $R_{th}$. All the segments with RMS less than $R_{th}$ were eliminated from the speech signal and only voiced segments left. Graphical representation of silence removal process is shown in Figure 2.

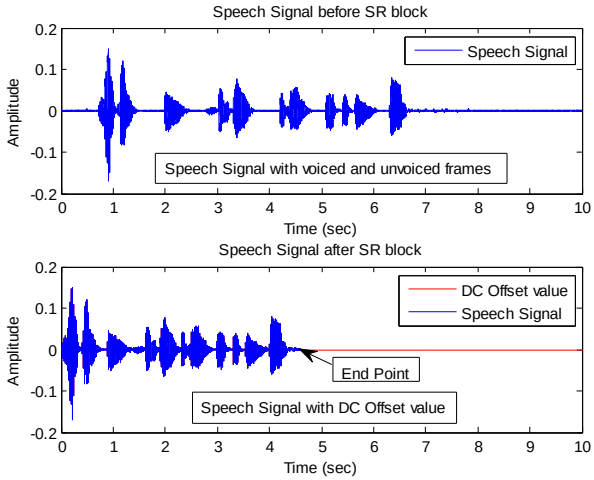


Fig. 2. Graphical representation of silence removal process

From the above figure it can observe that silence removal process eliminate all the unvoiced segments from the speech signal. DC Offset value is also shown at origin from 4.5 seconds to 10 seconds. Endpoint detector was used to remove the DC offset value and find the total time duration of speech signal. Endpoint detector measure the start point from where magnitude start to increase and stop (end) point from where magnitude start to decrease and it deleted all the DC offset value from speech signal. Graphical representation of endpoint detector process is shown in Figure 3.

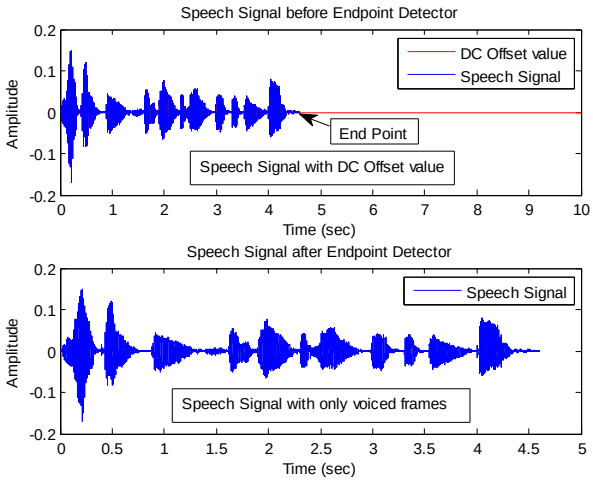


Fig. 3. Graphical representation of Endpoint detection process

Speech signal was recording for 10 seconds after all the process of proposed method the time duration of speech signal is 4.6 seconds left as shown in Figure 3. It can clearly analyzed that the proposed method has deleted all the unvoiced and silent segments from the speech signal and remaining signal contain only voiced data.

## Conclusion

In this paper a latest idea for silence removal and endpoint detection is suggested. Silence removal and endpoint detection plays an important role in speaker and speech recognition to increase the performance and reduce the processing time of the system. In proposed work a new formula is suggested to set the threshold value for silence removal. It is concluded from the results proposed method eliminates 97.2% unvoiced segments from the speech signal without corrupting the voiced segments. Accuracy and performance of proposed method can be increase by adding more features.

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# Paper No. 372

## MULTICRITERIA DECISION MAKING (MCDM) - A CASE OF RAWALPINDI BYPASS

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**Abstract**

*Safe, efficient and user friendly transportation of people and goods have been a premier point of concern for all the developed and the developing countries and their respective national and state highway agencies. National Highway N-5 is the most important Highway link in Pakistan. It carries about 80 % of the country traffic both freight and passenger's. When this heavy traffic passes through the twin cities of Rawalpindi and Islamabad, it causes congestion and environmental hazards particularly in business centers of Rawalpindi. The commercial traffic is routed through Islamabad (IJP Road). However to solve this problem on long term basis, it has planned to construct the Rawalpindi bypass. The 24 hrs traffic counts at Rawat in 2003 were more than 22,000 vehicles. It is because of this huge amount of traffic passing through the cities situated along N-5, bypasses to all of them have been provided. Rawalpindi is the city still without a bypass. A bypass to Rawalpindi city is, therefore, inevitable. Besides this, the Bypass will also provide a short access to the traffic on the Motorway (M2) destined for the western part of Rawalpindi. Rawalpindi Bypass is taken as a hypothetical scenario and is evaluated for its benefits. Besides addition to the networks of highways across Pakistan this bypass has many other benefits which include decrease in congestion from Islamabad and Rawalpindi main arteries (ISB Highway and IJP Road) that results in travel time savings, vehicle operating cost savings, safety savings and reduced air pollution. This research aims to produce an engineering and scientific comparison of various costs and benefits associated with the road agency and users in reference to the construction of an alternative. The Project involves transportation demand estimation on different segments of the National and Arterial roads, Project Costs, travel time savings, safety saving, vehicle operating cost savings, economic efficiency analysis, Air quality impact and Multi Criterion transportation Decision Making. The transportation decision making process usually involves the evaluation of effectiveness and efficiency of an alternative decision with respect to a base case DO-NOTHING Scenario. Authors have taken the existing road way structure with no improvements as DO-NOTHING Scenario, whereas the construction of Rawalpindi Bypass (60 Km) with 2 lanes in each direction is taken as Alternative B and Rawalpindi Bypass (51 Km) as Alternative C. Multi criteria decision making technique is used for decision because of multiple options with different dimensions, both monetary and nonmonetary. Basing of MCDM this study recommends Alternative C (51 Km) for Rawalpindi Bypass.*

**Key words**: Rawalpindi Bypass, multi criteria decision making, travel time savings, safety savings, vehicle operating cost savings, air quality impact.

## Introduction

The 24 hrs traffic counts at Rawat in 2003 were more than 22,000 vehicles. (Rawalpindi Bypass PC-I) [1]. It is because of this huge amount of traffic passing through the cities situated along N-5 that bypasses to all of them have been provided. Rawalpindi is the city still without a bypass. More than 6,000 trucks pass through the city in 24 hours. This volume of truck traffic seriously affects environment of the city. A bypass to Rawalpindi city is, therefore, inevitable. Besides this, the Bypass will also provide a short access to the traffic on the Motorway (M2) destined for the western part of Rawalpindi. Enroute, the Bypass will connect, Rawat-Chakbeli road, Adyala Road and Chakri Road in Rawalpindi and Tarnol-Fatehjang road in Islamabad. Absence of bypass results in mixed traffic, traffic Congestion, grid locks, environmental hazards (noise and air pollution) and traffic safety issues. During study, it was revealed that the intra city traffic is compelled to pass through the city of Islamabad and Rawalpindi and this traffic combined with the local slow moving vehicles results in high traffic congestion and traffic management problems usually on IJP road Rawalpindi and Islamabad expressway. The provision of Rawalpindi bypass will help reduce the traffic pressure in twin cities. The main objectives of this research work are to find the best alternative for Rawalpindi Bypass in term of construction cost and user benefits by carrying out multi criteria decision making (MCDM). The Project involves Project Cost estimations of Rawalpindi Bypass, travel time savings, safety saving, vehicle operating cost savings, economic efficiency analysis, air quality impact and multi criterion transportation decision making. Authors have taken the existing road way structure with no improvements as DO-NOTHING Scenario, whereas the construction of Rawalpindi Bypass (60 Km) with 2 lanes in each direction is taken as Alternative B and Rawalpindi Bypass (51 Km) as 3 Alternative C. Existing scenario shows the existing traffic pattern distributed along the N5 and Islamabad highway. Heavy traffic which is coming from Punjab cities and from Peshawar uses N5, at Pirwadai flyover the heavy traffic is diverted towards IJP road and from Faizabad interchange the traffic it diverts onto Islamabad Highway. Figure 1 is showing existing or do nothing scenario.


Figure 1: Existing Scenario / Do nothing scenario

For alternative 1 the start point of Rawalpindi Bypass project is 5 Km short of Rawat, which is an important junction on the N-5 and terminates at Nicolson Monument Islamabad at junction of N5. Total length of alignment is 60 Km.. Figure 2 is showing alignment # 1


Figure 2: Alignment # 1 for the proposed Rawalpindi Bypass (60 Km)

For Alternative # 2 the start point of Rawalpindi Bypass project is 1 Km short of Rawat, which is an important junction on the N-5 and terminates at sector B17 Islamabad at junction of N5. Total length of alignment is 51 Km. Figure 3 showing alignment # 2.


Figure 3: Alignment # 2 for the proposed Rawalpindi Bypass (51 Km)

**Methodology**

Multiple criteria decision making (MCDM) refers to make decisions in the presence of multiple, usually conflicting, criteria. MCDM problems are common in everyday life. Author have evaluated project cost, travel time benefits, safety benefits, vehicle operating cost benefits and reduced emissions. On the basis of these performance criteria different alternatives are evaluated and then a better alternative is selected through multi criteria analysis.

**Cost Estimation**

The second part and the most important part of our assigned project is the cost estimation. The cost for alternatives is calculated using the engineer's estimate of E35 Hasanabdal to Havelian while following the NHA CSR 2011 specifications. All the costs are calculated as an average sts after considering the costs of E35 Hasanabdal to Havelian expressway. Table 1 shows the aggregate costs of different categories of road construction. All costs are converted to year 2015 using CPI indices i.e. = 202.32 & =233. Two Interchanges data were used for the estimation of cost of Interchanges on the proposed Alignment. Those interchanges were Zero Point Interchange which was completed in year 2011 and Faizabad Interchange which was constructed in year 1998. Their construction cost was taken as in the relative year of its completion. Table 1 is showing the aggregate costs of each construction activity.

Table 1 *Aggregate Cost*

| Types of Construction/Structure | Cost (2011) Rs. Million | Cost (2015) Rs. Million | Units |
|---|---|---|---|
| Pavement Construction | 37 | 42.55 | Per Lane per Km |
| Interchanges | 2395 | 2755 | Per Interchange |
| Toll Plazas & Weight Stations | 115 | 132.25 | Per Toll Plaza |
| Bridges | 1.76 | 2.024 | Per Linear Meter |
| Underpasses | 1.05 | 1.20 | Per Linear Meter |
| Ancillary Works | 5.8 | 6.67 | Per Lane per Km |
| Structures (Culverts/Retaining Walls and Drainage & Erosion Works) | 12.7 | 14.605 | Per Lane per Km |

**Proposed Rawalpindi Bypass Cost Estimation**

Using Table 1 costs for proposed alignments for Rawalpindi Bypass have being calculated. Proposed alignments are 2 lanes on each side. The lengths and other characteristics of alignments are shown in Table 2. Table 2 and 3 are showing overall construction costs of both alignments. Total cost for proposed bypass is divided into two main categories i.e. land acquisition and road construction cost.

Table 2 Proposed Alignment # 1 (60 Km)

| Road Construction | | | | | |
|---|---|---|---|---|---|
| Pavement Construction cost per km (Rs. Millions) | | Structures Cost (Rs. Millions) | | Total Length (Km) | Total Cost (2015) (Rs. Millions) |
| (2011) | (2015) | (2011) | (2015) | | |
| 222 | 255.3 | 10997 | 12646 | 60 | 27964 |
| Cost of Acquiring Lang | | | | | |
| Avg Cost per Kanal (Rs. Million | Land to be Acquired (Kanal) | | Cost (Rs. Million) | | |
| 0.8 | 11869 | | 9495 | | |
| Total Cost (2015) | 9495+27964 | | | Rs. 37.459 Billions | |
| Contingencies @ 3 % of Total Cost = | | | | Rs. 112 Billions | |
| Escalation @ 6.5 % of Total Cost = | | | | Rs. 2.43 Billions | |
| Total Cost in Year 2015 | | | | Rs. 41 Billions | |

Table 3 *Proposed Alignment # 2 (51 Km)*

| Road Construction | | | | | |
|---|---|---|---|---|---|
| Pavement Construction cost per km (Rs. Millions) | | Structures Cost (Rs. Millions) | | Total Length (Km) | Total Cost (2015) (Rs. Millions) |
| (2011) | (2015) | (2011) | (2015) | | |
| 222 | 255.3 | 8522.5 | 9800 | 51 | 22820 |
| Cost of Acquiring Lang | | | | | |
| Avg Cost per Kanal (Rs. Million | | Land to be Acquired (Kanal) | | Cost (Rs. Million) | |
| 0.8 | | 10089 | | 8070 | |
| Total Cost (2015) | | 8070+22820 | | | Rs. 30.89 Billions |
| Contingencies @ 3 % of Total Cost = | | | | | Rs. 0.92 Billions |
| Escalation @ 6.5 % of Total Cost = | | | | | Rs. 2.00 Billions |
| Total Cost in Year 2015 | | | | | Rs. 33.81 Billions |

**Analysis**

**Travel Time Benefits**

For travel time benefits a present case scenario (existing situation) and an alternative scenario (transportation improvement due to intervention) is taken for analysis purposes. Currently 56500 vehicles pass through N5 that includes 70% non-commercial and 30% commercial vehicles. The commercial vehicles that are mostly the trucks are diverted to IJP road which passes through Faizabad Interchange joining the Islamabad Express way and travel to Rawat. In bypass case scenario out of total AADT 17000 which includes 9000 Trucks and 8000 cars are diverted on bypass while the rest is traveling on the existing route. There will be no trucks traveling on the existing routes as all the trucks are diverted on bypass. The existing road is divided into numbers of sections. Travel time before and after intervention. HCM method is used for calculations of speed. These calculations are made after making some assumptions of free flow speed for different segments taken for analysis. Table 4 and Table 5 are showing detailed calculations before and after interventions. Table 6 is showing calculations for travel time on bypass.

Table 4: Travel time Before Intervention (1-2-3-4-5-6) Section (ISB Highway, IJP & N5)

| SEG | LENGTH (Mile) | ADT | Total Capacity (Veh/hr) | V/C | Average Vehicle Speed (mph) | TT (min) |
|---|---|---|---|---|---|---|
| A | 4.875 | 56,500 | 7,600 | 0.31 | 33 | 8.86 |
| B | 9.08 | 56,500 | 7,600 | 0.31 | 33 | 16.51 |
| C | 5 | 56,500 | 21,000 | 0.11 | 34 | 8.82 |
| D | 6.41 | 56,500 | 7,600 | 0.31 | 33 | 11.65 |
| E | 11.8 | 56,500 | 7,600 | 0.31 | 33 | 21.45 |
| | | | Total= | | | 67.3 |

Table 5: Travel time after Intervention (1-2-3-4-5-6) Section (ISB Highway, IJP & N5)

| SEG | LENGTH (Mile) | ADT | Total Capacity (Veh/hr) | V/C | Average Vehicle Speed (mph) | TT (min) |
|---|---|---|---|---|---|---|
| A | 4.875 | 39,500 | 8,000 | 0. 17 | 33 | 8.60 |
| B | 9.08 | 39,500 | 8,000 | 0. 17 | 34 | 16.02 |
| C | 5 | 39,500 | 20,000 | 0. 17 | 35 | 8.57 |
| D | 6.41 | 39,500 | 8,000 | 0. 17 | 34 | 11.31 |
| E | 11.8 | 39,500 | 8,000 | 0. 17 | 33 | 20.82 |
| | | | Total= | | | 44.51 |

Table 6: Travel time on Rawalpindi Bypass

| Seg | LENGTH (Mile) | AADT | AWDT | Total Capacity (Veh/hr) | AWDT/C | Speed mph | TT (min) |
|---|---|---|---|---|---|---|---|
| F | 12.5 | 17,000 | 18,530 | 8800 | 2.11 | 59.34 | 12.64 |
| G | 25 | 17,000 | 18,530 | 8800 | 2.11 | 59.34 | 25.28 |
| | | | | Total= | | | 37.92 |

Table 7: Travel time saved due to intervention

| Travel Time Saved | |
|---|---|
| Mins | Hours |
| 67.3- 37.92 = 30 | 0.5 |

The unit travel time costs are converted to year 2015 using CPI index for year 2014 & 2015. For travel time savings Equation 2 is used and detailed calculations are given in table 8.

Travel Time Savings = (Occupancy of Vehicle) X (AADT X Travel Time Saved) X (Unit Travel Time

Cost)…….. Equation 2

Table 8: Travel Time Savings

| Veh Class | ADT | Unit Travel Cost 2015 Constant Rs. | Occupancy | TT Saved (Min) | TT Saved (Hrs) | TT (Saving (Rs/Day) |
|---|---|---|---|---|---|---|
| Cars | 8,000 | 320 | 1.2 | 30 | 0.5 | 1,536,000 |
| Trucks | 9,000 | 222 | 1 | 30 | 0.5 | 999,000 |
| | | | Total= | | | 2,535,000 |

Safety Savings

The World Health Organization has recognized the seriousness of traffic accidents in terms of fatalities, personal injuries and property damage as a social and public health problem. Transportation Projects either directly or indirectly reduce the crashes rates or severity. Enhancing the safety is considered as a key user benefits pertaining to the physical or policy changes in transportation system.

(Fatal Crashes + Non- fatal Crashes) $_{\text{Before Intervention}}$ - (Fatal Crashes + Non- fatal Crashes) $_{\text{After Intervention}}$ …… Equation 3

Equation 3 is used to calculate total numbers of crashes saved after intervention. The Number of Fatal and Non-Fatal Crashes are calculated in Excel for all of the above sections are calculated both without Intervention of RWP Bypass &with Intervention of RWP Bypass. The result of analysis is shown in table 9, 10 and 11.

Table 9 Number of Crashes for Sections A, B, C, D & E without Intervention

Safety Costs (IJP Road, N5 and Isb Highway) Before Intervention (Principal Arterial)

| Road Seg | Seg Length | | AADT | 100MVMT | Crashes (First Year) | | Rates | |
|---|---|---|---|---|---|---|---|---|
| | Km | Mile | Vihicle | Veh Mile Travelled | # of Fattal | # of Non Fatal | Fatal | Non Fatal |
| A | 7.68 | 4.8 | 56,500 | 0.99 | 1.29 | 123.43 | 1.3 | 124.69 |
| B | 14.53 | 9.08 | 56,500 | 1.87 | 2.43 | 233.48 | 1.3 | 124.69 |
| C | 8.00 | 5 | 56,500 | 1.03 | 1.34 | 128.57 | 1.3 | 124.69 |
| D | 10.26 | 6.41 | 56,500 | 1.32 | 1.72 | 164.83 | 1.3 | 124.69 |
| E | 18.88 | 11.8 | 56,500 | 2.43 | 3.16 | 303.43 | 1.3 | 124.69 |
| | | | Total Crashes | | 9.94 | 953.74 | | |

Table 10 Number of Crashes for Sections A, B, C, D & E after Intervention

Safety Costs (IJP Road, N5 and Isb Highway) After Intervention (Principal Arterial)

| Road Seg | Seg Length | | AADT | 100MVMT | Crashes (First Year) | | Rates | |
|---|---|---|---|---|---|---|---|---|
| | Km | Mile | Vihicle | Veh Mile Travelled | # of Fattal | # of Non Fatal | Fatal | Non Fatal |
| A | 7.68 | 4.8 | 39,500 | 0.69 | 0.90 | 86.29 | 1.3 | 124.69 |
| B | 14.53 | 9.08 | 39,500 | 1.31 | 1.7 | 163.23 | 1.3 | 124.69 |
| C | 8.00 | 5 | 39,500 | 0.72 | 0.90 | 89.89 | 1.3 | 124.69 |
| D | 10.26 | 6.41 | 39,500 | 0.92 | 1. 20 | 115.23 | 1.3 | 124.69 |
| E | 18.88 | 11.8 | 39,500 | 1.70 | 2.21 | 212.13 | 1.3 | 124.69 |
| | | Total Crashes | | | 6.95 | 666.77 | | |

Table 11 Number of Crashes on Rawalpindi Bypass:

Safety Costs (IJP Road, N5 and Isb Highway) After Intervention (Principal Arterial)

| Road Seg | Seg Length | | AADT | 100MVMT | Crashes (First Year) | | Rates | |
|---|---|---|---|---|---|---|---|---|
| | Km | Mile | Vihicle | Veh Mile Travelled | # of Fattal | # of Non Fatal | Fatal | Non Fatal |
| F | 40.00 | 25 | 17,000 | 1.55 | 1.16 | 106.42 | 0.75 | 68.6 |
| G | 20.00 | 12.5 | 17,000 | 0.78 | 0.58 | 53.21 | 0.75 | 68.6 |
| | | Total Crashes | | | 1.75 | 159.62 | | |

The costs for fatal and nonfatal crashes are taken from IiRAP - International Road Assessment Program which are as under

True Cost of Road Crashes:

- Fatality - 70 times GDP per capita
- Injury - 18 times GDP per capita

For Pakistan:

- Per capita income of Pakistan - $1250
- Fatal Crash - $87,500 (aprox. Rs.100,00,000.00)
- Injury Crash - $22,500 (aprox. Rs.2,500,000.00)

| Crash Costs | |
|---|---|
| Fatal (Rs. in Millions) | Non- Fatal (Rs. in Millions) |
| 8.9 | 2.2 |

Table 12: Total Safety Saving

| Crashes Types | Crashes on Bypass (a) | Principal Arterial W/O Bypass (b) | Principal Arterial with Bypass (c) | Crash Savings (b)-(a+c) | Crash Cost Rs. Millions |
|---|---|---|---|---|---|
| Fatal | 1.75 | 9.94 | 6.95 | 1.25 | 11.10 |
| Non Fatal | 159.62 | 953.74 | 666.77 | 127.34 | 280.15 |
| | | Total = | | | 291.25 |

**Results**

**Vehicle Operating Cost**

For the calculation of vehicle operating cost Rawalpindi bypass was considered as a case study. Rawalpindi by pass is supposed to be constructed to divert the traffic on N-5 from Taxilla to Rawat directly. The bypass will be 60 kilometer two lane divided highway with grade separated roads on the intersections. Before the construction of bypass the vehicles travel via two routes from Rawat to Taxila. These two routes directly pass through the city of Rawalpindi thus creating a lot of congestion on roads and increasing the vehicle operating cost. The vehicle operating cost calculation (VOC) was done by using the Hepburn model [3]. The model considers speed and vehicle characteristics for the calculation of VOC. The Hepburn model is used for the calculation because the routes for which VOC is to be calculated has different variation of speed sections.

After following the methodology VOC before the intervention is first calculated. Excel sheets are used for this purpose. The tables are shown below. The speed used for calculations was calculated using COMSIS method [3]. Results are shown in Table 13and 14.

Table 13 VOC after Interventions on existing route

| Seg | Length (miles) | AADT | VMT | | Speed (mph) | Unit VOC | | Delay cost (Rs.Millions) | | Annual cost (Rs.Millions) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Car | Trucks | | Car | Trucks | Car | Trucks | |
| A | 4.875 | 39,500 | 192562 | 00 | 33 | 31.39 | 00 | 6.04 | 00 | 2206.11 |
| B | 9.08 | 39,500 | 358660 | 00 | 34 | 31.30 | 00 | 11.23 | 00 | 4097.90 |
| C | 5 | 39,500 | 197500 | 00 | 35 | 31.22 | 00 | 6.17 | 00 | 2250.78 |
| D | 6.41 | 39,500 | 253195 | 00 | 34 | 31.30 | 00 | 7.63 | 00 | 2892.90 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| E | 11.8 | 39,500 | 466100 | 00 | 33 | 31.39 | 00 | 14.63 | 00 | 5339.91 |
| | | | | | Total= | | | | | 16787.59 |

Table 14 VOC after Interventions on bypass

| Seg | Length (miles) | AADT | VMT | | Speed (mph) | Unit VOC | | Delay cost (Rs.Millions) | | Annual cost (Rs.Millions) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Car | Trucks | | Car | Trucks | Car | Trucks | |
| F | 12.50 | 17,000 | 99875 | 112625 | 60 | 25.86 | 33.60 | 2.58 | 3.78 | 2323.80 |
| G | 25 | 17,000 | 199750 | 225250 | 60 | 25.86 | 33.60 | 5.16 | 7.57 | 4647.59 |
| | | | | | Total= | | | | | 6971.39 |

The VOC savings are calculated using equation 4 mentioned below

VOC User Saving = [Principal Arterial w/o Intervention] - [Principal Arterial with Intervention + Expressway/Bypass]…… Equation 4

Hence the total VOC savings are Rs.1060.56 Millions per year

**Air Quality Impacts**

In evaluating the impact of transportation improvements on air quality, the first step is to estimate the change in emissions as a result of changes in the average speed of vehicles, increases in motor vehicle trips, and increases in VMT due to these improvements [6]. The second step is to determine the resulting change in pollutant concentrations due to the change in emissions. Values which are taken for calculations of total emissions are given in table 15.

Table 15: Pollutant Emissions as per vehicle class (TCRP 2003) [4]

| Mode | VOC (g/VMT) | CO (g/VMT) | Nox (g/VMT) | $CO_2$ (g/VMT) |
|---|---|---|---|---|
| Car | 1.88 | 19.36 | 1.41 | 415.49 |
| Turcks | 2.405 | 18.445 | 6.87 | 1453.92 |

Where VOC = Volatile Organic Compounds
CO = Carbon Mono Oxide
Nox = Nitrogen Oxide
CO2 = Carbon Dio oxide

The overall emissions before and after interventions are shown in table 16

Table 16: Overall Pollutant Emissions before and after Interventions

| Pollutant | Emissions (Kg/Day) Before Intervention | Emissions (Kg/Day) After Intervention | missions (Kg/Day) on Rawlpindi Bypass |
|---|---|---|---|
| VOC | 4269.75 27 | 2754.30 | 1375.88 |
| CO | 39995.29 | 28363.4648 | 12032.8444 |
| NOx | 6387.34 | 2065.72755 | 2743.6725 |
| $CO_2$ | 1523530.11 | 608715.702 | 615734.411 |

Total Reduced Emissions

Total reduced emissions are calculated by using the equation 5

Reduced Emissions = (Emissions before Interventions)–(Emissions on Existing Route with Bypass + Emissions on Bypass)……. Equation 5

| Pollutants | Reduced Emissions | |
|---|---|---|
| | Kg/Day | Kg/Year |
| VOC | 139.57 | 50941.83181 |
| CO | -401.02 | -146372.905 |
| NOx | 1577.94 | 575949.206 |
| CO2 | 299080.00 | 109164199.2 |
| | Total | 109644717.4 |

Net Pollutant Emission Saving = 109644.717 Tons/Years

Multi Criteria Decision Making (MCDM)

Multiple criteria decision making (MCDM) refers to making decisions in the presence of multiple, usually conflicting, criteria. MCDM problems are common in everyday life. Author have evaluated project cost, travel time benefits, safety benefits, vehicle operating cost benefits and reduced emissions. On the basis of these performance criteria we have different alternatives and then we select which one is better through multi criteria analysis. After all performance criterions have been weighted and scaled, the challenge remains to combine the impacts for each alternative. In this amalgamation step an appropriate operation is used to yield a combined level of desirability for each alternative so that the best choice can be identified. Several tools and techniques are employed for amalgamation such as mathematical value, or utility functions rating and ranking and cost effectiveness. Figure 6 is showing the steps followed by author for MCDM.

The key Performance criteria which author have used for MCDM are, project initial, travel time saving, safety, vehicle operating, crash rate savings cost in Millions Rs while air quality impact as reduced emissions in Mg. It is sought to use Analytical Hierarchy Process to assign relative weights to all the above key performance criteria.

**Pair wise comparison matrix**

Pair wise comparison matrix is obtained by taking survey. The survey involves different questions asked from professionals about their perception of importance of these mentioned criterions.

| **Project Cost** | **Project Cost** **1** | **TT Saving** **3** | **Crash Saving** **½** | **VOC Saving** **5** | **Reduced Emission** **3** |
|---|---|---|---|---|---|
| TT Saving | 1/3 | 1 | 1/3 | 2 | 1/3 |
| Crash Saving | 2 | 3 | 1 | 5 | 5 |
| VOC Saving | 1/5 | 1/2 | 1/5 | 1 | 1/5 |
| Reduced Emission | 1/3 | 3 | 1/5 | 5 | 1 |

This matrix shown that Crash Savings are the most important criterion among all other criterions. After crash rate project cost, travel time, reduced emissions and voc savings are taken. Where 1 Refers to Criterion X is Equally Important to Criterion Y, 1/5 Refers to when Criterion X is Strongly less Important than Criterion Y, 1/3 Refers to when Criterion X is Moderately less Important than Criterion Y, 1/2 Refers to when Criterion X is slightly less Important than Criterion Y, 5 Refers to when Criterion X is Strongly More Important than Criterion Y, 3 Refers to when Criterion X is Moderately More Important than Criterion Y and 2 Refers to when Criterion X is slightly More Important than Criterion Y

The Normalized Weights of each criterion are

| **Performance Criterion** | **Normalized Weights** |
|---|---|
| Project Cost | 0.2722 |
| TT Saving | 0.0951 |
| VOC Saving | 0.0531 |
| Emission | 0.1689 |

After normalized weights obtained now consistency check is applied to check the randomness of the matrix using equation given below

$$A*w = \Lambda max * w$$

The Eigen vector (w) corresponding to the Eigen value in the above matrix equation is given as;

$$W = \begin{Bmatrix} 0.2722 \\ 0.0951 \\ 0.4107 \\ 0.0531 \\ 0.1689 \end{Bmatrix}$$

The Consistency ratio is then determined:

Consistency Ratio = $\frac{Consistency\ \ Indes}{Randomness\ \ Index} = \frac{\nearrow max - n}{(n-1)(R1)} = \frac{5.37-5}{(5-1)(1.12)}$

Consistency Ratio = 0.082 < 0.1 Acceptable.

Scaling

Scaling is used to Establishment of common unit or scale of measurement so that all performance criterions can be express in commensurate units. Risk scenario method is used for scaling (Certainty Equivalent Approach). The levels for each criteria is taken from bypass calculations relative to each alternative and shown in the table 17.

Table 17: Savings Criteria Levels for Each Criterion

Criteria Level as Per Alternative

| Alternative | Project Cost (Rs. Millions) | TT Savings (Rs.Millions) | Crash Rate Savings (Rs.Millions) | VOC Savings (Rs. Millions) | Reduced Emission (Tons) |
|---|---|---|---|---|---|
| A | (Do Nothing) | 0 | 0 | 0 | 0 |
| B (60 Km) | 41000 | 923.45 | 291.25 | 1060.56 | 109644 |
| C (51 Km) | 33800 | 1022 | 346.30 | 2107 | 144271 |

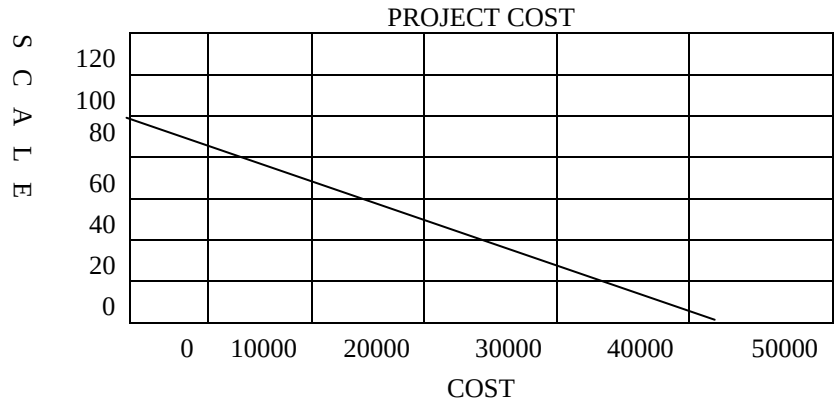
Now the procedure to find utilities using Certainty Equivalent Approach is given below.

1. Single-Criterion Utility Function for Project Cost

Upc (41000 M) = 0 (Worse)

Upc (0 M) = 100 Best

Assume that Decision Makers consider Rs.20000 Million as indifference point




2. Single Criteria Utility Function for TT Savings (Rs. Millions)

Utt (0) = 0 (Worse)
Utt (1022) = 100 (Best)
Assume that Decision Makers consider Rs. 500 Millions as indifference point
This Indicates Risk Taker Behavior

3. Single Criteria Utility Function for Crash Savings (Rs.Millions)

Ucr (0 ) = 0 (Worse )
Ucr (346.30) = 100 (Best)
Assume that Decision Makers consider Rs. 190 Millions as indifference point.

# Paper No. 375

## A NOVEL APPROACH FOR ERROR DETECTION AND CORRECTION USING GATED CORRECTION METHOD

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***Abstract***

*Data communication is the process of exchanging information between sender and receiver. The basic objective of a communication system is to transmit data which is free of error. Advancement in technology has made various revolutions in data communication, with which come greater chances that the data to be sent becomes corrupted. The data is transferred from various transmission impairments and during this period various factors affect the signal, the data received at the receiver is different from the data transmitted. As digital signals exist in two states either high or low, the error occurred will change its state. In today's advance world different techniques have been made to detect and remove error in the data. The paper delivers a simple error correction and detection method which can detect and correct single, multiple and burst error simply by using XNOR and COMPLEMENT. In the proposed method key is calculated and is send as a redundant bits at the receiver different operations are made to get the data that was originally sent. This error correction is a step ahead of hamming code. This paper also discusses the shortcomings of hamming code.*

**Keywords:** Data communication, transmission impairments, error correction and detection, xnor, complement, hamming code, gated data.

### Introduction

In communication system the data is sent through a channel. During transmission there exists a greater possibility of an error and a high bit is changed to low and a low bit is changed to high or vice versa [1-3]. The error occurred during transmission can be single bit, multiple bit or burst error. Single bit error occurs when only one bit is changed from high to low and vice versa figure 1, multiple bit error occurs when more than one bit is changed figure 2. In burst error consecutive multiple numbers of bits are changed figure 3. Different efforts have been made to detect and correct the error occurred during transmission [4-9]. Error correcting code are more complicated than error detecting codes also the error correction requires more redundant bit then error correction. The main purpose of error correction technique is that the received data is an exact copy of the transmitted signal.

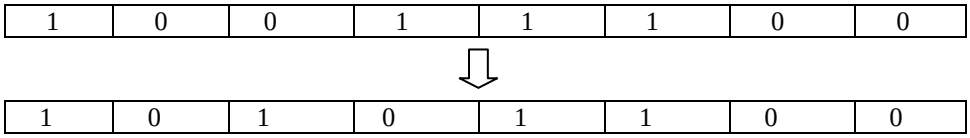



**Figure 1** Single bit error

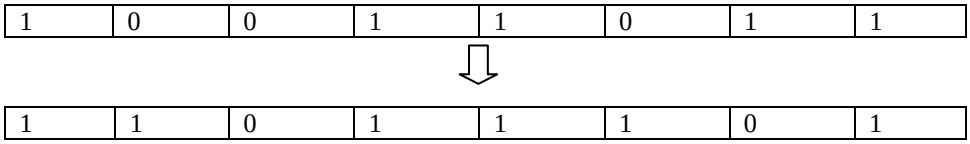



**Figure 2** Multiple bit error

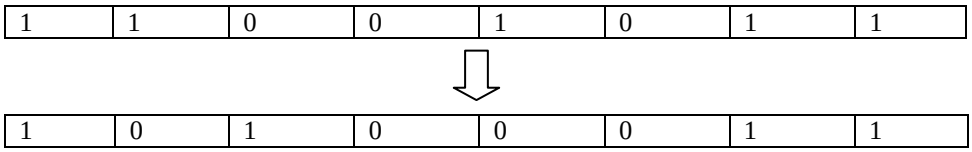


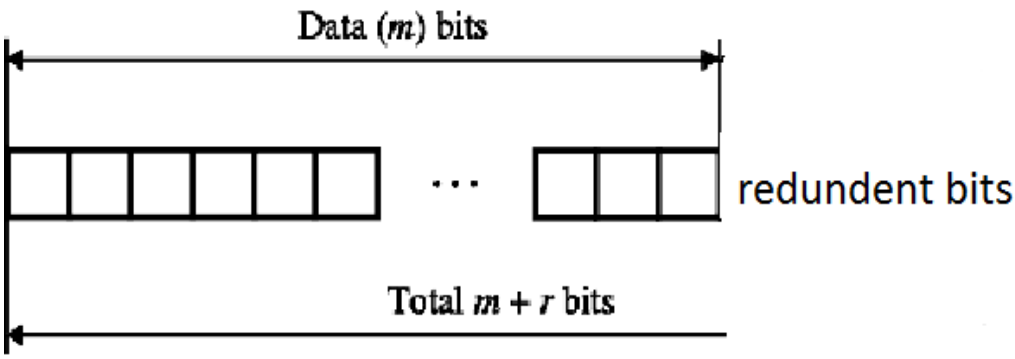

**Figure 3** Burst error

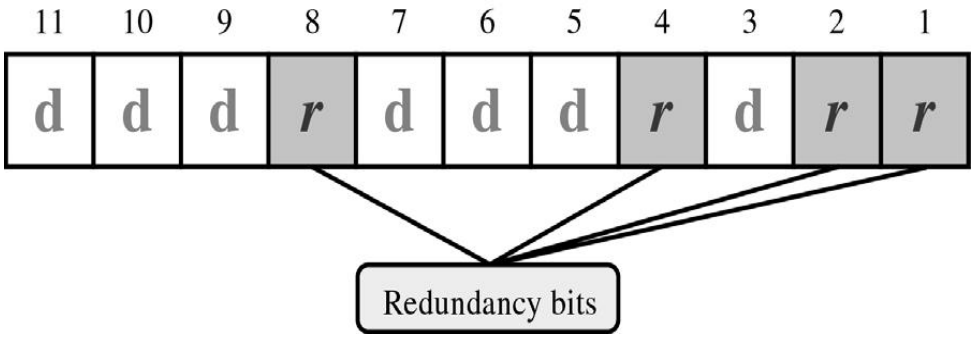
**Hamming Code:**

It is one of the power full methods for error correction in data communication. Redundant Bits (r) are calculated so that it can represent the states (the number by which the size of the bits can be represented in binary) of the bits(m) also the left hand side of the equation i.e. 2^r is greater than m+r+1 where m is the number of bits. Then the r bits are appended with the original bits, then the r bits are inserted by the formula 2^n. The binary position of each bit is calculated, and then the r bits are filled with either 1 or 0 depending upon the number of 1's.

o $2^r \geq m+r+1$

o If m=7, r=4 as $16 \geq 7+4+1$






| 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |
|---|---|---|---|---|---|---|---|

Error at 8th position

| 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |
|---|---|---|---|---|---|---|---|

$2^r \geq m+r+1$

$2^4 > 10+4+1$

$16 > 15$

| 0 | 0 | 1 | R8 | 0 | 1 | 1 | R4 | 0 | 0 | R2 R1 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1100 | 1101 | 1001 | 1001 | 1000 | 0111 | 0110 | 0101 | 0100 | 0011 | 0010 0001 |

| 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 0 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1100 | 1101 | 1001 | 1001 | 1000 | 0111 | 0110 | 0101 | 0100 | 0011 | 0010 0001 |

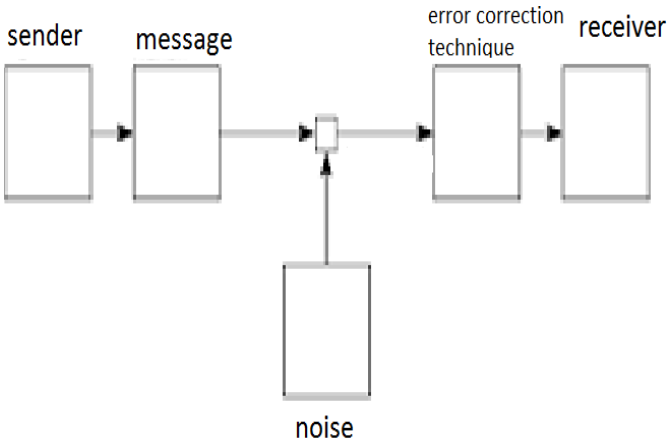
If error has occurred at 8th position, we calculate the states and the number of the bits in which the states can be represented. For the above example there are 8 states and hence we need 4 bits to represent the states which also obeys the 2^r > m+R+1. We then plug in the redundant bits into the table and find their values. Later on we get the position of the bit where the error has occurred.

**Methodology**

Now we discuss the steps and procedure for simple error correction. The following steps are involved at transmitter site and at the receiver side.

**Transmitter/ Receiver side**

The detection of the error can be determined by any of the pre defined methods for error detection. At the transmitter the data along with the key is sent to the receiver. The key is calculated by taking the complement of the data to be sent. At the receiver the received data is complemented, and then the key and the complemented data is xnor'ed, we call the result as gated data. At last the gated data and the received data are xnor'ed again this gives us the original data that the sender wants to send.



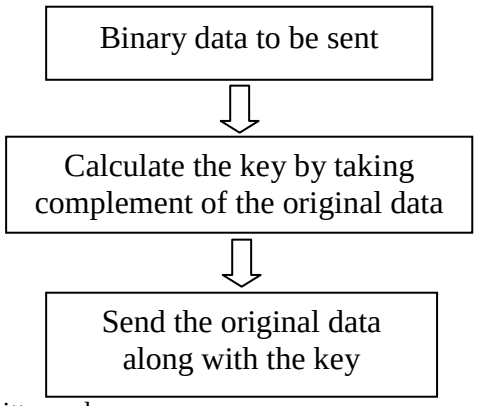




**Fig:** steps at transmitter end.

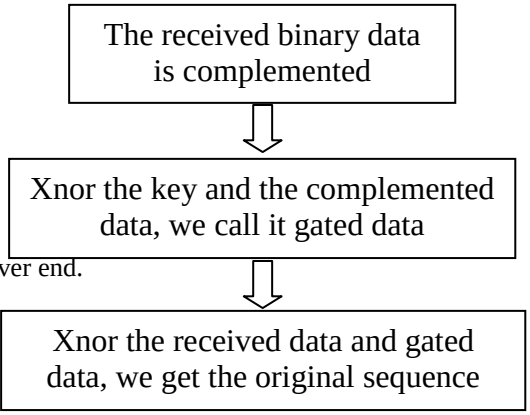



**Fig:** steps at receiver end.

**Single bit error**

Single bit error occurs when a single bit i.e. 1 is changed to 0 or a 0 is changes to 1. The proposed method can easily tackle single bit error without any drawback. The fig shows that a single bit error has occurred and a 1 is change to 0. Then the complement of the data is sent as a key as shown we then xnor the complement of the received data and key which gives us gated data. Then by again taking xnor with the gated data and the received data gives us the original signal as shown in the below figure.

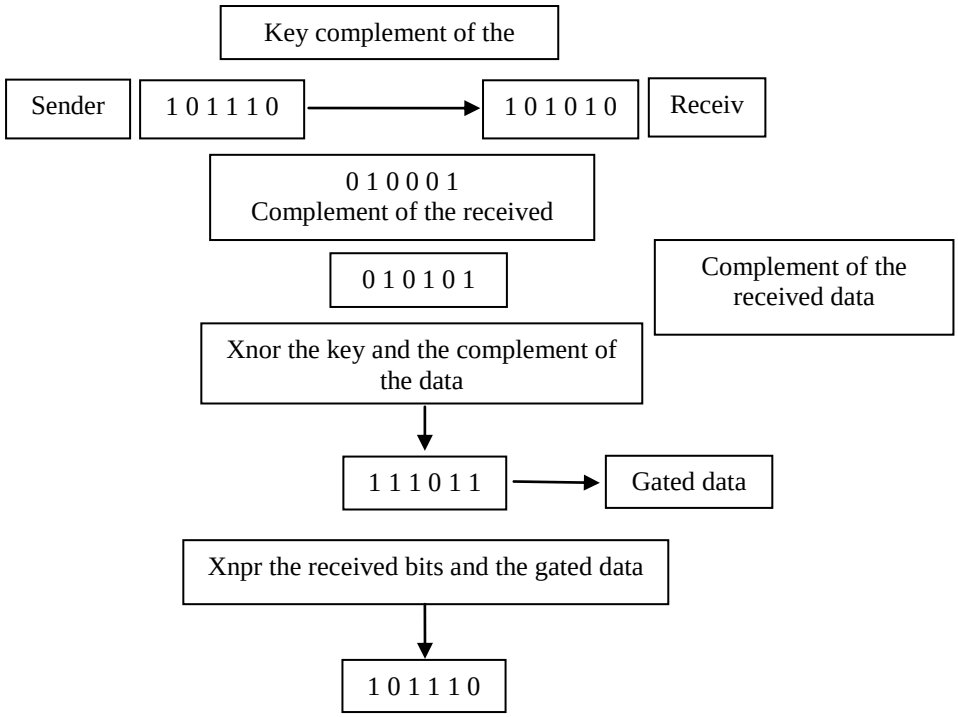



**Fig:** Representing the steps involved when a single bit error is produced

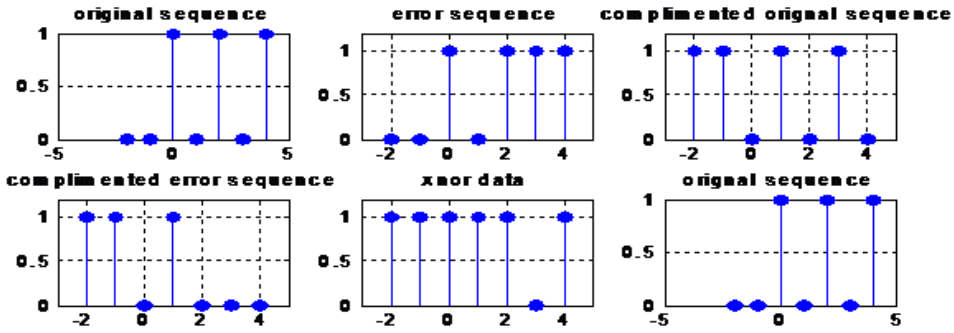



**Fig 2:** Single bit error

**Multiple errors**

Burst error occurs when multiple bits are changed. The proposed method can easily tackle multiple bit error without any drawback. The fig show that a multiple bit error has occurred and a 1 is change to 0 and 0 is changed to 1 as shown in the figure. Then the complement of the data is sent as a key, we then xnor the complement of the received data and key which gives us gated data. Then by again taking xnor with the gated data and the received data gives us the original signal as shown in the below figure.

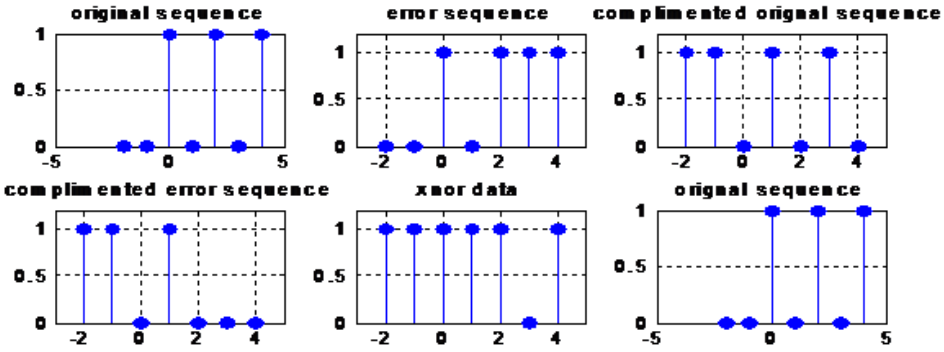



**Fig 3:** multiple bit error.

**Burst error**

Burst error occurs when a sequence of bits are changed. The proposed method can easily tackle multiple bit error without any drawback. The fig show that a multiple bit error has occurred and a 1 is change to 0 and 0 is changed to 1 as shown in the figure. Then the complement of the data is sent as a key, we then xnor the complement of the received data and key which gives us gated data. Then by again taking xnor with the gated data and the received data gives us the original signal as shown in below figure.

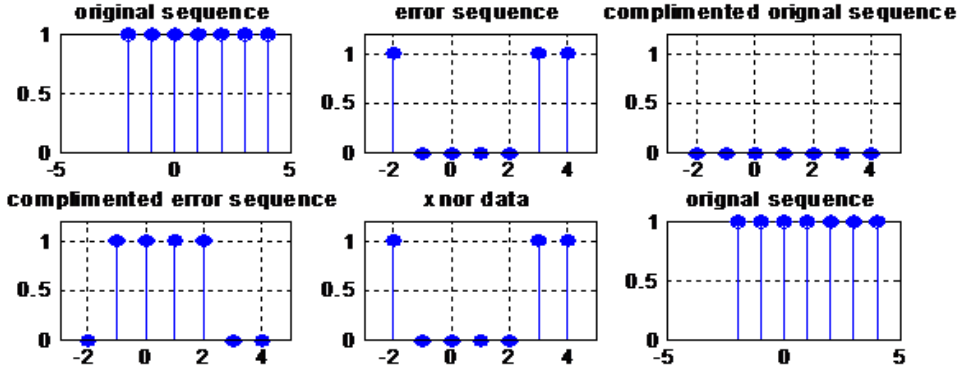



**Fig 4:** Burst error.

## Discussion

Error correcting code are more complicated than error detecting codes also the error correction requires more redundant bit then error correction. From the above discussion the proposed method simple and is a step head of hamming code which is one of the error correction method the hamming code performs well when a single bit error occurs but it fails when multiple bits error occurs and also when burst error occurs another drawback of the hamming code is that it is time consuming, whereas from the above simulations the proposed method is robust and can easily correct single, multiple and burst errors.

## Short Comings of Method

The short coming of the proposed method is that it fails to correct the data when the key is changed which is of less probability. The short coming of the proposed method can be fixed if the key is send twice and is compared.

## Conclusion

The proposed method is a simple error correction method and is compared with the hamming code. The simulation showed that the proposed method is simple and robust compared to hamming code, the paper also discussed the method was successful in determining multiple and burst error, also the short coming of this proposed method and a solution to problem is provided.

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# Paper No 410

## PLASMONIC PROPERTIES OF METALLIC NANOPARTICLES

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**Abstract**

*In this study, the scattering properties of three different gold nano-particles have been studied. The proposed nano-particles are spherical, conical and cylindrical. The simulation results indicate that as the parameter of these nano-particles are changed so different LSPR peaks and shifts achieved in the scattering spectra. So this shows that the resonance modes are strongly reliant on the parameters of the proposed nano-particles. Moreover we have compared the scattering spectra of all the three nano-particles on the basis of their volume. The spherical nano-particle got wide spectral width, shift and high amplitude in the scattering spectra due to which it can be used for biomedical applications.*

**Key words**: Plasmon, spherical, conical, cylindrical, LSPR.

### Introduction

Numerous studies have been made on the extraordinary and matchless properties of nano size gold particles. The very hasty and tremendous development has been adopted to chemically synthesis and modeling has been done on computational basis on various gold made nanostructures having multiple ranges like nanorods [1, 2] and nanostars [1, 3, 4] ,core shell nano shell [5, 6] and nano egg [7]. When the conduction electrons collectively oscillates on the surface of metallic nanoparticle is called surface Plasmon. When the external field is applied on these shining localized surface plasmons and the phase at which the frequency of the applied incident field and these localized surface plasmon become match so resonance phenomenon occurs and this is called localized surface plasmon resonance ,the frequency at which resonance take place is called resonance frequency[8-10]. These LSPR are strongly dependent on the nano particles size , shape and their local environment [9, 11]. Which can be used for various applications like surface enhanced Raman spectroscopy [12] , bio imaging [8] , and photo voltaics [13].

In this article, we observed the scattering properties of the three different gold made nano-particles i.e. spherical, conical and cylindrical. We found that the proposed nanoparticles are highly sensitive to the parameters of the nano-particles because different resonant modes are achieved and enhanced. Moreover we have done comparison of the proposed nano-particles on the basis of their volume while taking the volume of aspherical nanoparticle as a reference. So we found that the sphere nanoparticle exhibits large and enhanced resonant mode in the scattering spectra which can used for bio-sensing and bio-imagining applications.

### Nanoparticle Geometry and their Numerical Methodology

Figure 1 shows the geometry of the proposed nano-particles. The spherical nanoparticle has only one parameter called radius ‘r’, while the cylindrical and conical nano-particles

have two parameters i.e. radius ‘r’ and height ‘h’. The polarization is considered to be along x-axis and propagation is along z-axis. The software we used for simulations is COMSOL multi-physics, the technique which we used in our simulation is finite element method (FEM) for calculating nano-particles spectra.

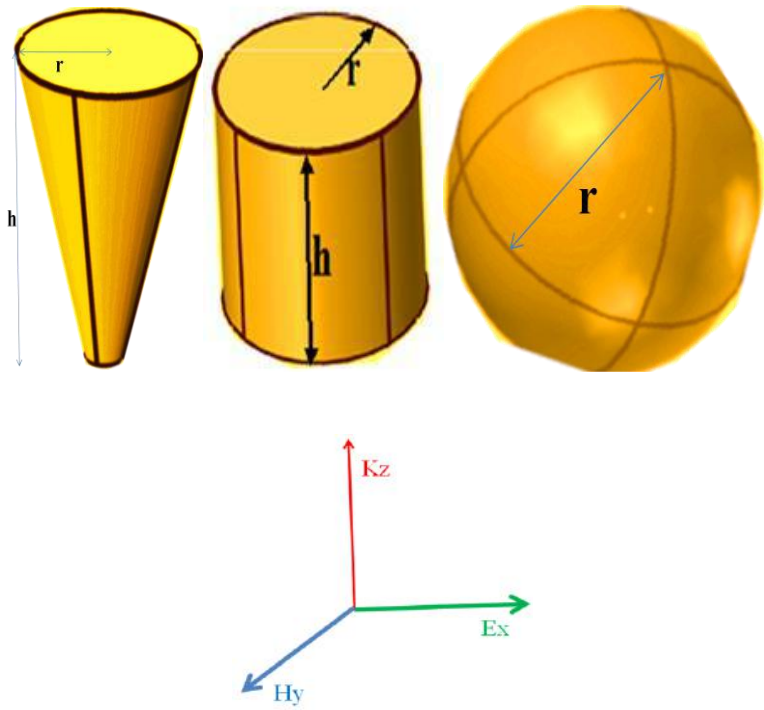


Figure 1 Spherical, Conical and Cylindrical nanostructures with polarization along X-axis

Figure 2 shows the 3 dimensional space we defined for the simulations are consist of the proposed nano-particles resonators , far field sphere enclosing the resonators and the perfect match layer (PML) enfolded all the spheres and nano-particles [14] . The PML provided an absorbing media for all the outgoing waves which can be not be reflected back. Furthermore we are interested to calculate far field scattering spectra on the far field sphere using the following equation

$$Q_{scat} = \frac{1}{\pi r^2 E_{inc}^2 R_f^2} \int \left| E_{far} \right|^2 R_f^2 d\Omega$$

Where $R_f$shows the radius of the far field sphere, $E_{far}$is the far field computed Stratton-Chu formulation. $E_{ins}$ shows the amplitude of the incident electric field and r defines the radius of the nanoparticle. We used the Johnson and Christy data model for the dielectric constant of gold [14].

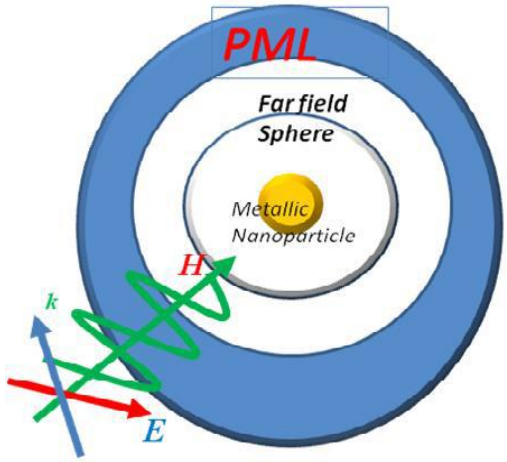


Figure 2. Perfect Match Layer with far field sphere and nanoparticle

**Results and Discussion**

Figure 3 (a) shows the scattering spectra of spherical nanoparticle having parameter radius. We computed the scattering spectra for the polarization is along x-axis. These results are achieved by tuning the radius of the spherical nanoparticle at initially r=30nm. It shows that by gradually increasing the radius of the spherical nanoparticle, the amplitude and the spectral width of the plasmon mode increases but there is no shift occur in the spectrum because the incident field have same effect on the all directions of the sphere. All theses peaks represents LSPR modes and that is dipole mode because the fundamental mode exhibit by the plasmonic nanoparticle is dipolar mode[15]. The higher order modes can be excited by the symmetry breaking of the nanoparticle[11, 16]. But in these all cases the higher order modes are dark, so by changing the radius of the spherical nanoparticle LSPR modes can easily be tuned. Figure 3(b) shows the scattering spectra for conical nanoparticle which is obtained by changing the radius of the nanoparticle. As the radius increases a red shift occur of the LSPR modes are observed in the scattering spectra. Whose spectral width and amplitude also increases. Figure 3(c) shows the scattering spectra for cylindrical nanoparticle. These results are obtained by changing the radius of cylindrical nanoparticle. By increasing the value of r, red shifts of the resonance mode are appeared in the scattering spectra, whose spectral width and amplitude also increases accordingly.

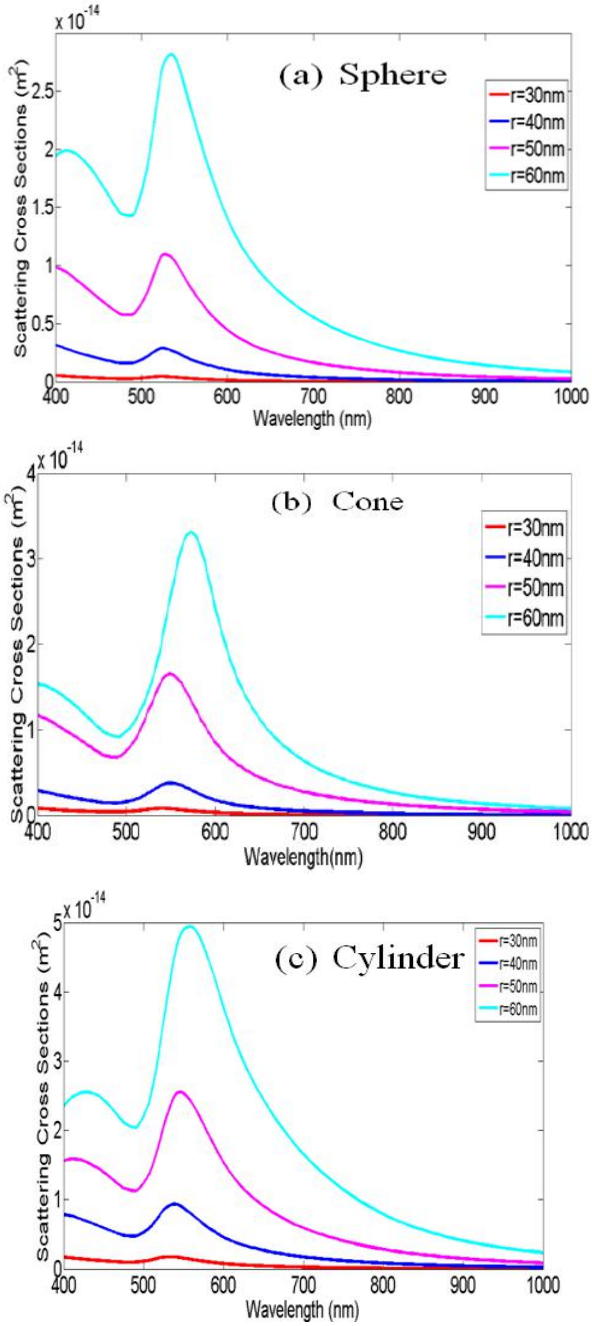


Figure 3.Scattering spectra of proposed nanoparticle for different value of radius (a) for spherical nanoparticle (b) for conical nanoparticle (c) for cylindrical nanoparticle

We next alter the height of the proposed nano-particles and study its effect on the scattering spectra. Figure 4a shows the scattering cross sections for the same polarization as like previous case in the x-direction. Which is achieved by the changing the height of the conical nanoparticle. By changing the height, a very small blue shift of the LSPR modes is appeared in the scattering cross section. Whose spectral width and amplitude of the resonate modes remain almost same. Figure 4b shows the scattering spectra by varying the height of the cylindrical nanoparticle. By changing height increases the LSPR modes can be tuned in the spectrum. As the height increases a small blue shift observed in the resonate mode of scattering spectra .the spectral width and amplitude of the LSPR modes are also almost same.

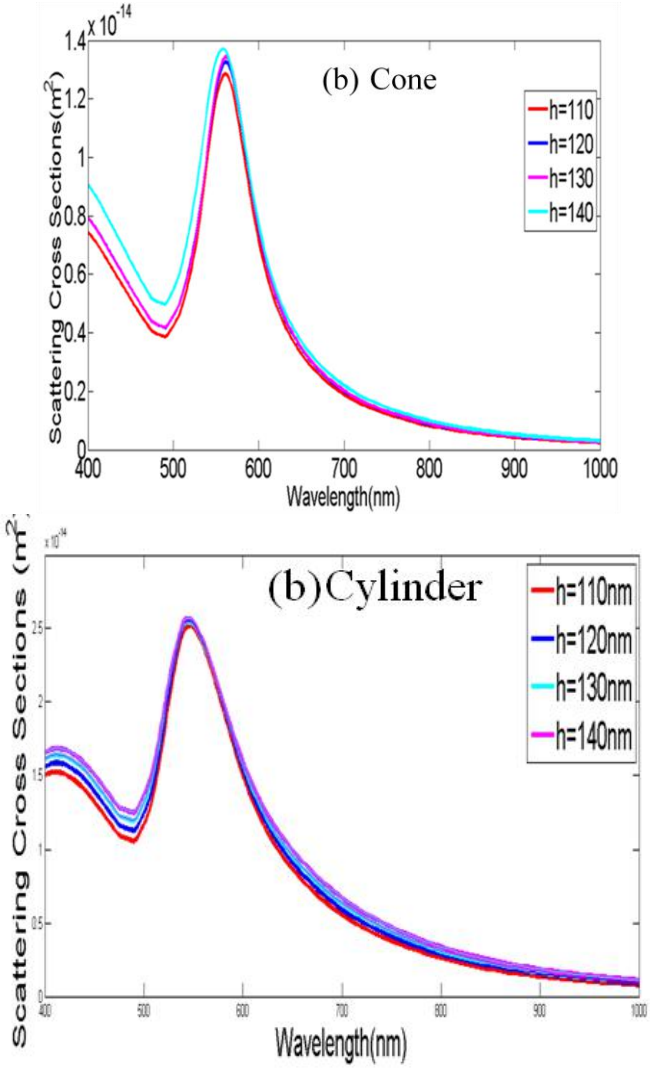


Figure 4a. Scattering Spectra of the proposed nano-particles for different values of height (a) Conical nanoparticle (b) Cylindrical nanoparticle

Finally we have achieved the result shown in figure 5 by the comparison of the three proposed nano-particles. We calculated the volume of the sphere taking the sphere as a reference by using the formula for the volume of sphere $V = {}^{4}/_{3}\,\pi r^3$. That value of radius r has chosen which is having the highest amplitude in the scattering spectra. Then next using this known volume of spherical nanoparticle, we find the volume for the conical nanoparticle using the conical volume formula$V = {}^{\pi}/_{3}\,r^2 h$ and finally we find the volume of cylindrical nanoparticle using the spherical known volume by using the volume formula for the cylinder $V = \pi r^2 h$. The result obtained from simulation showed that the spherical nanoparticle exhibits large amplitude and wide spectral width and shift in the scattering spectra.

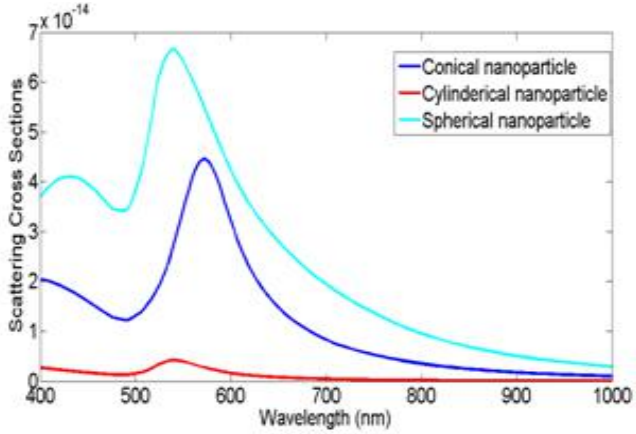


Figure 5. Scattering Spectra of the spherical, conical and cylindrical nanoparticle on the basis of their volume comparison.

**Conclusion**

We theoretically investigated the scattering properties of the spherical, conical and cylindrical nano-particles while considering the polarization along x-axis, it was observed that the LSPR modes can easily be tuned by changing the parameter of the nano-particles. The spherical nanoparticle exhibits large LSPR shifts and have large spectral width and amplitude. therefore, it can be used for biomedical applications.

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# Paper No. 411

## SOLAR AIR-CONDITIONED BED

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**Abstract**

*Summer is much hot in Pakistan as compare to winter. Therefore adequate source for efficient cooling system is required to make the life comfortable. In conventional air conditioning system most of the cooling is leaked or wasted there, where it is not required. For example cooling around the bed is required instead of the whole room. This paper proposed an efficient cooling system for the above problem. The proposed cooling system is based on the solar air conditioned bed. This cooling system restricts air conditioned environment to reduce cooling losses. The Proposed cooling system operates with renewable energy and main AC source.*

**Key words:** Solar Air-Conditioner, Air-Conditioned Bed, DC Powered Air-Conditioner, DC Compressor

### Introduction

Air conditioning is the processing of temperature, humidity, refinement and spreading of air current in the requirement of space needing air conditioning [1]. With increasing electricity tariffs, solar energy becomes attractive once the system has been installed [2]. Solar Air conditioned Bed prototype is initially made for new born babies in which small Air condition system is provided underneath the cart. The Air Condition system is to provide necessary cooling inside the cart only. It is very interesting to know that the amount of cooling by Air Condition system inside the room is equal to the heat throughout by the Air Condition to the outer environment. It means that at the cost of our own room cooling we are heating the outer environment, to minimize this heat balance we should limit our luxurious environment to our real need.

In fact summer in Pakistan is more severe than winter. The death rate of new born babies are high which is caused by hot wave in summer. The babies born in the summer season are badly affected by heat with high humidity, which followed by baby deaths. If we provide air conditioned environment for these babies at least we can control this loss of lives. The most suitable idea is solar air conditioned bed which is partially depend on AC mains electricity and will work in rural areas of Pakistan especially where long load shedding in the summer due to high short fall of electricity.

Summer in Pakistan is more severe than winter and the short fall of electricity is high in rural areas. Everyone but especially babies need air conditioned environment around them but due to short fall of electricity, limit this need. What we are making is the need of the day which is Solar Air Conditioned Bed (for babies) in first phase of the project, which is innovative approach to the problem. In conventional air conditioning systems most of the cooling is wasted in the room where we don't required which decrease the efficiency of

the system. We confined the air conditioned environment around the bed which we really need and control the heat leakage to improve the efficiency and decrease running cost of the air conditioning system.

**Model Description**

Either for a house or an automobile, the air conditioning system consists of five main components which are compressor, expansion, evaporator, refrigerant and condenser [3].

A compressor is the heart of the air conditioning system in which refrigerant is compress to increase the temperature and pressure of supplied gaseous refrigerant. Expansion valve is used to expend refrigerant immediately to increase the temperature and pressure. The working of the evaporator is opposite of the condenser. In evaporator refrigerant liquid is converted to gas, absorbing heat from air in the room. Refrigerant is a cooling agent which absorb heat from surrounding and will complete the cycle inside the circuit of the air conditioning system. 1,1,1,2-tetrafluoroethane, R-134a, Forane 134a, Genetron 134a, Florasol 134a, Suva 134a orHFC-134a, also known as norflurane (INN), is a halo alkane refrigerant with thermodynamic properties similar to R-12.A condenser are simply small width pipes which are used to decrease the temperature of refrigerant by blowing air through it.

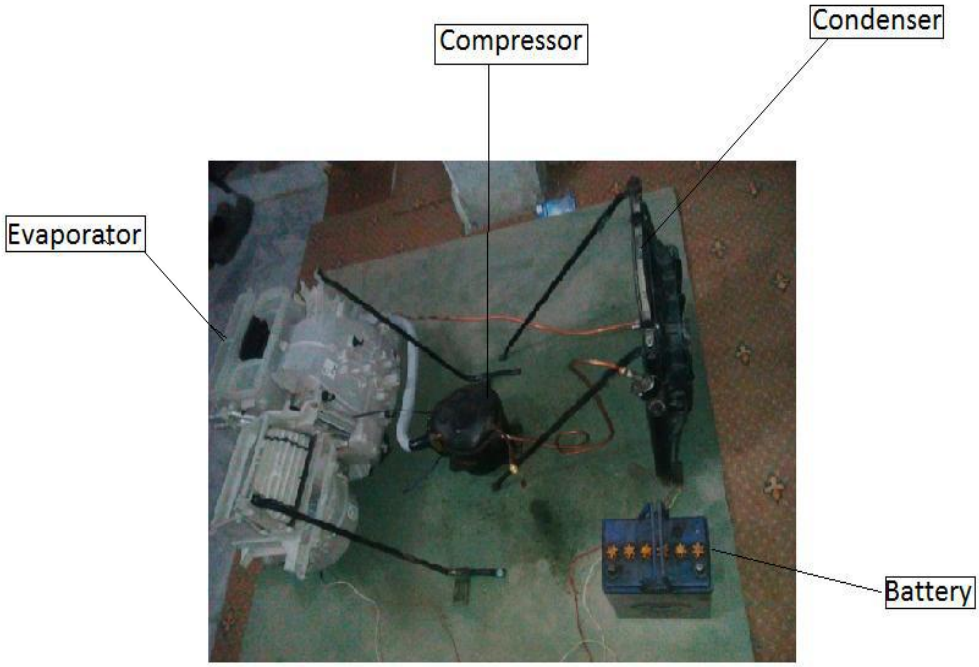


Figure1. Prototype of solar air condition system.

This prototype consists of a Compressor, Evaporator, Condenser and Battery. The copper pipe is connecting all the components with each other. The discharging side of the Compressor is connected with the inlet of the condenser. The outlet of the condenser is

connected with the capillary tube and then capillary tube is connected with the Evaporator with the help of Expansion Valve. Then the outlet of the Evaporator is connected with the inlet of the compressor this completes the refrigeration cycle.

The calculation of the battery time is.

Charging current should be 10% of the Ah rating of battery.

Charging Time of battery = Battery Ah / Charging Current, £ = Ah / A.where £= Charging Time of Battery So 10% of 200Ah is 20A current Then£ =200/20. The result will be £=10 Hours.

Discharging time of battery can be calculated as Discharging Time= battery capacity* Volts/Total power. In mathematical form we can write as β=Ah * V/W. where Discharging Time = β we use 200Ah Battery, 12 volt &500 watt total load Then, β=200*12/500. The result will be β=4.8 Hour

Power Rating for Solar Panel, The idea is 200Ah at 12 V (DC) we need to apply the 10hr charging method, so 10% of 200Ah gives 20A.In calculation we can write as 200Ah/10h = 20A. So power of needed solar panel is computed as follows, 12V·20A=240W. So the power of panel is 240 W.

**Result**

On the observation of upper calculation the result can be obtained as

Table 1. Starting Results of the proposed design.

| **Compounds** | **Voltage (v)** | **Current (A)** | **Power (P)** | **Efficiency (%)** |
|---|---|---|---|---|
| Compressor | 12 | 22.5 | 270 | 93 |
| Evaporator | 12 | 7.5 | 90 | 95 |
| Condenser | 12 | 7.5 | 90 | 90 |
| Fans | 12 | 4.1666 | 50 | 100 |

Table 2. Running Results of the proposed design.

| **Compounds** | **Voltage (v)** | **Current (A)** | **Power (P)** | **Efficiency (%)** |
|---|---|---|---|---|
| Compressor | 12 | 4 | 48 | 98 |
| Evaporator | 12 | 2.5 | 30 | 98 |
| Condenser | 12 | 3.5 | 42 | 98 |
| Fans | 12 | 4.1666 | 50 | 100 |

## Conclusion and Future Work

This paper concludes that the air condition system design needs to consider PV system in order to achieve the space cooling. For the air conditioning, cooling size must be determined first so that it will give a rough idea about the design and construct the air condition system with enough electrical energy as well as solar energy supplied to it. With considering of these several factors, all these factors will help to improve the strength and efficiency of the system for the solutions to the world's energy needs.

In future we will use DC Compressor with the help of which we can improve more efficiency of our System. After than we will install sensor for Calculating different parameters of the system for better data logging and use deep-cycle batteries in our project.

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# Paper No. 412

## WEATHER DATA LOGGING OF TEMPERATURE, HUMIDITY AND DUST SENSOR USING XBEE MODULE

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**Abstract**

*The changing of climate is one of the most crucial factors affecting the life style and the activity of the increasingly population. The current resources for the data collection of weather are indeed limited and make use of some expensive weather stations, leading to the lack of such system in most of the areas due to its high costs. We designed a low cost Zigbee module based on Arduino Uno board, which measures the atmospheric data, including air temperature, relative humidity and dust. It sends this information to the GUI designed in a programming Language Called Visual Basic running on a PC through Xbee wireless link.*

**Key words:** Arduino UNO, DHT 11 Sensor, Dust Sensor, Xbee Module.

### Introduction

In this 21st century, weather monitoring holds a very big importance and have uses in several areas ranging from agricultural field weather conditions to industrial fields conditions monitoring. Weather monitoring would help in keep tracking different climatic conditions including temperature, humidity and light intensity. The main problem is the cost of the weather stations and the designed applications, which are so much costly. In this project we will make our own system and our own designed application. That can be later modified for so many other sensors. Such application can be used in main weather stations with or without the Xbee technology.

The rest of the paper is followed by this method that we have our related work, System model after that our Results and Discussions at the end given is the conclusion of the project.

### Related Work

"Zigbee based weather monitoring system "Nisha Gahlot, Varsha Gundkal, Sonali Kothimbire, Archana Thite4. They Proposed System design consists of transmitter and receiver. Transmitter section consist of different type of sensors such as temperature, humidity, rain quantity, wind direction, wind flow as well as the sun intensity. The microcontroller get the values from the sensors and it passes these values to the zigbee it transmit these data to receiver side wirelessly [2]. "Low cost Zigbee based automatic wirless weather station with GUI and WEB hosting facility "Nitant Sabharwal, Rajesh Kumar, Abhishek Thakur, Jitender Sharma. The proposed system has integrated all of these sensors on the same Arduino Uno board. The BMP085 and SHT21 sensors have I2C interface, hence can be connected on the same line. On the other hand all of the other

sensors are connected through different lines to the Arduino. The two Xbee modules, one connected to Arduino's Tx and Rx terminals and other on the Xbee Xplorer, connected through the USB to computer system, are the link between the Arduino and Computer system after successful uploading the program in ATMega328 microcontroller in the Arduino Uno Board [3].

**System Model and Prototype Design**

We are designing a wireless weather station which calculate the Temperature, Humidity and Dust values through sensors. We are using Ardunio to get the values from sensors and send it to Xbee .Now this Xbee will transfer data wirelessly at receiver side where we get these values. At receiver side we design our GUI(Graphical User Interface) for displaying these values.

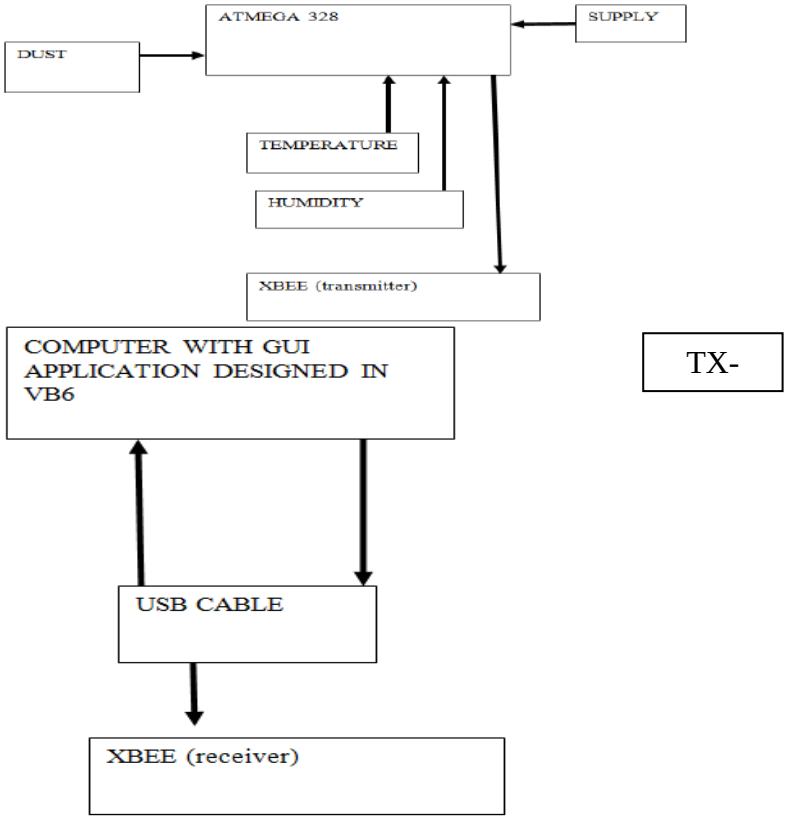


Figure 1. Block Diagram of the system.

We considered these digital sensors and place them at different locations in Peshawar City. Each sensor sense the three parameters i.e. temperature, humidity and dust. In this operation, we took three Zigbee modules and by D2D communication, the data of each sensor is forwarded to the other two. After that arduino save the values of the sensors and make it one time slot to transmit these values wirelessly with the help of Xbee. The XBee is a RF Module and are designed to operate with ZigBee protocol and support the unique

needs of low-cost, low-power wireless sensor networks. The module operate with 2.4 GHz frequency band. It operates on different ranges but we use Xbee S1 itsrange is 100 meters. In Xbee we create our personal area network(PAN) for the secure transmission. At the receiver side we are designed the GUI(Graphical User Interface) in the laptop. The receiver Xbee is connected with the laptop through Universal Serial Bus (USB).

**Results AND Discussion**

We considered two scenarios: location 1 is Peshawar City and location 2 is Peshawar Cantt, and they are about 50 miles away from each other. The results shown here are for the average of three sensors Temperature, Humidity and Dust. The data collection duration was one hour. Each sensor collected data for all the three parameters at an interval of ten minutes.

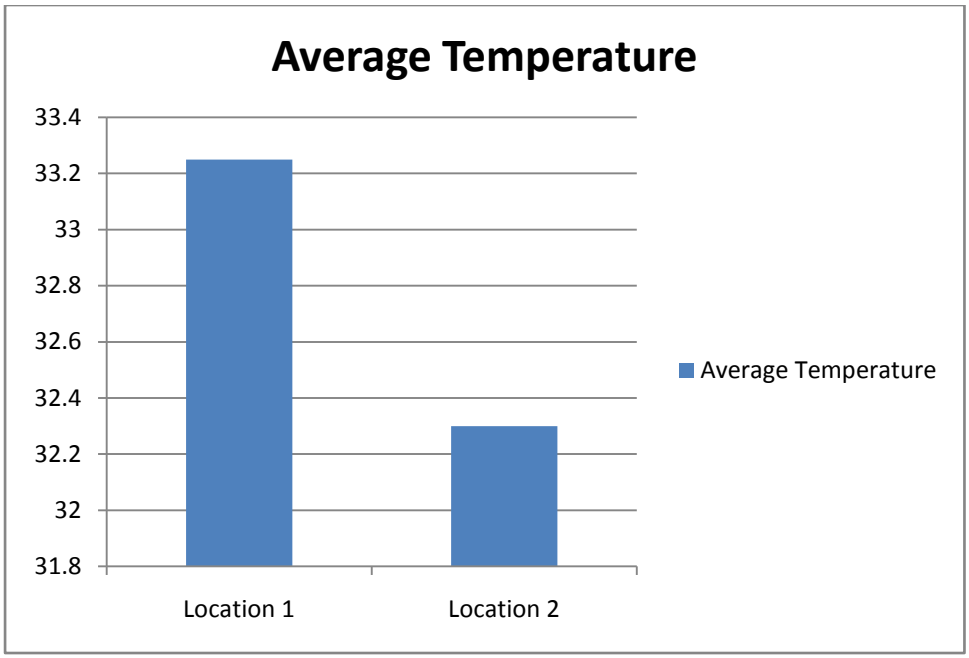


Figure 2.Average Temperature of Location 1 and Location 2.

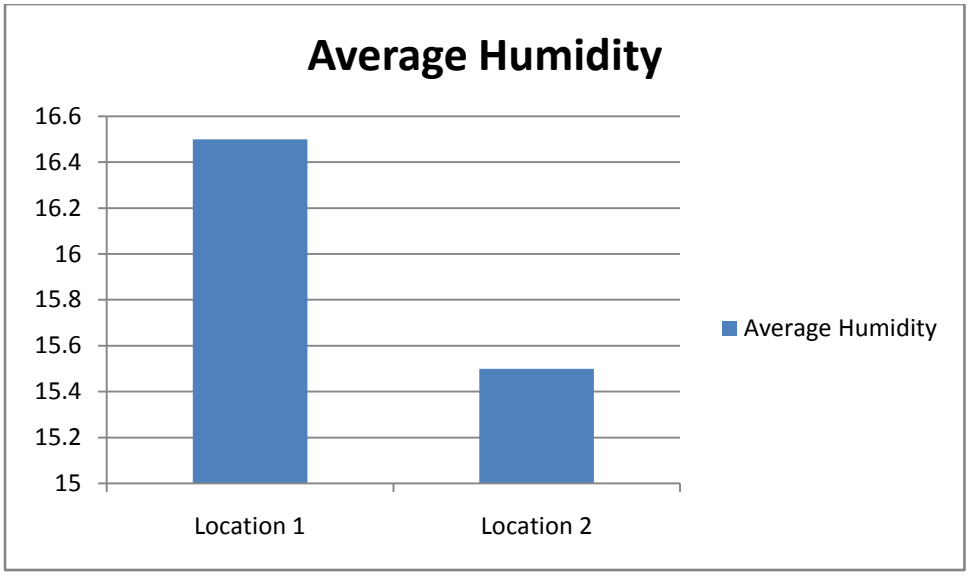


Figure 3.Average Humidity of Location 1 and Location 2.

The results shown here in this paper are the average across all the ten readings for every sensor. Figure 2 shows the average temperature of the values of location 1& Location 2. In this graph we see the temperature difference as in location 1, the temperature is high as compare to location 2.

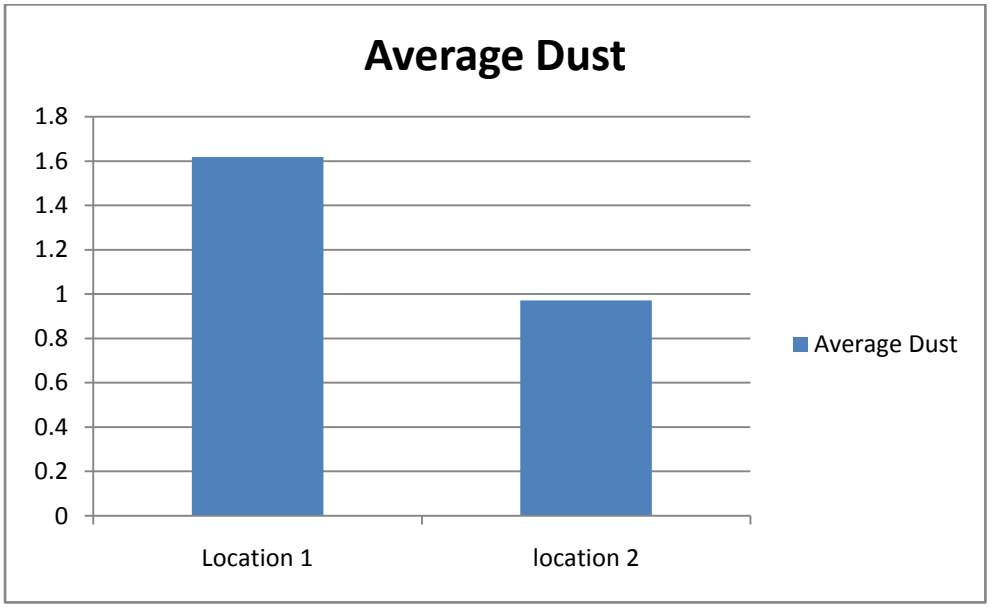


Figure 4.Average Dust of Location 1 and Location 2.

Figure 3 shows the average Humidity in location 1&2. As in location 1 the temperature is high but the humidity is low and in location 2 the humidity is high as the temperature is low, so for this we said that humidity is inversely proportional to the temperature.

Figure 4 shows the average dust according to the graph the 1st location is a dusty as compare to the 2nd location .At location 2 the environment is clear because there is no noise pollution and also there is much more greenery present in there but at location 1 the noise pollution is present and the amount of greenery is almost zero.

**Conclusion**

This work demonstrates Design and Implementation of Weather Monitoring System. In this paper we proposed a low cost wireless weather station and a design application. It is capable of calculating temperature, humidity, dust and the alert notification. In future we can add a few more sensors like wind speed, pressure etc for an accurate system. We can also build multiple transmitters and collect all of their data at one application.

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# Paper No. 413

## DESIGN AND IMPLEMENTATION OF VISIBLE LIGHT COMMUNICATION

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**Abstract**

*Currently, the research community has shown very strong interest towards visible light communication. This work explores VLC communication through a prototype implementation. In this work the visible light is being used and IR sensors. The IR sensor have been in practice for receiving of data which is send from the keypad and is further displayed on the receiver side with the LCD. The IR sensor is interfaced at the receiving end. The data is sensed by the receiver side through the blinking of the LED at the transmitter end. The IR sensor receives the data at the same baud rate and displays it on LCD which is interfaced with the Arduino at the receiver end. We were able to transmit small data through VLC. In future, we are planning to transmit live stream and large video files through it.*

**Key words:** Visible light Communication, Device-to-device, Sensors

### Introduction

The first device used to communicate without wires in the history of wireless communication was based on electromagnetic waves back to the Photo phone, invented by Alexander Graham Bell in the late 19th century. It was basically used the light produced by the sun to carry the information and was a great achievement at that time. Afterwards wireless communication systems based on lower frequency waves has been introduced and almost all the data sent through the air was carried by waves with frequencies lower than those of the visible light, during the $20^{th}$ century.

The visible light communication (VLC) is the communication technology which uses the visible light source as a transmitter, the air is used a communication medium, and the appropriate IR sensors or photodiode is used as a signal receiving component.VLC use the white Light Emitting Diodes (LED), which send data by flicking light at the speed which is unable to detect by the human eyes. LEDs' having the ability to transfer information signals in the form of light (light which have the frequency about 400THz to 800THz &the wavelength is between 700nm to 400nm). The main technical development which made is that VLC likely is cheap, high power light-emitting diodes (LED) of high quality, capable for switching at high frequencies. All these need is done by to exchange the already deployed light bulbs with smart and proficient LED bulbs. [3]One interesting application is to communicate between two objects or more than two objects inside the room by using VLC. Light has the dual nature of illumination and as well as transfer the data. An everyday example the infrared (invisible) light in remote controllers, used only to send for a short control signal. According to the directionality between the transmitter, the receiver and the obstacles in the path of light, the link configurations are based on non-directed Line-of -Sight (LOS). The figure 1 below shows the geometry representation.

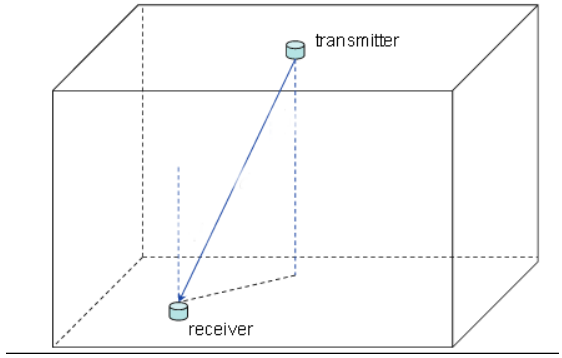


**Fig. 1: Geometrical Representation of non-directed LOS of VLC**

To clear the concept of VLC we first compare it with the infrared communication technology. The main differences between the VLC and infrared communication are listed in Table 1.With the exponentially expanding information request however restricted accessible radio range, options will be important to suit the necessities of the need. This part will delineate the issues of current remote correspondence frameworks and other options to these frameworks, and in addition inspirations and conceivable applications for unmistakable light interchanges.

The Federal Communications Commission (FCC) directs numerous remote applications in the US, including radio, TV, wire, satellite, and link. Every application is given a recurrence band in which it is permitted to work to permit effective utilization of the accessible recurrence range. From Figure 2, forecasts assessed that when even 2013, the US could conceivably be in a range deficiency. Accordingly, a more productive method for using radio recurrence is essential.

Table 1. Comparison of short-range wireless communication technologies (FIR: fast infrared, VFIR: very fast infrared)

| | Visible light communication | Infrared communication |
|---|---|---|
| **Data rate** | >100Mb/s possible<br>(LED dependent) | 4 Mb/s (FIR),<br>16 Mb/s (VFIR) |
| **Status** | Research and standardization<br>in IEEE | Standardization<br>(IrDA) |
| **Distance** | ~meters | ~3 meters |
| **Regulation** | No | No |
| **Security** | Good | Good |
| **Carrier wavelength (frequency)** | 380~780 nm<br>visible light<br>(multiple wavelengths) | 850 nm infrared |
| **Services** | Communication, illumination | Communication |
| **Noise source** | Sun light,<br>Other illumination | Ambient light |
| **Environmental** | Daily usage<br>Eye safe (visible) | Eye safe for low power<br>(invisible) |
| **Applications** | Indoor & vehicular communication,<br>Optical ID | Remote control,<br>Point-to-point connection |

Lights in the unmistakable range are utilized all over the place, giving a few chances to apply obvious light interchanges. There are numerous applications in which information exchange by means of VLC frameworks could be valuable including movement lights, which could use frameworks to streamline activity stream; TV sets, which could supply a client with data on current show postings; and doctor's facilities, which could use the frameworks for more secure exchange of information.

Doctor's facilities have numerous motivations to utilize distant innovation. Use of distant innovation in clinics integrate overhauling data by distantly keeping up patient records, gathering information as a continuous handheld patient screen to identify changes in a patient's condition, or aside watching therapeutic pictures by means of ultrasound.

Smart buildings require smart lighting. VLC provides the Smart lighting, the infrastructure for illumination purposes, controlling and communicating. In the process it greatly reduces the wirings and saves energy usage in the building. It is the fact that the visible light cannot be detected outside of the wall thus had great security advantages. RF does not work underwater while visible light can support the high speed data transmission over short distances underwater. This could be enable divers and underwater vehicles can communication inside the water.

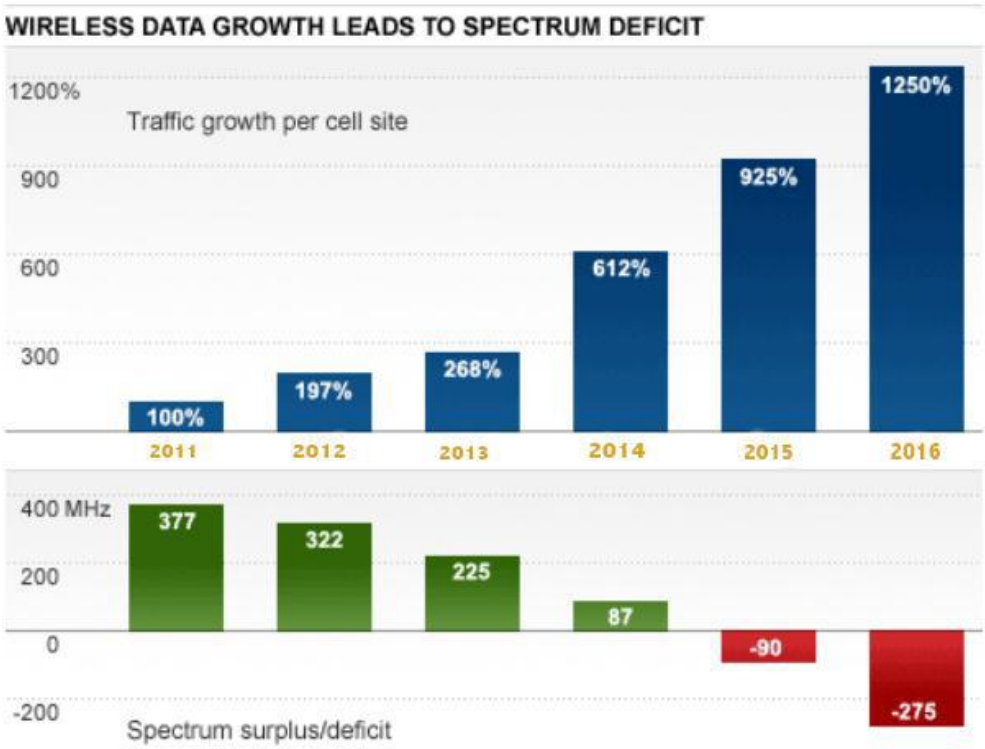


Figure 2 Wireless data growth source

**System Model and Experiment Design**

The LED based half duplex is used for communication of data. For first prototype the led torch, a small low range led at transmitter side, a photo transistor or IR at receiver side is interfaced. The project consists of two parts, one is the transmitter part and the other is the receiver part. The transmitter part consist of the Arduino UNO connected with system(laptop), the Arduino send data over serial port and the LED transmit this data in the form of light, also the 4X3 keypad is used instead of system. On the receiver side the IR sensor is used, the data once received is decoded by the MCU and streamed to the LCD where the sent data is displayed. The LCD having a parallel interface, which means that microcontroller, has to influence several interface pins to control the display. The IR which is exchanging On and Off at the rate of 38 KHz. It is dynamic low, implies its yield is stays HIGH when there is no IR, and turns out to be low when it recognizes IR radiation. The IR receiver is considered to be more noise immune than the Light dependent resistor. The system has one limitation that both transmitter and receiver must be in line of sight. The figure shows the block diagram of overall project.

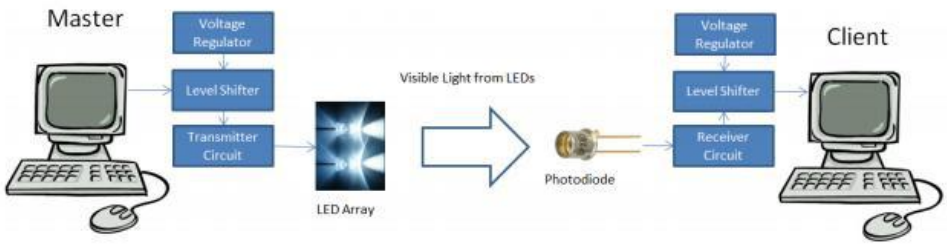


**Fig. 3: Design of prototype with USB interface.**

Using visible light communication (VLC), the data (Text Message) from transmitter end to the receiver end is transferred. A Line-of-Sight technique, explained to achieve the data at receiver side. The software called "Arduino software" is used at transmitter end to 'type and send' the data and also at the receiver end to 'receive and show' the data on the LCD. The IR sensor which is used on receiving end is having a wavelength of 700 nanometers (frequency 430 THz) to 1 mm (300 GHz).Max232 is used for sending data from computer. The computer is working on TTL logic and the other side is working on digital logic having reference voltage at 0V. In TTL there is negative reference. So that Max 232 works like a TTL to CMOS or CMOS to TTL converter circuit. One transistor is used to invert the output of the sensor. The data is sent on a baud rate of 9600 using visible light. The IR receives the data at the same baud rate and displays it on serial terminal. The transmitter and receiver are placed in front of each other. The system gives error some time and the external light effect the communication.

**Result and Discussion**

At the completion of the project while, transmitting information from the transmitter side to the receiver side gives up satisfactory results. There were some mistakes whose eradication enhanced the productivity. Diverse information was transmitted through the transmitter and was successfully conceived at the receiver end. The big issues were encountered during the interfacing of Arduino, interfacing of keyboard and LCD. The Arduino UNO was a sharp fix to the issue since it was well known and accessible. In this segment, the other advanced choices brought into practice, for example, Keypad, and LCD. A Programmable Arduino is an incorporated circuit that contains a vast asset of rationale entryways and memory to execute computerized calculations. With an Arduino, it is conceivable to have parallel executions. This would permit the system to test the approaching information without influencing the other process. Arduino could take the information and play out calculation alternately notwithstanding once again into ASCII content. Arduino is additionally more qualified for the signals of light.

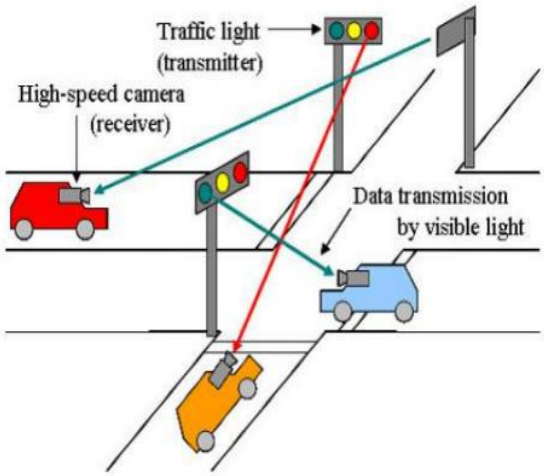


Figure 6 Road-to-vehicle and using High speed cameras

**Conclusions**

The initiative has been taken with the undertaking while considering the writing and market overview about information. Since the hardware is not effectively accessible on business sector. The circuit schematic is settled and at the last brought to completely working. The success of this project relied to a great extent upon numerous days of examining and testing. The past learning leads us to more in-depth insight and top of it is said that various upgrades could be made. Building the transmitter for the framework was generally simple. It was a generally clear renovation of the past configurations of the VLC. The plan however introduced more of a challenge in the method, the essential arrangement of these circuit components was general fundamentally the same throughout. The principle difference came in the IR sensor and the MCU's. This project accomplished a transmitting separation of 6cm, with the feasibility to be expanded, at a transmission rate of only 9.6 kbps while working in a surrounding light setting. This VLC model was planned as a continuation of exploration into the field of VLC innovations. Our work will help others to probe more in this field and would help get awesome VLC innovations. This technology is no doubt still in its beginning stages, the usefulness of this technology has high implications for a great amount of good.

**Distance –** The high demand of the transmitting information could affect the speed of the data and also the distance is dependent as well. So for a short distance it is easy for transmitting the complete data at the receiver side but over a long distance it requires some techniques to transfer the complete either increasing LEDs and IR sensor or the amplifiers used for a long distance transmission.

**Cost -** The LED-power Li-Fi connection can be used to transmit the information directly with the speed of light. Using this technique office building can stay connected to each other. The use of additional cables is getting rid of. The obstruction would be face by heavy fog, solid objects or the snow would be the only cause of problem.

**Traffic Updates Road-to-vehicle and using High speed camera's –**The traffic lights update the drivers using the basic information or live-streaming video directly from news broadcasts , keep updating to avoid accidents and traffic headache. For the purpose of communication medium to communicate Road-to-vehicle, the LEDs are now being used in traffic lights. The figure shows that the LED is used as a transmitter and the camera as a receiver. In the figure shown that the camera is mounted the front end of the car. This camera is used the information receiver from the traffic signal lights.

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# Paper No. 415

## ON PERFORMANCE OF QUANTUM LOCKING FOR WHEEL-LESS TRANSPORTATION

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**Abstract**

*Transportation has continuously been a vital side of human civilization reflective the extent of general economic and technological advancement of a given society. The recent technological advancements in power electronics are pushing for Maglev train using Quantum locking. For levitation the most important factor is temperature which is affecting the efficiency of the train. In this work we have compared different prototypes of Maglev trains including Japanese, German and Chinese technologies. We also did mathematical modeling to relate the magnetic force required for a certain weight of the train to levitate. We suggest that Japanese maglev is better than Germany and china maglev.*

**Key words**: Transportation, Quantum Locking, Maglev, Superconductor.

### Introduction

Transportation has continuously been a vital side of human civilization reflective the extent of general economic and technological advancement of a given society. Transportation suggests that of assorted types are evolving for hundreds of years resulting in quicker, further, safer, and a lot of price economical visits on roads, rail, on the water, or within the air. It is, however, solely within the last half of this century that the development of holdup becomes predominant because of the fast increase of the quantity of vehicles and will increase in demand for nearly all modes of transportation. Holdup seems once too several vehicles conceive to use a standard transportation infrastructure with restricted capability. Within the best case, holdup ends up in queuing phenomena (and corresponding delays) whereas the infrastructure capability ("the server") is totally used. within the worst (and much more typical) case, holdup ends up in a degraded use of the accessible infrastructure (reduced outturn that will even cause fatal gridlocks) with excess delays, reduced safety, and recently, increase environmental pollution. The aim of developing the new ground transportation systems of the long run is worth it and so it ought to be pursued with great enthusiasm and dedication. This analysis notifies more technical and economic problems related to this promising transportation technology. The ever-growing base of rail technology information and skill is manufacturing advantages these days and holds nice promise for the long run. Quantum levitation or quantum locking is the ability of a superconductor to perfectly match the magnetic fields surrounding it. A superconductor is a material, that when cooled to a temperature below its critical temperature, its resistivity goes to zero[1]. Levitation of the superconductor above the magnet obey two properties i.e. Zero resistance which is also called perfect conductivity and the other one as the meissner effect [3]. To show zero resistance one has to cool the disk to the superconducting state with the help of liquid nitrogen and placed

over magnets. Placing the disk upon the magnets and then cooling it afterwards will show the meissner effect. Before the discovery of meissner effect in 1933, the meissner effect was completely unbelievable. Other Traditional theories magnetism is not expected that a warm superconductor setting atop a magnet will be levitate when the superconductor is cooled below its superconducting critical temperature. By moving the superconductor towards the magnet gives a moving magnetic energy field which ultimately produces currents in the superconductor. These currents are produce in any electrical conductor in a changing magnetic field. This principle is called as Lenz's law [2].

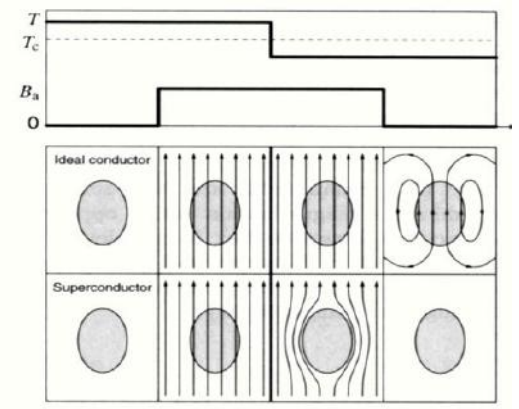



Figure.1 shows Meissner effect in a superconductor [3].

**Superconductor and Magnet**

A disk of a white ceramic material yttrium-barium-copper-oxide called superconductor. It is covered in a copper chamber, and positioned in the center of a plastic foam container which is open by celled Styrofoam [12]. The copper chamber levitates the super conducting disk in such a way that levitation of the superconductor may be seen clearly. There is no need to immerse the superconductor in liquid nitrogen because copper provide enough conductivity.

The track of train is made of magnet which creates magnetic force to lift the train. There are four types of magnets i.e. Neodymium Iron Boron (NdFeB or NIB), Samarium cobalt, Alnico and Ferrite. Neodymium magnet is a powerful magnet that can easily levitated the superconductor when the superconductor is cooled below its transition temperature.

The rest of the paper is organized as follows: Firstly, we discuss the basics of Magnetic levitation. We did a detailed survey about the already deployed technologies for magnetic. Further we present a prototype model for magnetic train using quantum levitation. Before the prototype implementation we found mathematical modeling to find the relationship between the weight of the train and the force required to levitate it. In the last section we conclude the paper.

**Basics of Magnetic Levitation**

The basis of all magnetic levitation is due creation of magnetic forces. There are different ways of creation of a magnetic field. One way is to use a permanent magnet which is made of a solid material and consists of two poles north and South. The second way is to produce magnetic field through an electric field by changing linearly with time. The third way is to produce by means of using direct current [10].

There are two basic principles for the concept of magnetic levitation. The first law states that if there is a change in the magnetic field on a coil of wire, there will be induced emf. It can be illustrated that the changing magnetic field produces current which can be seen in From Figure 2.

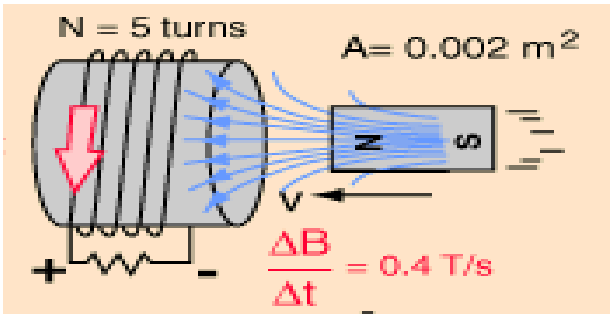
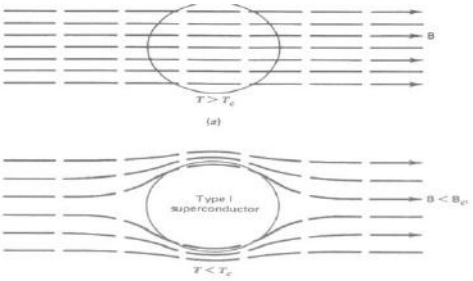



Figure.2 Induced Current from Change in Magnetic Field [9].

**Direct diamagnetic levitation and levitation of superconducting materials**

These concepts are well known for several years, that diamagnetic materials have skill to partially screen out external magnetic field from the volume. This effect can also be used for levitation at room temperature. But there are two important limitations: there is no too strong diamagnetic material in the nature, high magnetic field is required. Very strong magnetic field (about 16 Tesla) is required for levitation for example water drops or some (diamagnetic material) at human fingertips. This effect is sometimes known as "diamagnetically stabilized levitation".



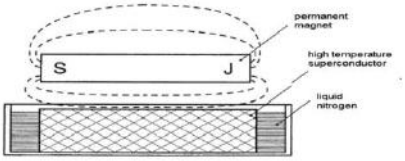




Fig. 3(a) screening out of magnetic field from the volume of the Type I superconductor [7].

Figure. 3(b) Simple superconducting bearing [6].

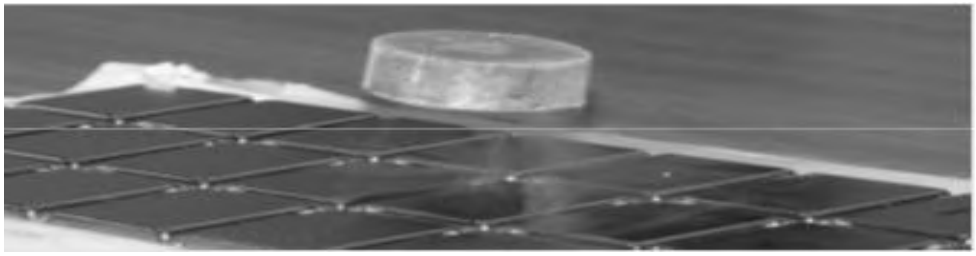


Figure 4 Levitation of a YBCO pellet above a set of permanent magnets [8].

The two scientists Meissner and Ochsenfeld discovered that superconducting material is best diamagnetic material; therefore it can levitate in magnetic field. Few types of magnetic suffering based on this principle were given. This term has one significant limitation – very low temperatures are required. With the fast development of new superconducting materials allows using of cheaper thing for cooling – liquid nitrogen. Nowadays, a critical temperature of superconductors is about 130K. For the levitation purposes the most widely material used is YBCO (a material based on Yttrium-Barium-Copper-Oxygen - melt textured YBa2Cu3O7-x with Y2BaCuO5 excess) with a critical temperature about 92K.As liquid nitrogen is used for cooling [4, 5].

**Comparison of Maglev Technologies Deployed**

In 1900's century First time two scientists named Robert Goddard and Emile bachelet give the idea of frictionless train. Both scientists was fail to explain their idea, so the concept of frictionless train is ended. After 60 years in 1960 the German and Japanese started research on this concept and they are succeeded.

Table.1 Germany maglev compared with Japanese and china maglev.

| Properties | Germany maglev | Japanese maglev | China maglev |
|---|---|---|---|
| Working principal | EMS (electromagnetic suspension) | EDS (electrodynamics suspension) | EMS (electromagnetic suspension) |
| Speed | 500km/h | 581km/h | 470km/h |
| Gap between train and track | 8mm to 10mm | 10cm | 8mm |
| Cost | Low | High | Low |
| safety | Low | High | Low |

**Review on Japanese maglev VS Germany maglev**

Japanese maglev works on EDS principal and Germany maglev work on EMS. Japanese maglev is more expensive than Germany maglev due to the cost of superconductor. But Japanese maglev is safer and faster than Germany maglev. Japanese maglev is better than Germany maglev.

**Demonstrated Method**

Quantum locking demonstrated on two parts: A magnetic track and YBCO with a critical temperature Of 93 K (-292 F) cooled by liquid nitrogen. The track is made up of 250 magnets organized in two parallel rows, oriented such that the magnetic field is directed up at the centre and down at the edges. When the superconductor is cooled below Critical temperature in the presence of the magnetic field tracks. Due to the maximum degree of defect in the material the vortices are strongly pinned, creating a stable imprint of the magnetic field at the time of cooling. A small displacement of the superconductor will mismatch the magnetic field and the "frozen in" sides, and give rise to a restoring force. The restoring force acts in both directions (perpendiculars to the track as well as in the vertical direction). Only along the direction of the track have a uniform magnetic field and the superconductor will move freely [1, 13].

Prior to the prototype implementation, we did mathematical modeling to find the relation of the weight of the train and the force required. We assumed a circular track of diameter D. The other parameters are:

Diameter of track = 40cm

Radius of the track = 20cm

Mass of train

Let mass of train = 300 gram

For the length of track, we have the following equation because we are considering a circular track.

$$L = 2\pi r \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

As we have D= 0.4m, the length of the track is:

$$= 2\ x\ 3.14\ x\ 0.2$$

$$L = 1.256m..$$

$$W = mg \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

By applying the above eq. (2) we can find weight as:

$$W = .3x9.8$$

$$W = 2.94N$$

Force per unit (Magnet)

$$F = AB\text{^}2/2u \ldots\ldots\ldots\ldots\ldots\ldots (3)$$

$$=0.01\ \text{x}(0.0179)^2 / 2x1.667x10^{-6}$$

$$= 1.263N$$

Force of total track is:

1.263 x 249 = 314.48N

Force of magnet under the train

$$F = AB\text{^}2/2u \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots (4)$$

$$= 0.04 \text{ x} (0.0179)^2 / 2x1.667x10^{-6}$$

$$F = 5.04N$$

As from the above calculations, we show that the force of magnet is greater than the weight of train so the train is levitated. Now for the prototype implementation, we have the following parameters for the train, track, the magnet we used and levitator.

Length of train L=20 mm

Diameter of track D=40cm

Magnet:

Neodymium Iron Boron (NdFeB or NIB)

Flux density B = 0.0179T

Length of the magnet l1=10mm

Width of the magnet w1=10mm

Thickness of the magnet h1=5mm

Number of magnets in track N= 249

Levitator:

Length of levitator l2=20mm

Width of levitator w2=20mm

Mass of the (levitator Train) m=300gm

**Prototype Design**

The principle selected for the experiment is levitation of a superconductive material (ideal diamagnetic material) above a guide way with permanent magnets. The guide way of the model was designed as a circular track, 20mm wide and 1.25 meters long track, made out of rare-earth NbFeB permanent magnets (PM).PMs are arranged in circle with the same orientation of magnetic field. The vehicle model was designed to enable keeping of YBCO pellet in the considerable amount of liquid nitrogen. One pellet with diameter 20mm and thickness 20mm were used as the main levitators, which lift the vehicle above the guide way. Pellet with diameter 20mm and thickness 20mm were used as auxiliary levitators, which should stabilize lateral swinging of the vehicle.

**Conclusion**

Maglev train using quantum locking is advance type of railway having latest technologies in power electronics .Temperature is important factors affecting the efficiency of the maglev train. Maglev train (ybco) which is levitates on 92K or-181 C. For bringing the temperature at that level we use liquid nitrogen .If the temperature increases from that specific level will not levitate. Initial cost is high than the running cost of the maglev train because of the cost of superconductor. The main property of the superconductor is

diamagnetism. This property helps to know about a vertical repulsion force through which superconductor levitates and the magnet (circular track).

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# Paper No. 428

## DESIGN AND OPERATION OF MICROGRID

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**Abstract**

*The need for new generation systems has motivated the development of microgrids. This new concept may provide significant benefits such as losses compensation, achieving high degree of efficiency and reliability to the transmission and distribution networks. This novel idea provides more advantages about Microgrids like general structure and different topologies. Also an original methodology for facilitating its design is proposed. Finally Simulink model of Microgrid is designed and then analyzed.*

**Key words:** Microgrid, Diesel generator, wind turbine, batteries and converters.

### Introduction

Due to the benefits like high reliability, good power supply, environmentally friendly and low cost energy the distribution generation technologies such as photovoltaic (PV), Wind power system (WPS) and fuel cells have gain popularity, but with increasing the amount of individual distributed generation will many problems regarding its control and protection of microgrid. Its control will be complex.

In order to solve these problems microgrid technology comes into play.Microgrid has two modes of operation one is grid connected and other is islanded mode. Due to this it increase the reliability of energy supplies by disconnecting it from the grid during the network faults.

A microgrid is the combination of electrical sources; loads and energy storage system operate in grid connected scenario or in islanded mode [1].

Micro-grid offers different important advantages. Microgrid operates mostly connected with high voltage distribution network but can also be operate in islanded mode. Until now the generating capacity of microgrid is 1MW [2].

Microgrid is the smaller version of electrical main grids in many aspects. Like main electrical grid system they are also consists of power generating system, distribution system, converters and controls and protection. There difference in between main grid system and microgrid is that microgrid is used closer to the power use as compared to the main grid system which are connected far away from the power use mean the power generation is at the large distance from the power use while in microgrid there is low transmission loss as well as high efficiency due to this factor. Microgrid can be design from conventional and renewable sources but now a days researches are done by using renewable sources [3].

According to [4] microgrid is the system consisting of generating system, storage system, and load connected. For microgrid we can use backup system during peak hours. Main grid, batteries can be used as a backup system for microgrid. Energy sources use in microgrid can be renewable and also conventional.

**Results and Discussions**

The sources used in microgrid are diesel generator and wind power system. As both the sources have output AC voltage. To connect two AC sources at a single point they must be synchronized in order to avoid blackout. The output of wind turbine is variable; to stabilize the output voltage of wind turbine FACTS devices are nowadays commonly used. In simulation as shown in fig 1 the wind speed and pitch angle is taken as constant value i-e 12 m/s and $0^0$.As shown in the figure 2 the output voltage and current of wind power system is shown hence pitch angle and wind speed is taken as constant so the output voltage is constant.

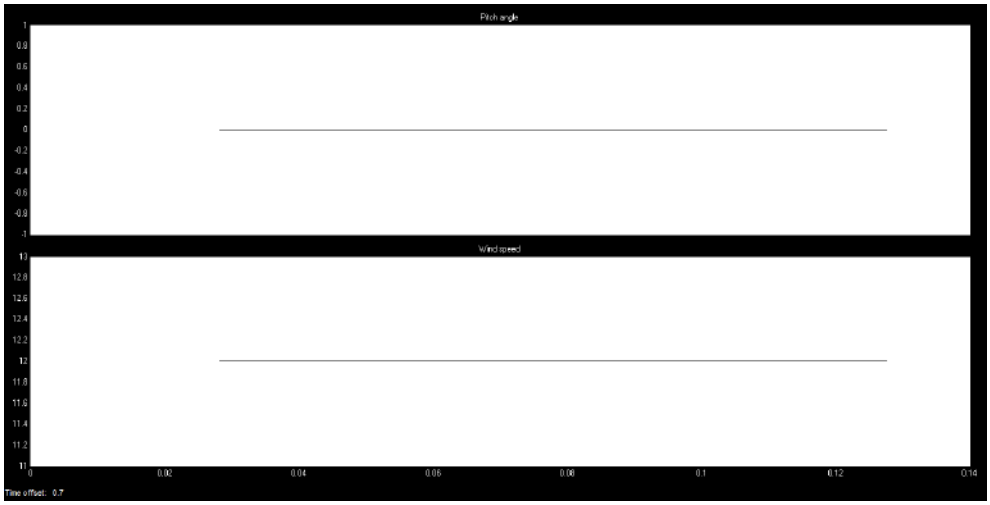


Figure 1. Wind speed and pitch angle wave form.

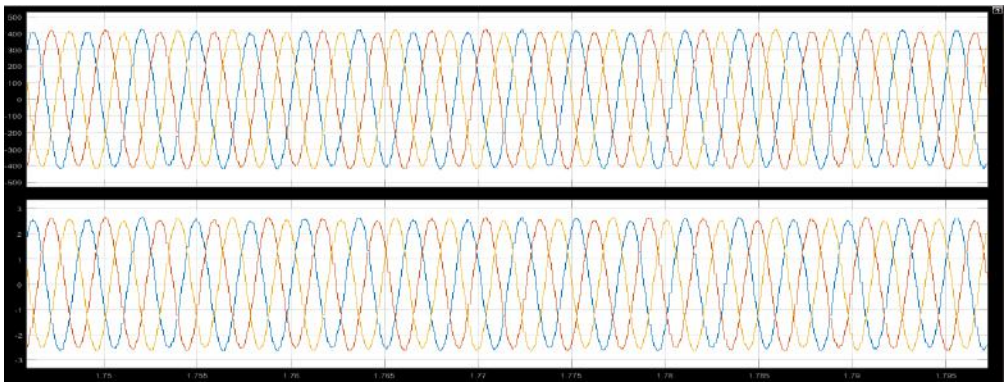

Figure 2. Output voltage and current waveform.

The overall Simulink model of microgrid is shown in fig 3 Diesel generator and wind power system are the sources used in microgrid, batteries are used which can be charged from the wind power system and we can connect DC load from its output.

As shown in the fig 3 universal bridge is used. The universal bridge block is a universal three-phase power convertor, consists of up to six power switches connected in bridge configuration.

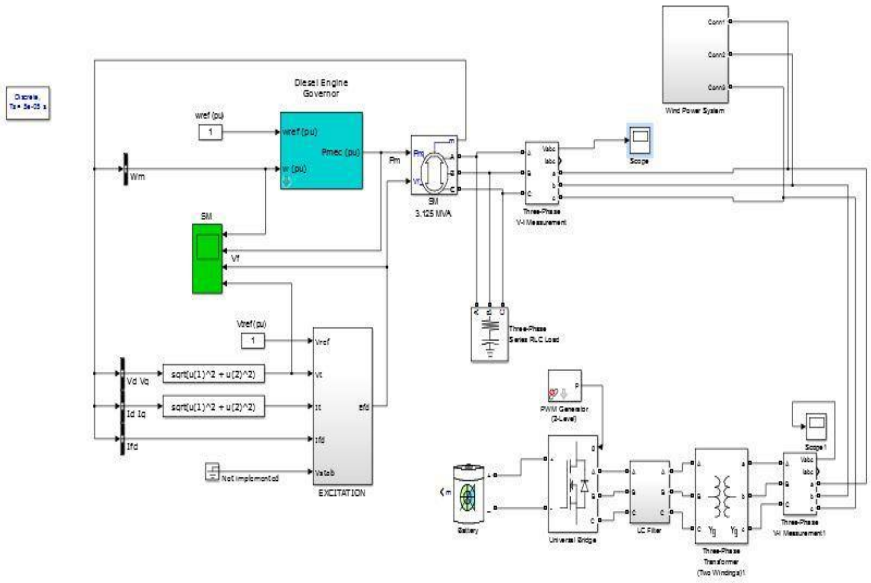


Figure3. Simulink model of microgrid.

Fig 4 shows the stable sinusoidal output voltage of the microgrid i-e the output voltage waveform of Diesel generator, wind power system and battery system. As the output voltage of microgrid is stable so we can easily connect it with grid station through synchronization during peak demand on the grid station.

During the base load the Diesel generator will supply enough power to the consumer and at that time wind power system (WPS) will be disconnected from the load and will charge the batteries. During the peak load the load current is increased as a result relay will send signal to circuit breaker and circuit breaker will closed down and wind power system and diesel generator both will supply power to the load. Batteries can be discharged across DC Load or we can use it to meet the required demand of consumers during peak hour by converting it into AC using DC-AC converter or inverter.

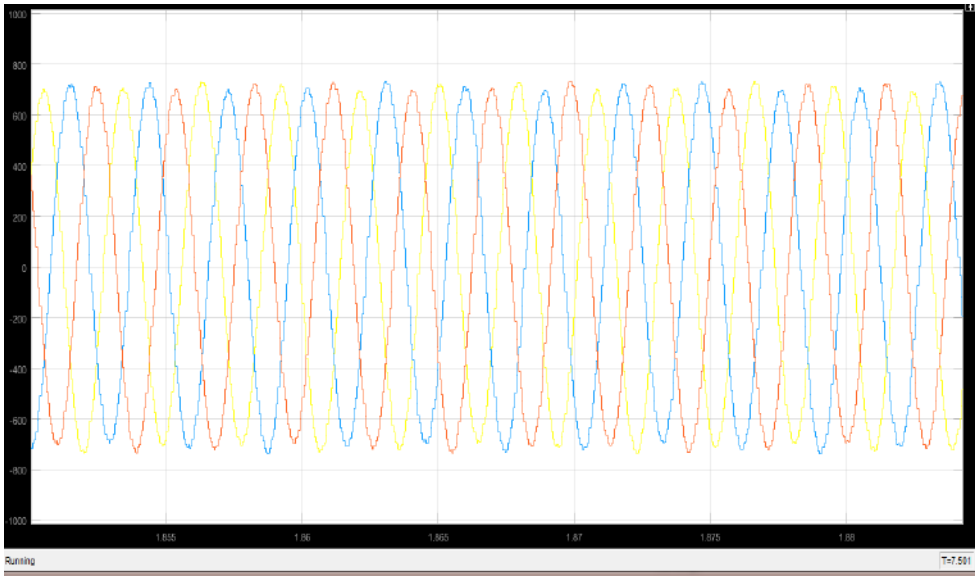


Figure4. Output Voltage of Microgrid.

Comparison with other microgrid designs, the microgrid we design can give both AC and DC output voltage at the same time. We can get DC output from the output of storage device i-e batteries. During peak load there is no need of other backup system the charge stored in batteries can be used as a backup system for microgrid.

**Conclusion**

Microgrids are a future power system configuration providing clear economics and environmentally friendly i-e providing environmental benefit compared to the modern large power systems. Development of microgrid concepts needs to resolve different economic, commercial and technical challenges. Microgrid plays important role in places which are currently poorly served by the main or large power system.

Microgrid can be used complementary network of utility to improve the power supply reliability and power quality. Its control is not complex, microgrid has plug and play control i-e it doesn't require site engineers for it. Most of the researches are concentrating on the control of microgrid but the protection microgrid is still stagnating at the theoretical stage [5].A modern way of generating large scale electrical power from renewable and conventional sources.

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# Paper No. 432

## ROBOTS PLAYING SOCCER

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***Abstract***

*Collaborative robots involve a team of robots which work together socially to achieve a task. There are many ways to work together socially and one of them is playing soccer. In this project, we have designed robots to play soccer. This design of robots involves using Arduino UNO R3 microcontroller and using Bluetooth for communication. We have designed a stadium (approximately 6ft by 6ft) and a camera is mounted on the top of stadium to detect the robots and guide them towards goal. Furthermore, we have developed an Android app to control the robots from cell-phone/tablet. This project consists of 2 teams of robots. One team is controlled by computer and the second one is controlled by human using the android app.*

**Keywords: Arduino UNO R3, HC 05 Bluetooth Module**

## Introduction

Robots are designed to do certain activity on the basis of algorithm programmed in them and they are mostly limited to a field. These kind of robots need a system to understand their environment, their location in that environment, a way to perform the designed activity and how to do that accurately. When more than one robot are present the complication arises as one robot has to be built intelligent enough to perform the activity without disturbing the other.

The small size league robots are a part of Robots playing soccer team. The robots in this project are guided by software MATLAB in all respect like their team members, opponents, location of goals and location of ball. Both the teams have same hardware dressing as for this activity hardware components are standardized. So basically the activity or competition is all about the controller designing for the robots.

The rest of the paper is followed by this method that we have ourrelated work, System model after that our Results and Discussions at the end given is the conclusion of the project.

## Related Work

The RoboCup most advanced league uses the Aldebaran Nao robots. Project Nao launched in 2004 and the Nao robots have been the robot of the SPL since 2010. The most recent release of the heads for the Nao robots is version 4, which features 2 high-definition cameras (1280x960), an Intel ATOM 1.6 GHz CPU, and wireless communications over Wi-Fi. The body of the robots features 21 degrees of freedom [1]

The entire system's desired processing flow is encoded in a multi-camera stack which fully defines how many cameras are used for capturing, and what particular processing should be performed. The system has been designed so that developers can create different stacks for different robotics application scenarios. By default, the system will load a particular multi-camera stack, labeled as “RoboCup Small Size Dual Camera Stack”.[3]

Tracking means following a defined path. For different wheel vehicles different equations are derived to make them follow the path keeping in mind the slippage of wheels and precision of movement. For unicycle type robot with two actuated wheels on a common axle and a midpoint “M" between the two wheels the equations is as follows

$$\begin{cases} \begin{pmatrix} \dot{X} \\ \dot{Y} \end{pmatrix} = v. \begin{pmatrix} cos\theta_m \\ sin\theta_m \end{pmatrix} \\ \dot{\theta}_m = w \end{cases}$$

[2]

Here v and w are the robot translation and angular velocity of the robot respectively and the theta denotes the vehicle's angle in the field with respect to a fixed co-ordinate system

## System Model and Prototype Design

We are designing a team of robot that will be controlled by a matlab software and do the following processing includingProcess the captured frame, Conversion to binary image, Calculate frame dimensions, Calculate Region of interests (ROI), Arranging the Region of interests (ROI),Comparing the findings, Sending the commands. The software will interact with the camera attached to the computer and mounted on the top of the stadium to give live streaming of the field and capture a frame. Once the frame is captured it will be processed in the following way. The captured frame is converted into binary frame for normal processing and reduces the load on the processing. The captured frame’s dimensions are acquired for calibration. Once the frame is fully processed and filtered the regions of interest are obtain that are basically the detected objects on the robots field. The detected regions are then arranged according to their sizes so they can be compressed and obtain the information. Each object size represents a specific ROI like the detected ROI is for the location of goal. The controller then process for the conditions of movement. Like it distinguish the angle between the two robot and the ball. If the angle is bigger or smaller

then certain amount the Arduino robots rotates to hit the ball. After the conditions are checked, if the condition is not accurate like the robot is facing not towards the ball the controller will send moving command to rotate the robot so that it faces the ball. On the other side if the condition is accurate the controller process for the next step.

## Results and Discussion

After the successful processing the Robot will move towards the imaginary points defines in the algorithm. After reaching the imaginary point the controller send alligns command to the robot in direction of goal and hit the target in direction of goal with some speed. The graphbelow shows the imaginary point placement. The point 'G' represents the location of goal on the stadium, the point 'B' represents the current location of ball and 'I' represents the imaginary poit defined by the controller.

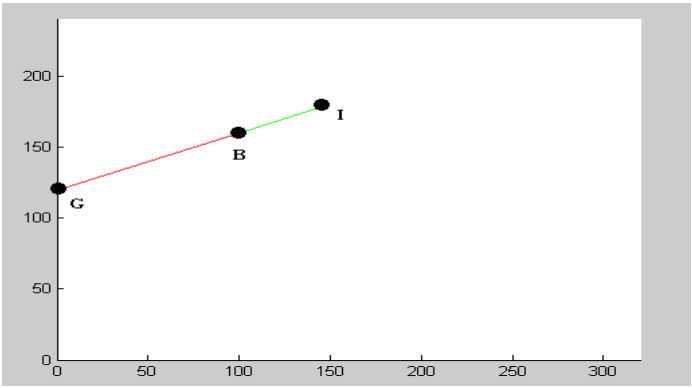


Figure 1. Imaginary point placement.

## Conclusion

This work demonstrates Design and working of Robot playing soccer. In this paper we proposed a low cost wireless communication and a design application. It is capable of image processing and wireless communication between two robots. In future we can add a few more robots to make it more interesting, or we can work on Humanoid robot for the future technology.

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# Paper No. 437

## WIRELESS HAND GESTURE ROBOT USING DIGITAL IMAGE PROCESSING

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**Abstract**

*To build RF based hand gesture robot which can be controlled through RF technology, where the decision of the gesture will be taken on behalf of image processing in MATLAB. To control the motion of the robot i.e. moving forward, moving backward, moving left and moving right. Moreover the information regarding direction will also be displayed on the transmitter end. In this system microcontroller is used as a central part to control the movement and direction of the Robot. The movement of the robot is controlled by hand gesture, the robot moves at a particular direction where hand gives a gesture. In this system for the detection of hand movement, DIP(digital image processing) tool is used which detect the hand and give information to the microcontroller which gives command to the transmitter. The transmitter transmits the desire signal to receiver side. The receiver gives command to microcontroller on the receiver side and the robot moves toward the desire place or direction*

**Key words**: DIP, Gesture, RF technology, Microcontroller and H-bridge.

### Introduction

Robot is an electromechanical device, which automatically work in different applications such as military application, Industrial Power Plant [3] etc. There are two type of robots categorized on the basis of its control mechanism, one is Autonomous robots and other is non-autonomous.

Autonomous Robot: such type of robots which have capability to take decision on behalf of human. They don't need any human assessment.

Non-Autonomous Robot: In such types of robots programming is done to complete the required task. Such robots are controlled by controller i-e human.

As we see today's technology robot play an important roles in all human aspects, from factory automation to services application to medical care and entertainment. The basic goal of HRI[2](human robot interaction) is to define the principles and algorithms for robotic systems to make it capable of direct, safe and effective interaction with humans. Rf-based wireless hand gesture robot using digital image processing in matlab [4],execute the raising applications of the RF technology. By using RF frequencies, a control system has been suggested that will act as an embedded system through which different appliances can be controlled and also other devices by using built-in input and output components. The main concept of this project is to receive command from the pc and processing on it to do several operations. The principle on which the project is based is very simple. Firstly, the information sent is stored and polled from the receiver RF side

and then the required control signal is generated and sent to the microcontroller on receiver side which gives command to h-bridge which drives the motor in that particular direction. There are several terminologies that are used extensively throughout this project report. I.e. RF (radio frequency), RF module, H-bridge, microcontroller etc

This system sends four different types of codes to the receiving end these codes will be used to move the robot in either direction (left, right, forward and backward).

**Gesture**

It is a type of non-verbal communication in which visible body actions communicates a particular message instead of speech. Gesture includes shaking of head, hand or other parts of the body.

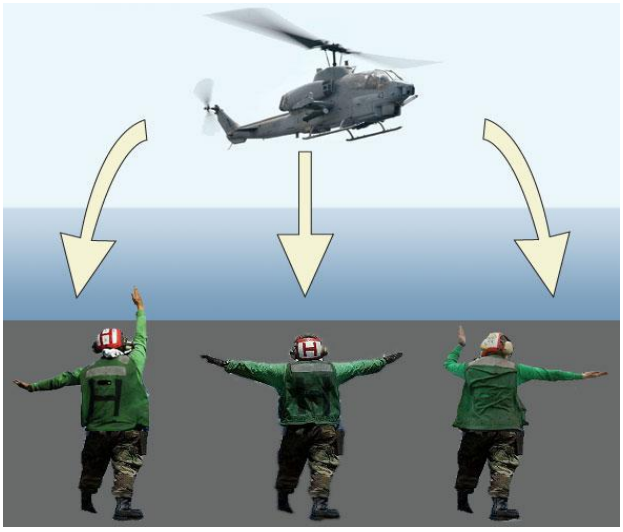

Figure 1 Describe different hand gesture.

**Results and Discussions**

***Matlab***

We use matlab as a programming tool for digital image processing[5]. In matlab different commands are written as the taken picture by camera is compare with the pre-written code in matlab if any desire gesture is found it will send the command to microcontroller on receiver side.

**Transmitter side**

The transmitter side is connected to PC through DB-9 connector which will send the data serially to microcontroller through max-232. As the data match with pre-written code in microcontroller the data encoded transmitted to receiver side.

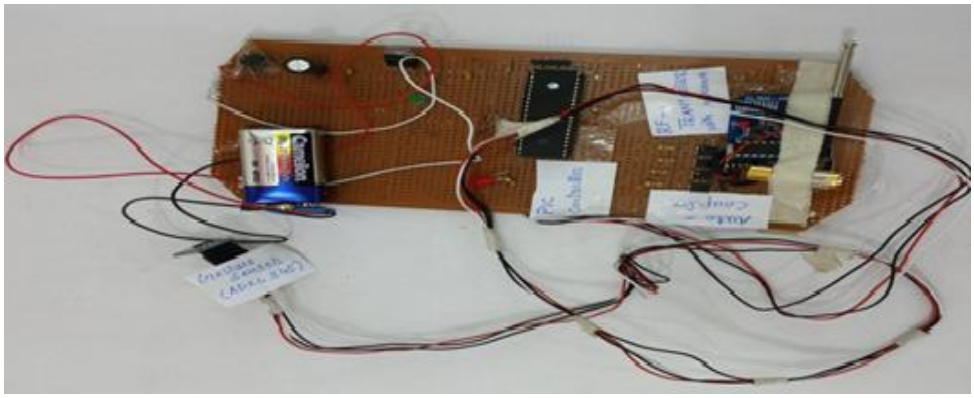

*Figure1* Different component of transmitter side, consist of max 232, microcontroller, relay, relay driver, LCD screen and RF-transmitter.

**Receiver side**

After receiving signal from the transmitter side the signal is decoded and pass it to microcontroller where it is compare to the pre-written code if the desire command found then it gives command to the h-bridge which drives the motor at the desire direction. Below is the snapshot of receiver side.

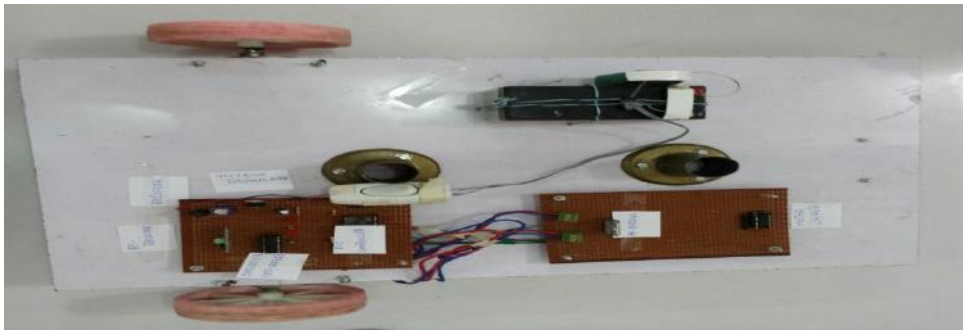

Figure 3 Different parts of receiver side that are R F receiver H-bridge, surge diodes, decoder, and regulator. Here H-bridge is used to drive the robot motors in desired direction, H-bridge is basically the combination of 4 relays (mean we can use H-Bridge instead of 4 Relays).the connection of each components is shown in circuit diagram.

**Simulation result of receiver side**

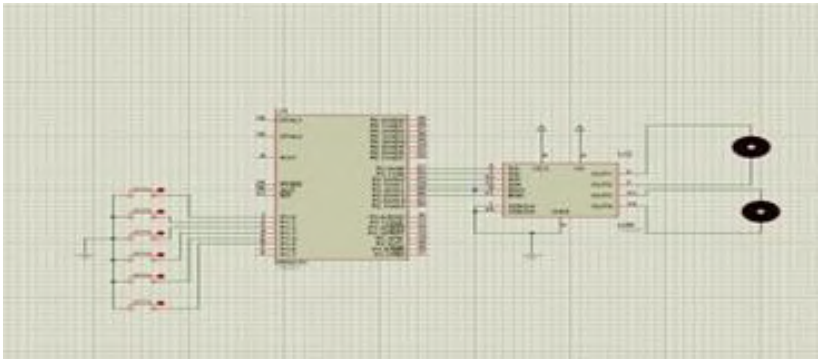

Figure 4. Simulation result of receiver side to see our command are working. This figure is the output of proteus.

**Matlab result**

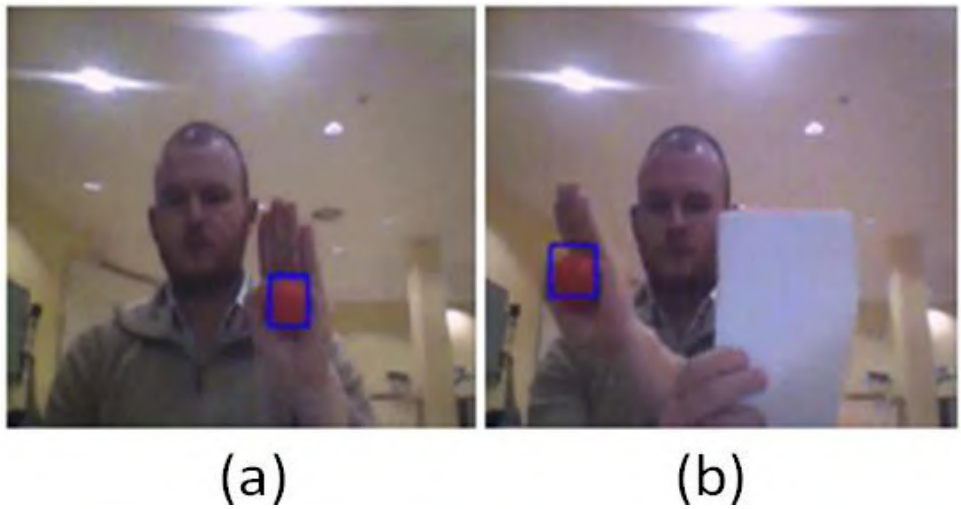


Figure 5. (a) Snapshot of hand for the forward direction and (b) snapshot of hand for left direction.

**Conclusion**

We presented an oval method for continuous gesture recognition that should support a natural and flexible human-robot social interaction.

In the end we are able to get our objective of controlling robot by using RF technology. Our hardware is capable to respond the signal sent by user, and according to the need of user robot moves in either direction. This robot is completing the project objective as the robot moves according to the movement of hand. More over the robot is simple and reliable; this robot is also capable to show real time video of the subjective results. So the cost on this project is extremely low when comparing with other robots.

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# Conference Recommendations

- The world has turned into a global village and only through collective approach its problem can be resolved.
- It is time that we start searching for solutions to the existing problems not only with thorough deliberations but by revolutionizing our researches via new ideas and their commercialization.
- The world we are living in today is witnessing a great deal of technological and scientific innovations and discoveries. This development in the fields of Science and technology has brought with it associated packages of new social and political dynamics. As we all know Social Sciences takes in its scope of study and research of the entire social and scientific phenomenon that directly or indirectly affect the course of social evolution.
- There are various trends making their way to change or sometimes alter the previously held theories and social laws in the society. There is a need of exploring and investigating these trends.
- There is affecting a major shift in research in education from basic (or fundamental) research to applied (and empirical) research. There is need of getting advantage their complementing nature.
- Many 'fundamental' research contributions have not been noted in the recent past. In contrast, empirical research bulged rather in geometric progression. It is obvious that fundamental research cannot progress at the same rate of growth as of empirical research. Otherwise perhaps fundamental research contributions do not remain 'fundamental'.
- Researchers have to realize the importance of policy relevant research as compared to 'abstract' research. Because this would increase the possibilities of applications of research to real problems being faced by humanity. Thus prescriptive research is more valued than analytical research.
- A strong tendency in research has been a shift from data analysis to collection and compilation of data. The funding agencies or consulting firms, particularly international consulting firms who do not know even the basic information about a country or a given region, seem to be more interested in information rather than the analysis. There is a need of discouraging this trend.
- Universities are the main creators and disseminators of knowledge through formal learning processes. This phenomenon has got currency and which has further changed the vision and scope of the universities. Therefore, Higher education

internationalization is generally considered as an array of academic activities in teaching & research and this usually takes place by the cooperation and support of international partners virtually, as well as crossing the borders physically.

- Most of the universities in the world have been influenced by the challenges of globalization and one of the reasons is that academic requirements of the students particularly the research scholars are getting higher day by day.
- Unfortunately many domestic universities in developing countries do not have the solutions to for such issues and in addition, because of intense competition, they have to design some solutions to get globalized.
- In connection to the above mentioned realities pertaining to the internationalization of universities, the third world and developing countries are facing a lot of challenges to compete the already advanced countries.
- There a need of creating a level field by the WTO/GATS to ensure quality standards, which must be maintained in both the countries particularly the one which is in need of state of the art higher education services.
- Despite of these challenges, it is worthwhile to mention that Pakistan is second to none with particular reference to higher education system, and the credit goes to Higher Education Commission of Pakistan for its tireless efforts in making Pakistan a role model for other developing countries.
- Great people always leave impact. Such persons of repute always hold on to their value system, hold onto what they believe till the very end and go against the grain to uphold their principles. And when they are gone, immense vacuum is left behind. They are sources of inspiration for the ones to come.
- What our responsibility is to follow their foot step and get the world out of the mire of socio-economic problems.

Thanks to all!