

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT

I
J
R
C
M



A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

Indexed & Listed at:

Ulrich's Periodicals Directory ©, ProQuest, U.S.A., EBSCO Publishing, U.S.A., Cabell's Directories of Publishing Opportunities, U.S.A.

Open J-Gate, India [link of the same is duly available at Inlibnet of University Grants Commission (U.G.C.)],

Index Copernicus Publishers Panel, Poland with IC Value of 5.09 & number of libraries all around the world.

Circulated all over the world & Google has verified that scholars of more than 2718 Cities in 161 countries/territories are visiting our journal on regular basis.

Ground Floor, Building No. 1041-C-1, Devi Bhawan Bazar, JAGADHRI – 135 003, Yamunanagar, Haryana, INDIA

<http://ijrcm.org.in/>

CONTENTS

Sr. No.	TITLE & NAME OF THE AUTHOR (S)	Page No.
1.	IMPACT OF THE URBAN INFORMAL SECTOR IN THE URBAN RESIDENTIAL PROPERTY MARKET <i>MOHAMMED YAHAYA UBALÉ, DAVID MARTIN & DR. SEOW TA WEE</i>	1
2.	COMPARISON OF PCA AND LDA BASED FACE RECOGNITION TECHNIQUE IN NOISY ENVIRONMENT <i>MEETA DUBEY & PRASHANT JAIN</i>	9
3.	A STUDY ON WORKER'S EMOTIONAL INTELLIGENCE IN SIPCOT INDUSTRIAL ESTATE, RANIPET <i>REV. FR. ANGELO JOSEPH, SDB, R. VEERAPPAN, A. STEPHENRAJ, L. MARY EZHILARASI & A. ANTONY MUTHU</i>	14
4.	TERRORISM: A BIG THREAT FOR TELECOM AND INTERNET BASED COMMUNICATION <i>VISHAL KAUSHIK, DR. AVINASH GAUR & DR. ASHISH MANOHAR URKUDE</i>	18
5.	STUDY OF PERCEPTIONS OF INDIVIDUAL INVESTORS TOWARDS INVESTMENT <i>DR. KANCHAN NAIDU & HETAL GAGLANI</i>	23
6.	A STUDY ON TRAINING NEEDS FOR EXECUTIVES IN SMALL AND MEDIUM ENTERPRISES AT SALEM DISTRICT <i>S. SUSENDIRAN, DR. T. VETRIVEL & M. CHRISTOPHER</i>	28
7.	NONFINANCIAL REWARD SYSTEM IN NIGERIAN PUBLIC AND PRIVATE ORGANISATIONS <i>DR. A. M. ABU-ABDISSAMAD</i>	32
8.	WORKING CAPITAL EFFICIENCY AND CORPORATE PROFITABILITY: EMPIRICAL EVIDENCE FROM INDIAN AUTOMOBILE INDUSTRY <i>DR. A. VIJAYAKUMAR</i>	35
9.	EFFECTIVENESS OF RESPONSIBILITY ACCOUNTING SYSTEM OF THE ORGANIZATIONAL STRUCTURE AND MANAGER'S AUTHORITY <i>ALI AMIRI, HOJJATALLAH SALARI, MARYAM OMIDVAR & JACOB THOMAS</i>	44
10.	A STUDY ON APPLICATION OF DATA AND WEB MINING TECHNIQUES TO ENRICH USER EXPERIENCE IN LIBRARIES AND ONLINE BOOK STORES <i>A. PAPPU RAJAN, DR. G. PRAKASH RAJ & ROSARIO VASANTHA KUMAR.P.J</i>	47
11.	IMPACT OF SIX SIGMA IMPLEMENTATION: A CASE STUDY OF A PHARMACEUTICAL COMPANY <i>N. VENKATESH & DR. C. SUMANGALA</i>	51
12.	A STUDY ON EVALUATING THE EFFECTIVENESS OF TUTORIAL PROGRAMS IN QUANTITATIVE TECHNIQUES <i>DR. ROSEMARY VARGHESE & DEEPAK BABU</i>	54
13.	PROFITABILITY ANALYSIS OF REGIONAL RURAL BANKS IN INDIA: WITH SPECIAL REFERENCE TO WESTERN REGION <i>DR. KAUSHAL A. BHATT</i>	59
14.	A SMALL TRIBUTE TO COMPUTER LEGENDS WHO MADE AN IMPACT ON THE COMPUTER INDUSTRY AND PASSED AWAY IN THE YEAR 2011 <i>PRITIKA MEHRA</i>	65
15.	A STUDY ON MANAGERIAL EFFECTIVENESS <i>ANITHA R & M.P.SARAVANAN</i>	68
16.	COMPARATIVE STUDY ON TALENT MANAGEMENT PRACTICES <i>DR. D. N. VENKATESH</i>	76
17.	REVIEW AND CLASSIFICATION OF LITERATURE ON RURAL CONSUMERS' BUYING BEHAVIOUR FOR MOBILE PHONE IN INDIA <i>CHIRAG V. ERDA</i>	87
18.	MOBILE BANKING IN INDIA: OPPORTUNITIES & CHALLENGES <i>DR. P. AMARAVENI & K. PRASAD</i>	92
19.	THE STUDY OF RELATIONSHIP BETWEEN REFINED ECONOMIC VALUE ADDED (REVA) AND DIFFERENT CRITERIA OF THE RISK ADJUSTED RETURN <i>MOHAMMAD NOROUZI & MAHMOUD SAMADI</i>	97
20.	ONLINE SHOPPING: A NEW TREND OF SHOPPING BEHAVIOUR <i>SANTHOSH J & ANU VARGHESE</i>	101
21.	IMPLEMENTATION OF PCA WITH SVD TO REDUCE PRECISION LOSS <i>AMITPREET KOUR & RAMANDEEP KAUR</i>	104
22.	AN ASSESSMENT OF UNIVERSITY-INDUSTRY RELATIONS FOR COLLABORATIVE TECHNOLOGY TRANSFER: THE CASE OF INSTITUTE OF TECHNOLOGY OF BAHIR DAR AND TECHNOLOGY FACULTY OF GONDAR UNIVERSITY <i>TADESSE MENGISTIE</i>	108
23.	DEMARKETING: A CREATIVE THINKING <i>ANITA KUMARI PANIGRAHI</i>	113
24.	A REVIEW OF ISLAMIC BANKING AND CURRENT ISSUES AND CHALLENGES FACED BY ISLAMIC BANKS ON THE WAY TO GLOBALIZATION <i>UZMA FAZAL, SALMA TARIQ, MUHAMMAD MUMTAZ, MUHAMMAD NAEEM, JUNAID ABBAS & MADIHA LATIF</i>	118
25.	THE IMPACTS OF PRODUCTIVE MARKETING COMMUNICATION ON EMERGING MARKET <i>LOO LAE SYEE, TAN KAI HUN, VIVIAN LEONG & RASHAD YAZDANIFARD</i>	124
26.	HP SUSTAINABILITY AS COMPETITIVE ADVANTAGE <i>RIDHI GUPTA</i>	129
27.	ELECTRONIC HEALTH RECORD IMPLEMENTATIONS AROUND THE WORLD <i>DIANA LÓPEZ-ROBLEDO & SANDRA SANTOS-NIEVES</i>	132
28.	FOREIGN DIRECT INVESTMENT (FDI): AN OBSERVATION ABOUT TOURISM INDUSTRY IN INDIA <i>SANDEEP KUMAR, RAJEEV SHARMA & NAVEEN AGGARWAL</i>	137
29.	A SYSTEMATIC APPROACH FOR DETECTION AND COST ESTIMATION OF CLONING IN VARIOUS PROGRAMMING LANGUAGES <i>ANUPAM MITTAL</i>	142
30.	INTELLIGENT SCADA FOR HOME APPLICATION <i>S. R. KATKAR</i>	147
	REQUEST FOR FEEDBACK	151

CHIEF PATRON

PROF. K. K. AGGARWAL

Chairman, Malaviya National Institute of Technology, Jaipur
(An institute of National Importance & fully funded by Ministry of Human Resource Development, Government of India)
Chancellor, K. R. Mangalam University, Gurgaon
Chancellor, Lingaya's University, Faridabad
Founder Vice-Chancellor (1998-2008), Guru Gobind Singh Indraprastha University, Delhi
Ex. Pro Vice-Chancellor, Guru Jambheshwar University, Hisar

FOUNDER PATRON

LATE SH. RAM BHAJAN AGGARWAL

Former State Minister for Home & Tourism, Government of Haryana
Former Vice-President, Dadri Education Society, Charkhi Dadri
Former President, Chinar Syntex Ltd. (Textile Mills), Bhiwani

CO-ORDINATOR

DR. SAMBHAV GARG

Faculty, Shree Ram Institute of Business & Management, Urjani

ADVISORS

DR. PRIYA RANJAN TRIVEDI

Chancellor, The Global Open University, Nagaland

PROF. M. S. SENAM RAJU

Director A. C. D., School of Management Studies, I.G.N.O.U., New Delhi

PROF. S. L. MAHANDRU

Principal (Retd.), Maharaja Agrasen College, Jagadhri

EDITOR

PROF. R. K. SHARMA

Professor, Bharti Vidyapeeth University Institute of Management & Research, New Delhi

EDITORIAL ADVISORY BOARD

DR. RAJESH MODI

Faculty, Yanbu Industrial College, Kingdom of Saudi Arabia

PROF. PARVEEN KUMAR

Director, M.C.A., Meerut Institute of Engineering & Technology, Meerut, U. P.

PROF. H. R. SHARMA

Director, Chhatrapati Shivaji Institute of Technology, Durg, C.G.

PROF. MANOHAR LAL

Director & Chairman, School of Information & Computer Sciences, I.G.N.O.U., New Delhi

PROF. ANIL K. SAINI

Chairperson (CRC), Guru Gobind Singh I. P. University, Delhi

PROF. R. K. CHOUDHARY

Director, Asia Pacific Institute of Information Technology, Panipat

DR. ASHWANI KUSH

Head, Computer Science, University College, Kurukshetra University, Kurukshetra

DR. BHARAT BHUSHAN

Head, Department of Computer Science & Applications, Guru Nanak Khalsa College, Yamunanagar

DR. VIJAYPAL SINGH DHAKA

Dean (Academics), Rajasthan Institute of Engineering & Technology, Jaipur

DR. SAMBHAVNA

Faculty, I.I.T.M., Delhi

DR. MOHINDER CHAND

Associate Professor, Kurukshetra University, Kurukshetra

DR. MOHENDER KUMAR GUPTA

Associate Professor, P.J.L.N. Government College, Faridabad

DR. SAMBHAV GARG

Faculty, Shree Ram Institute of Business & Management, Urjani

DR. SHIVAKUMAR DEENE

Asst. Professor, Dept. of Commerce, School of Business Studies, Central University of Karnataka, Gulbarga

DR. BHAVET

Faculty, Shree Ram Institute of Business & Management, Urjani

ASSOCIATE EDITORS

PROF. ABHAY BANSAL

Head, Department of Information Technology, Amity School of Engineering & Technology, Amity University, Noida

PROF. NAWAB ALI KHAN

Department of Commerce, Aligarh Muslim University, Aligarh, U.P.

ASHISH CHOPRA

Sr. Lecturer, Doon Valley Institute of Engineering & Technology, Karnal

TECHNICAL ADVISOR

AMITA

Faculty, Government M. S., Mohali

FINANCIAL ADVISORS

DICKIN GOYAL

Advocate & Tax Adviser, Panchkula

NEENA

Investment Consultant, Chambaghat, Solan, Himachal Pradesh

LEGAL ADVISORS

JITENDER S. CHAHAL

Advocate, Punjab & Haryana High Court, Chandigarh U.T.

CHANDER BHUSHAN SHARMA

Advocate & Consultant, District Courts, Yamunanagar at Jagadhri

SUPERINTENDENT

SURENDER KUMAR POONIA

CALL FOR MANUSCRIPTS

We invite unpublished novel, original, empirical and high quality research work pertaining to recent developments & practices in the areas of Computer Science & Applications; Commerce; Business; Finance; Marketing; Human Resource Management; General Management; Banking; Economics; Tourism Administration & Management; Education; Law; Library & Information Science; Defence & Strategic Studies; Electronic Science; Corporate Governance; Industrial Relations; and emerging paradigms in allied subjects like Accounting; Accounting Information Systems; Accounting Theory & Practice; Auditing; Behavioral Accounting; Behavioral Economics; Corporate Finance; Cost Accounting; Econometrics; Economic Development; Economic History; Financial Institutions & Markets; Financial Services; Fiscal Policy; Government & Non Profit Accounting; Industrial Organization; International Economics & Trade; International Finance; Macro Economics; Micro Economics; Rural Economics; Co-operation; Demography; Development Planning; Development Studies; Applied Economics; Development Economics; Business Economics; Monetary Policy; Public Policy Economics; Real Estate; Regional Economics; Political Science; Continuing Education; Labour Welfare; Philosophy; Psychology; Sociology; Tax Accounting; Advertising & Promotion Management; Management Information Systems (MIS); Business Law; Public Responsibility & Ethics; Communication; Direct Marketing; E-Commerce; Global Business; Health Care Administration; Labour Relations & Human Resource Management; Marketing Research; Marketing Theory & Applications; Non-Profit Organizations; Office Administration/Management; Operations Research/Statistics; Organizational Behavior & Theory; Organizational Development; Production/Operations; International Relations; Human Rights & Duties; Public Administration; Population Studies; Purchasing/Materials Management; Retailing; Sales/Selling; Services; Small Business Entrepreneurship; Strategic Management Policy; Technology/Innovation; Tourism & Hospitality; Transportation Distribution; Algorithms; Artificial Intelligence; Compilers & Translation; Computer Aided Design (CAD); Computer Aided Manufacturing; Computer Graphics; Computer Organization & Architecture; Database Structures & Systems; Discrete Structures; Internet; Management Information Systems; Modeling & Simulation; Neural Systems/Neural Networks; Numerical Analysis/Scientific Computing; Object Oriented Programming; Operating Systems; Programming Languages; Robotics; Symbolic & Formal Logic; Web Design and emerging paradigms in allied subjects.

Anybody can submit the **soft copy** of unpublished novel; original; empirical and high quality **research work/manuscript anytime** in **M.S. Word format** after preparing the same as per our **GUIDELINES FOR SUBMISSION**; at our email address i.e. infoijrcm@gmail.com or online by clicking the link **online submission** as given on our website ([FOR ONLINE SUBMISSION, CLICK HERE](#)).

GUIDELINES FOR SUBMISSION OF MANUSCRIPT

1. **COVERING LETTER FOR SUBMISSION:**

DATED: _____

THE EDITOR
IJRCM

Subject: SUBMISSION OF MANUSCRIPT IN THE AREA OF

(e.g. Finance/Marketing/HRM/General Management/Economics/Psychology/Law/Computer/IT/Engineering/Mathematics/other, please specify)

DEAR SIR/MADAM

Please find my submission of manuscript entitled '_____ ' for possible publication in your journals.

I hereby affirm that the contents of this manuscript are original. Furthermore, it has neither been published elsewhere in any language fully or partly, nor is it under review for publication elsewhere.

I affirm that all the author (s) have seen and agreed to the submitted version of the manuscript and their inclusion of name (s) as co-author (s).

Also, if my/our manuscript is accepted, I/We agree to comply with the formalities as given on the website of the journal & you are free to publish our contribution in any of your journals.

NAME OF CORRESPONDING AUTHOR:

Designation:
Affiliation with full address, contact numbers & Pin Code:
Residential address with Pin Code:
Mobile Number (s):
Landline Number (s):
E-mail Address:
Alternate E-mail Address:

NOTES:

- a) The whole manuscript is required to be in **ONE MS WORD FILE** only (pdf. version is liable to be rejected without any consideration), which will start from the covering letter, inside the manuscript.
- b) The sender is required to mention the following in the **SUBJECT COLUMN** of the mail:
New Manuscript for Review in the area of (Finance/Marketing/HRM/General Management/Economics/Psychology/Law/Computer/IT/Engineering/Mathematics/other, please specify)
- c) There is no need to give any text in the body of mail, except the cases where the author wishes to give any specific message w.r.t. to the manuscript.
- d) The total size of the file containing the manuscript is required to be below **500 KB**.
- e) Abstract alone will not be considered for review, and the author is required to submit the complete manuscript in the first instance.
- f) The journal gives acknowledgement w.r.t. the receipt of every email and in case of non-receipt of acknowledgment from the journal, w.r.t. the submission of manuscript, within two days of submission, the corresponding author is required to demand for the same by sending separate mail to the journal.

2. **MANUSCRIPT TITLE:** The title of the paper should be in a 12 point Calibri Font. It should be bold typed, centered and fully capitalised.

3. **AUTHOR NAME (S) & AFFILIATIONS:** The author (s) **full name, designation, affiliation (s), address, mobile/landline numbers, and email/alternate email address** should be in italic & 11-point Calibri Font. It must be centered underneath the title.

4. **ABSTRACT:** Abstract should be in fully italicized text, not exceeding 250 words. The abstract must be informative and explain the background, aims, methods, results & conclusion in a single para. Abbreviations must be mentioned in full.

5. **KEYWORDS:** Abstract must be followed by a list of keywords, subject to the maximum of five. These should be arranged in alphabetic order separated by commas and full stops at the end.
6. **MANUSCRIPT:** Manuscript must be in **BRITISH ENGLISH** prepared on a standard A4 size **PORTRAIT SETTING PAPER**. It must be prepared on a single space and single column with 1" margin set for top, bottom, left and right. It should be typed in 8 point Calibri Font with page numbers at the bottom and centre of every page. It should be free from grammatical, spelling and punctuation errors and must be thoroughly edited.
7. **HEADINGS:** All the headings should be in a 10 point Calibri Font. These must be bold-faced, aligned left and fully capitalised. Leave a blank line before each heading.
8. **SUB-HEADINGS:** All the sub-headings should be in a 8 point Calibri Font. These must be bold-faced, aligned left and fully capitalised.
9. **MAIN TEXT:** The main text should follow the following sequence:

INTRODUCTION**REVIEW OF LITERATURE****NEED/IMPORTANCE OF THE STUDY****STATEMENT OF THE PROBLEM****OBJECTIVES****HYPOTHESES****RESEARCH METHODOLOGY****RESULTS & DISCUSSION****FINDINGS****RECOMMENDATIONS/SUGGESTIONS****CONCLUSIONS****SCOPE FOR FURTHER RESEARCH****ACKNOWLEDGMENTS****REFERENCES****APPENDIX/ANNEXURE**

It should be in a 8 point Calibri Font, single spaced and justified. The manuscript should preferably not exceed **5000 WORDS**.

10. **FIGURES & TABLES:** These should be simple, crystal clear, centered, separately numbered & self explained, and **titles must be above the table/figure. Sources of data should be mentioned below the table/figure.** It should be ensured that the tables/figures are referred to from the main text.
11. **EQUATIONS:** These should be consecutively numbered in parentheses, horizontally centered with equation number placed at the right.
12. **REFERENCES:** The list of all references should be alphabetically arranged. The author (s) should mention only the actually utilised references in the preparation of manuscript and they are supposed to follow **Harvard Style of Referencing**. The author (s) are supposed to follow the references as per the following:
 - All works cited in the text (including sources for tables and figures) should be listed alphabetically.
 - Use (ed.) for one editor, and (ed.s) for multiple editors.
 - When listing two or more works by one author, use --- (20xx), such as after Kohl (1997), use --- (2001), etc, in chronologically ascending order.
 - Indicate (opening and closing) page numbers for articles in journals and for chapters in books.
 - The title of books and journals should be in italics. Double quotation marks are used for titles of journal articles, book chapters, dissertations, reports, working papers, unpublished material, etc.
 - For titles in a language other than English, provide an English translation in parentheses.
 - The location of endnotes within the text should be indicated by superscript numbers.

PLEASE USE THE FOLLOWING FOR STYLE AND PUNCTUATION IN REFERENCES:**BOOKS**

- Bowersox, Donald J., Closs, David J., (1996), "Logistical Management." Tata McGraw, Hill, New Delhi.
- Hunker, H.L. and A.J. Wright (1963), "Factors of Industrial Location in Ohio" Ohio State University, Nigeria.

CONTRIBUTIONS TO BOOKS

- Sharma T., Kwatra, G. (2008) Effectiveness of Social Advertising: A Study of Selected Campaigns, Corporate Social Responsibility, Edited by David Crowther & Nicholas Capaldi, Ashgate Research Companion to Corporate Social Responsibility, Chapter 15, pp 287-303.

JOURNAL AND OTHER ARTICLES

- Schemenner, R.W., Huber, J.C. and Cook, R.L. (1987), "Geographic Differences and the Location of New Manufacturing Facilities," Journal of Urban Economics, Vol. 21, No. 1, pp. 83-104.

CONFERENCE PAPERS

- Garg, Sambhav (2011): "Business Ethics" Paper presented at the Annual International Conference for the All India Management Association, New Delhi, India, 19-22 June.

UNPUBLISHED DISSERTATIONS AND THESES

- Kumar S. (2011): "Customer Value: A Comparative Study of Rural and Urban Customers," Thesis, Kurukshetra University, Kurukshetra.

ONLINE RESOURCES

- Always indicate the date that the source was accessed, as online resources are frequently updated or removed.

WEBSITES

- Garg, Bhavet (2011): Towards a New Natural Gas Policy, Political Weekly, Viewed on January 01, 2012 <http://epw.in/user/viewabstract.jsp>

IMPACT OF SIX SIGMA IMPLEMENTATION: A CASE STUDY OF A PHARMACEUTICAL COMPANY**N. VENKATESH****ASST. PROFESSOR****DEPARTMENT OF MECHANICAL ENGINEERING****CANARA COLLEGE OF ENGINEERING****BENJANAPADAVU****DR. C. SUMANGALA****ASST. PROFESSOR****DEPARTMENT OF BUSINESS MANAGEMENT****UNIVERSITY OF MYSORE****MYSORE****ABSTRACT**

Quality is the key for the success of any product or service in the present context. Many concepts have been used to improve the quality on a continuous basis. Six Sigma has been utilized by manufacturing industries to decrease cost and improve quality and productivity by reducing variation and production defects. By and large Six Sigma is seen as a quality improvement concept for mechanical industries. But of late it is gaining importance in other sectors as well. In this paper a pharmaceutical industry has been examined to test the underlying facts about Six Sigma implementation. The opinion of employees who have worked in the Six Sigma projects has been collected, tested and analyzed to check the outcome of Six Sigma implementation. Employees have observed that the implementation of Six Sigma has improved the financial status, productivity, peoples' equity, growth of the company and customer satisfaction.

KEYWORDS

Benefits, Implementation, Pharmaceutical, Six Sigma.

INTRODUCTION

Quality improvement concepts are being tested and used since many decades. It is due to improved quality consciousness among the customers that the companies have become more pragmatic about their products and services. Six Sigma has now spread far and wide, and has been adopted in many service industries as well as in manufacturing. While some of the big manufacturing names, such as General Electric, were early adopters, now service giants like American Express and Starwood Hotels also have major programs. So why does the pharmaceutical industry remain skeptical? (David Johnston, 2003)

REVIEW OF LITERATURE

Few aspects distinguish the pharmaceutical industry from most other manufacturing industries. Firstly, the roles of consumers of pharmaceutical products are often limited in the products that they use as the drugs follow a chemical composition than the taste. Secondly, the pharmaceutical industry the patenting of products is essentially a critical issue especially in developing countries like India. Due to heavy investment for R & D of the drugs the companies the cost of the drugs would be very high till the patent period expires typically in the range of 20 years. However when the patent on drug expires, a generic drug usually gets surfaced and ready to be sold by a competitor. Hence it is very important for the manufacturer of drugs to keep the cost at minimum. Due to this reason Six Sigma is keenly observed by many pharmaceutical industries. More over the aim of sigma is not just to provide tangible benefits but the ultimate goal for Six Sigma is to change the mindset and culture of the entire organization to create an environment where in the quality and perfection are seen as achievable thus ensuring that the work force enjoys the work to achieve best possible performance levels (Maria Jernelid and Steven Roan, 2009).

Six Sigma is seen as a quality improvement concept targeting the process rather the end product. It uses a methodology known as DMAIC model, which begins by defining and identifying a problem like higher scrap rate, higher price of non conformance, etc. and then sets the course of actions in fixing it. Once the problem is resolved controls are put in place to make sure the problem doesn't recur. This procedure is very common for improvement of the processes of manufacturing industries.

This concept is gaining popularity with pharmaceutical industries in recent times. There are many pharmaceutical companies that have implemented Six Sigma and are successful in achieving their corporate strategy. Examples of pharmaceutical companies that have implemented Six Sigma are Baxter, Eli Lilly, Johnson & Johnson and Novartis (Stückrath, 2006).

The implementation problems that companies face and the success factors are not unique to any industry and it is essential to recognize the similarities instead of differences, which would help to gain the knowledge and experience of other industries (Sewing et al. 2008).

When using Six Sigma in the pharmaceutical industry, extra care is required while identifying the customer as the customer definition is wider in this industry compared to many others (Young et al. 2004).

Carleysmith et al. (2009) explains the benefits of the implementation of Six Sigma tools in the R&D Pharmaceutical department of GlaxoSmithKline (GSK) which resulted in increased productivity by eliminating and decreasing time spent on repetitive tasks thereby reducing cycle times and a better knowledge exchange due to increased teamwork and common best practice procedures.

Maria Jernelid and Steven Roan (2009), in their research of pharma companies observed that there is a huge potential for Six Sigma to be implemented in pharma companies to improve their satisfaction in terms of delivery time, reduced price. However they suggest that the process of Six Sigma implementation has to be fine tuned as per the requirement of the company as each company is unique in its nature regarding its administrative practices.

NEED AND IMPORTANCE OF THE STUDY

Literature review suggested for more research of pharmaceutical companies to understand their perception of Six Sigma. In India very rarely we have seen any pharmaceutical company coming forward to implement Six Sigma. There is a huge scope for implementation of Six Sigma particularly in pharmaceutical industry. Hence, in this paper a study of one such pharmaceutical company is done. Outcome of this study decides the status of six sigma implementation in pharmaceutical company. this could be a road map for other pharmaceutical companies. Normally any study comprises of primary data obtained through the company records to highlight the achievements of the company. Here the opinion of the employees is collected to understand to how far the employees are kept in the loop.

THE OBJECTIVES OF THE STUDY

The study has the following objectives:

1. Investigate the benefits of Six Sigma implementation in a pharmaceutical industry

2. Prioritize the benefits as per the opinion of the respondents
3. Examine whether the managers and workers differ in their opinion about Six Sigma implementation.

HYPOTHESES OF THE STUDY

The following hypotheses were declared based on the objectives of the study

H1: The Six Sigma implementation brings about the benefits to the organization in the form of

- a. Financial benefits
- b. Improved growth of the company
- c. Improved Peoples' equity
- d. Higher Productivity and
- e. Increased Customer satisfaction

H2: Managers and workers differ in their opinion about the practices of Six Sigma.

RESEARCH METHODOLOGY

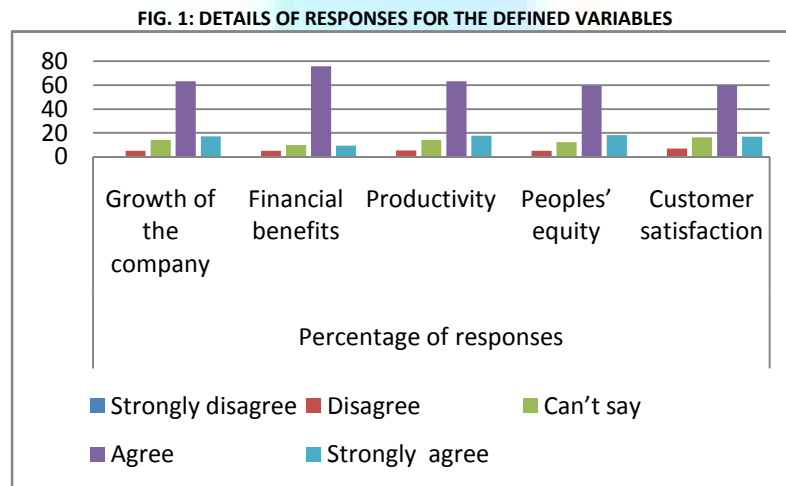
The research is done with the help of a questionnaire which consisted of questions to collect information on benefits of Six Sigma implementation categorized under financial benefits, growth of the company, peoples' equity, productivity and customer satisfaction. The data collected is analyzed with the help of SPSS V16 software.

SAMPLE SIZE

The study consisted of a sample of 20 employees who have gained the knowledge of Six Sigma. The respondents have worked on various Six Sigma projects for six years. Out of these, five belonged to manager level and fifteen belonged to worker level.

RESULTS AND DISCUSSIONS

The data is collected from the respondents on a Likert 5 point scale of 1 to 5 (strongly disagree to strongly agree). The following graph gives the picture of frequency of response for the scale parameters. The graph indicates that the respondents have a positive response towards the benefits of Six Sigma implementation as highest percentage of the respondents (about 80% for growth of the company, 85% for financial benefits, 82% for productivity, 80% for peoples' equity and 78% for customer satisfaction) have consented about the benefits of Six Sigma.



This fact is tested for its statistical significance. To start the tests it is important to test the reliability of the testing instrument. The Cronbach's alpha was observed to be 0.72 and as the Cronbach's alpha value is more than 0.7 the reliability of the testing instrument is established (Nunnally, 1978).

TESTING OF HYPOTHESIS H1a, H1b, H1c, H1d, H1e

Next, to test the hypotheses, we have used one sample t-test. The following table 1 gives the result of one sample t-test for the variables of the benefits for a sample size of N=20. The company has a practice of accepting the survey results if the mean value for a question is more than 3.6. In case of growth of the company the questionnaire included 9 questions under this variable. Thus the total expected value is 3.6 * 9 = 32.4, in case of financial benefits (8 questions) it is 8 * 3.6 = 28.8, for productivity (18 questions), it is calculated as 18 * 3.6 = 64.8, for peoples' equity (27 questions) the expected value is 27 * 3.6 = 97.2 and for customer satisfaction (16 questions) it is 16 * 3.6 = 57.6.

TABLE 1: OBSERVED AND EXPECTED MEAN VALUES OF THE VARIABLES AND RESULTS OF ONE SAMPLE t-TEST

	Observed value of Mean	Std. Deviation	Expected value of Mean	T-value	P-value
Growth of the company	34.85	3.18	32.4	3.442	0.003 (highly significant)
Financial benefits	31.15	2.74	28.8	3.837	0.001 (highly significant)
Productivity	70.85	5.33	64.8	5.073	0.000 (highly significant)
Peoples' equity	105.85	8.11	97.2	4.768	0.000 (highly significant)
Customer satisfaction	61.9	5.39	57.6	3.52	0.002 (highly significant)

From the above table we can notice that the calculated mean is more than the expected value with respect to all the variables. Results of the one sample t-test indicate that all the variables enjoy a high significance. This is written as

- i. For growth of the company, the observed mean = 34.85 against the expected mean of 32.4, t (19) = 3.442, p (0.003) < 0.05.
- ii. For financial benefits, the observed mean = 31.15 in opposition to the expected mean of 28.8, t (19) = 3.837, p (0.001) < 0.05.
- iii. For productivity, the observed mean = 70.85 against the expected mean of 64.8, t (19) = 5.073, p (0.000) < 0.05.
- iv. For peoples' equity, the observed mean = 105.85 in comparison with the expected mean of 97.2, t (19) = 4.768, p (0.000) < 0.05.
- v. For customer satisfaction, the observed mean = 61.9, against the expected mean of 57.6, t (19) = 3.52, p (0.002) < 0.05.

Since the result of the one sample t-test established a high significance of difference of means between calculated and expected one can infer that all the five components of the hypothesis H1 is accepted. This means Six Sigma has helped the company in terms of financial benefits, growth of the company, productivity, peoples' equity and customer satisfaction.

TESTING OF HYPOTHESIS H2

After accepting the first hypothesis regarding the benefits of Six Sigma now it is required to check whether the managers and workers differ in their opinion. For this an independent sample t- test was used.

The following table gives result of the independent sample t – test.

TABLE 2: GROUP STATISTIC TABLE FOR BENEFITS OF SIX SIGMA AND RESULT OF INDEPENDENT SAMPLE t TEST

Variable	Designation of respondent	N	Mean	Std. Deviation	t-value	P-value
Growth of the company	Worker	15	34.6	3.51	-.436	0.668 (not significant)
	Manager	5	35.4	2.07		
Financial benefits	Worker	15	30.9	3.05	-0.602	0.554 (not significant)
	Manager	5	31.8	1.48		
Productivity	Worker	15	71.06	4.44	0.307	0.762 (not significant)
	Manager	5	70.2	8.07		
Peoples' equity	Worker	15	105.8	9.08	-.048	0.963 (not significant)
	Manager	5	106	4.84		
Customer satisfaction	Worker	15	62.0	6.02	0.14	0.89 (not significant)
	Manager	5	61.6	3.36		

The independent sample t –test suggest that the difference of mean values of managers and workers are not statistically significant written as

- i. For growth of the company, $t = -0.436$; $P = .668 > 0.05$
- ii. For financial benefits, $t = -0.602$; $P = .554 > 0.05$
- iii. For productivity, $t = 0.307$; $P = .762 > 0.05$
- iv. For peoples' equity, $t = -0.048$; $P = .963 > 0.05$
- v. For customer satisfaction, $t = 0.14$; $P = .89 > 0.05$

Since the result of independent sample t-test established a non significant difference between managers and workers with respect to all the benefits one can infer that managers and workers do not differ in their opinion towards practice of Six Sigma. Hence hypothesis H2 is rejected.

CONCLUSIONS

The investigation of the benefits of Six Sigma at a pharmaceutical industry had aroused curiosity as there was a lack of clarity about its implementation in pharmaceutical industries. The survey of the opinion of employees of the company leads us to following observations.

1. Employees experience that the implementation of Six Sigma has helped the company to grow, due to its improved financial status and vice versa i.e. the improved financial status helped the company expand its market.
2. The respondents believe that the implementation of Six Sigma has resulted in process improvement which has improved the productivity with reduced price of non conformance.
3. The changes in a company will not sustain for a long time in any company. However, in this case, the work force has enjoyed the implementation of Six Sigma and they have preferred to work with more number of projects as per Six Sigma methodology. This fact is indicated by improved peoples' equity after the implementation.
4. Employees have observed that the implementation of Six Sigma resulted in a win-win situation with the customers as a result the customer satisfaction has become higher.
5. It is believed that the opinions of managers and workers usually differs as they belong to two different class of work force. But in this case their opinion does not differ significantly. In other words both of them feel that the Six Sigma implementation has helped their company to reap benefits and stay on course of the competition.

All these facts and figures have helped to come to conclusion that the implementation of Six Sigma is a success even in pharmaceutical industry. This should arouse the interest in other pharmaceutical industries to go ahead with the implementation of Six Sigma or else they may lose the competitive edge that the Six Sigma provides.

REFERENCES

1. Carleysmith, SW., Dufton, AM. & Altria, KD (2009), "Implementing Lean Sigma in pharmaceutical research and development: a review by practitioners", *R&D Management*, Vol.39, No. 1, pp 95-106.
2. David Johnston (2003), "Is Six Sigma Right for Validating Processes in the Pharmaceutical Industry?", *Pharmaceutical Technology Europe*, Vol 15, No.12, pp 55-60.
3. Maria Jernelid and Steven Roan (2009), "Six Sigma strategy applied to Pharmaceutical industry - how customer benefit", MBA Thesis 2009 available from <http://www.scribd.com/doc/65047180/Final-Thesis-Steven-Roan-and-Maria-Jernelid-MBA-2009>, (accesses on 25-04-2013)
4. Nunnally, J. C. (1978). "Psychometric theory (2nd edition)", New York: McGraw-Hill.
5. Sewing, AS., Winchester, T., Carnell, P., Hampton, D. & Keighley, W (2008), "Helping science to succeed: improving processes in R&D", *Drug Discovery today*, Vol 13, No. 5/6, pp 227-233.
6. Stückrath, I. (2000), "Six Sigma and the road to success", *World Pharmaceutical Frontiers*, Available from www.worldpharmaceuticals.net (accessed 03-04-2013).
7. Young, T., Brailsford, S., Connell, C., Davies, R., Harper, P. & Kleain, JH. (2004), "Using industrial processes to improve patient care". *British Medical Journal*, Vol 328, pp 162-164.

REQUEST FOR FEEDBACK

Dear Readers

At the very outset, International Journal of Research in Computer Application and Management (IJRCM) acknowledges & appreciates your efforts in showing interest in our present issue under your kind perusal.

I would like to request you to supply your critical comments and suggestions about the material published in this issue as well as on the journal as a whole, on our E-mail infoijrcm@gmail.com for further improvements in the interest of research.

If you have any queries please feel free to contact us on our E-mail infoijrcm@gmail.com.

I am sure that your feedback and deliberations would make future issues better – a result of our joint effort.

Looking forward an appropriate consideration.

With sincere regards

Thanking you profoundly

Academically yours

Sd/-

Co-ordinator

ABOUT THE JOURNAL

In this age of Commerce, Economics, Computer, I.T. & Management and cut throat competition, a group of intellectuals felt the need to have some platform, where young and budding managers and academicians could express their views and discuss the problems among their peers. This journal was conceived with this noble intention in view. This journal has been introduced to give an opportunity for expressing refined and innovative ideas in this field. It is our humble endeavour to provide a springboard to the upcoming specialists and give a chance to know about the latest in the sphere of research and knowledge. We have taken a small step and we hope that with the active co-operation of like-minded scholars, we shall be able to serve the society with our humble efforts.

Our Other Journals

