

INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT & 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., Google Scholar,

Open J-Gate, India [link of the same is duly available at Infotribnet 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 5555 Cities in 190 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.	ADAPTATION LEVEL OF GREEN SUPPLY CHAIN PRACTICES: AN EMPIRICAL STUDY OF INDIAN AUTOMOBILE SECTOR <i>DR. SHIVANI SHARMA & DR. V. K. JAIN</i>	1
2.	LEASING: A SOLUTION TO CREDIT RATIONING <i>MANDEEP KAUR & DR. POOJA MISHRA</i>	5
3.	A STUDY ON THE RELATIONSHIP BETWEEN FOREIGN DIRECT INVESTMENT AND ECONOMIC GROWTH WITH SPECIAL EMPHASIS TO FOREIGN TRADE AND GROSS DOMESTIC PRODUCT <i>MANINDER KAUR & RITU PRIYA</i>	10
4.	PERFORMANCE MANAGEMENT: IMPLICATIONS FOR POTENTIAL WAGE CAPPING AT RAKSHITH HOSPITAL, CHENNAI <i>V.CHANDIRAVATHANAN & DR. S. POUGAJENDY</i>	15
5.	EMPOWERMENT OF WOMEN THROUGH CREATING AWARENESS TRAINING ON VALUE ADDITION OF NUTRICEREALS FOODS <i>DR. S. GANAPATHI & A.THANAGM</i>	19
6.	MERGER & ACQUISITION IN THE INDIAN CONTEXT: THE IMPACT ON SHAREHOLDER VALUE <i>S. GOWRI & DR. S. POUGAJENDY</i>	22
7.	CHALLENGES OF CHANGE MANAGEMENT ON SERVICE DELIVERY IN THE ADMINISTRATION POLICE SERVICE IN MURANGA COUNTY <i>DR. JOHN WEKESA WANJALA, CLIFFORD G. MACHOGU, DR. RICHARD JUMA OTIENO & NELLY AYABEI</i>	25
8.	A STUDY ON ELECTRONIC-HUMAN RESOURCE MANAGEMENT AND ITS STRATEGIES: LITERATURE REVIEW <i>MONALISHA PATEL & SUNIL DHAL</i>	31
9.	AN EMPIRICAL STUDY ON ROLL AND PERFORMANCE OF MSMEs IN INDIA <i>B R MURTHY, G MANJULA & G NARAYANA SWAMY</i>	37
10.	UNDERSTANDING CUSTOMER SATISFACTION OF INTERNET BANKING: A CASE STUDY IN UTTARAKHAND <i>DR. PRIYANKA AGARWAL</i>	39
11.	A STATISTICAL STUDY ON ADVERTISING EFFECTIVENESS OF COLD DRINKS IN CHINNATHIRUPATHY, SALEM DISTRICT <i>M.VALAVAN</i>	44
12.	PRIVATE LIFE INSURANCE INDUSTRY: AN OVERVIEW <i>MONA JINDAL</i>	46
13.	IMPACT OF INSTITUTIONAL FINANCE ON BORROWERS CONCERNED WITH PRIORITY SECTOR <i>DR. POONAM NAGPAL, PRACHI GUPTA & SHACHI GUPTA</i>	51
14.	RURAL MARKETING IN INDIA <i>DR. MIRDULESH SINGH & ANKIT KUMAR KATIYAR</i>	55
15.	GREEN BANKING: AN APPROACH TOWARDS ENVIRONMENT CONSERVATION <i>VANDANA SONI & DR. B. B. PANDEY</i>	59
16.	OPPORTUNITIES AND CHALLENGES OF E-ADVERTISING: THE CONSUMERS' PERSPECTIVE <i>DR. SEEMA SINGH & SARIKA AHLUWALIA</i>	63
17.	A STUDY ON EMPLOYEES SATISFACTION TOWARDS E-HRM IN PRIVATE SECTOR BANKS <i>DR. P. KANNAN & D. MOHANA PRIYA</i>	72
18.	PERFORMANCE ESCALATION THROUGH SUPPLIER RELATIONSHIP PRACTICES (SRP) <i>RAJEEV KUMAR</i>	76
19.	WORKING OF NEURONS IN ARTIFICIAL NEURAL NETWORKS <i>MAMTA SHARMA</i>	82
20.	STUDY ON INDIAN BANKS USING GREEN BANKING <i>NEHA CHOUDHARY</i>	86
	REQUEST FOR FEEDBACK & DISCLAIMER	88

CHIEF PATRON**Prof. (Dr.) 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, Chinara Syntex Ltd. (Textile Mills), Bhiwani

FORMER CO-ORDINATOR**Dr. S. GARG**

Faculty, Shree Ram Institute of Business & Management, Urjani

ADVISOR**Prof. S. L. MAHANDRU**

Principal (Retd.), Maharaja Agrasen College, Jagadhri

EDITOR**Dr. R. K. SHARMA**

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

CO-EDITOR**Dr. BHAVET**

Faculty, Shree Ram Institute of Engineering & Technology, Urjani

EDITORIAL ADVISORY BOARD**Dr. S. P. TIWARI**

Head, Department of Economics & Rural Development, Dr. Ram Manohar Lohia Avadh University, Faizabad

Dr. CHRISTIAN EHIOBUCHIE

Professor of Global Business/Management, Larry L Luing School of Business, Berkeley College, USA

Dr. SIKANDER KUMAR

Chairman, Department of Economics, Himachal Pradesh University, Shimla, Himachal Pradesh

Dr. JOSÉ G. VARGAS-HERNÁNDEZ

Research Professor, University Center for Economic & Managerial Sciences, University of Guadalajara, Guadalajara, Mexico

Dr. M. N. SHARMA

Chairman, M.B.A., Haryana College of Technology & Management, Kaithal

Dr. TEGUH WIDODO

Dean, Faculty of Applied Science, Telkom University, Bandung Technoplex, Jl. Telekomunikasi, Indonesia

Dr. M. S. SENAM RAJU

Professor, School of Management Studies, I.G.N.O.U., New Delhi

Dr. CLIFFORD OBIYO OFURUM

Professor of Accounting & Finance, Faculty of Management Sciences, University of Port Harcourt, Nigeria

Dr. KAUP MOHAMED

Dean & Managing Director, London American City College/ICBEST, United Arab Emirates

SUNIL KUMAR KARWASRA

Principal, Aakash College of Education, ChanderKalan, Tohana, Fatehabad

Dr. MIKE AMUHAYA IRAVO

Principal, Jomo Kenyatta University of Agriculture & Tech., Westlands Campus, Nairobi-Kenya

Dr. SYED TABASSUM SULTANA

Principal, Matrusri Institute of Post Graduate Studies, Hyderabad

Dr. NEPOMUCENO TIU

Chief Librarian & Professor, Lyceum of the Philippines University, Laguna, Philippines

Dr. SANJIV MITTAL

Professor & Dean, University School of Management Studies, GGS Indraprastha University, Delhi

Dr. ANA ŠTAMBUK

Head of Department of Statistics, Faculty of Economics, University of Rijeka, Rijeka, Croatia

Dr. RAJENDER GUPTA

Convener, Board of Studies in Economics, University of Jammu, Jammu

Dr. SHIB SHANKAR ROY

Professor, Department of Marketing, University of Rajshahi, Rajshahi, Bangladesh

Dr. ANIL K. SAINI

Professor, Guru Gobind Singh Indraprastha University, Delhi

Dr. SRINIVAS MADISHETTI

Professor, School of Business, Mzumbe University, Tanzania

Dr. NAWAB ALI KHAN

Professor & Dean, Faculty of Commerce, Aligarh Muslim University, Aligarh, U.P.

MUDENDA COLLINS

Head, Operations & Supply Chain, School of Business, The Copperbelt University, Zambia

Dr. EGWAKHE A. JOHNSON

Professor & Director, Babcock Centre for Executive Development, Babcock University, Nigeria

Dr. A. SURYANARAYANA

Professor, Department of Business Management, Osmania University, Hyderabad

Dr. MURAT DARÇIN

Associate Dean, Gendarmerie and Coast Guard Academy, Ankara, Turkey

Dr. ABHAY BANSAL

Head, Department of Information Technology, Amity School of Engg. & Tech., Amity University, Noida

Dr. YOUNOS VAKIL ALROAIA

Head of International Center, DOS in Management, Semnan Branch, Islamic Azad University, Semnan, Iran

WILLIAM NKOMO

Asst. Head of the Department, Faculty of Computing, Botho University, Francistown, Botswana

Dr. JAYASHREE SHANTARAM PATIL (DAKE)

Faculty in Economics, KPB Hinduja College of Commerce, Mumbai

SHASHI KHURANA

Associate Professor, S. M. S. Khalsa Lubana Girls College, Barara, Ambala

Dr. SEOW TA WEEA

Associate Professor, Universiti Tun Hussein Onn Malaysia, Parit Raja, Malaysia

Dr. OKAN VELİ ŞAFKLI

Associate Professor, European University of Lefke, Lefke, Cyprus

Dr. MOHENDER KUMAR GUPTA

Associate Professor, Government College, Hodal

Dr. BORIS MILOVIC

Associate Professor, Faculty of Sport, Union Nikola Tesla University, Belgrade, Serbia

Dr. MOHAMMAD TALHA

Associate Professor, Department of Accounting & MIS, College of Industrial Management, King Fahd University of Petroleum & Minerals, Dhahran, Saudi Arabia

Dr. V. SELVAM

Associate Professor, SSL, VIT University, Vellore

Dr. IQBAL THONSE HAWALDAR

Associate Professor, College of Business Administration, Kingdom University, Bahrain

Dr. PARDEEP AHLAWAT

Associate Professor, Institute of Management Studies & Research, Maharshi Dayanand University, Rohtak

Dr. ALEXANDER MOSESOV

Associate Professor, Kazakh-British Technical University (KBTU), Almaty, Kazakhstan

Dr. ASHOK KUMAR CHAUHAN

Reader, Department of Economics, Kurukshetra University, Kurukshetra

YU-BING WANG

Faculty, department of Marketing, Feng Chia University, Taichung, Taiwan

SURJEET SINGH

Faculty, Department of Computer Science, G. M. N. (P.G.) College, Ambala Cantt.

Dr. MELAKE TEWOLDE TECLEGHIOGIS

Faculty, College of Business & Economics, Department of Economics, Asmara, Eritrea

Dr. RAJESH MODI

Faculty, Yanbu Industrial College, Kingdom of Saudi Arabia

Dr. SAMBHAVNA

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

Dr. THAMPOE MANAGALESWARAN

Faculty, Vavuniya Campus, University of Jaffna, Sri Lanka

Dr. SHIVAKUMAR DEENE

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

SURAJ GAUDEL

BBA Program Coordinator, LA GRANDEE International College, Simalchaur - 8, Pokhara, Nepal

FORMER TECHNICAL ADVISOR**AMITA****FINANCIAL ADVISORS****DICKEN 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 the 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/Mkt./HRM/General Mgt./Engineering/Economics/Computer/IT/ Education/Psychology/Law/Math/other, please specify)

DEAR SIR/MADAM

Please find my submission of manuscript titled ' _____ ' for likely publication in one of your journals.

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

I affirm that all the co-authors of this manuscript have seen the submitted version of the manuscript and have agreed to inclusion of their names as co-authors.

Also, if my/our manuscript is accepted, I agree to comply with the formalities as given on the website of the journal. The Journal has discretion to publish our contribution in any of its journals.

NAME OF CORRESPONDING AUTHOR

Designation/Post*

Institution/College/University with full address & Pin Code

Residential address with Pin Code

Mobile Number (s) with country ISD code

Is WhatsApp or Viber active on your above noted Mobile Number (Yes/No)

Landline Number (s) with country ISD code

E-mail Address

Alternate E-mail Address

Nationality

* i.e. Alumnus (Male Alumni), Alumna (Female Alumni), Student, Research Scholar (M. Phil), Research Scholar (Ph. D.), JRF, Research Assistant, Assistant Lecturer, Lecturer, Senior Lecturer, Junior Assistant Professor, Assistant Professor, Senior Assistant Professor, Co-ordinator, Reader, Associate Professor, Professor, Head, Vice-Principal, Dy. Director, Principal, Director, Dean, President, Vice Chancellor, Industry Designation etc. **The qualification of author is not acceptable for the purpose.**

NOTES:

- a) The whole manuscript has to be in **ONE MS WORD FILE** only, which will start from the covering letter, inside the manuscript. **pdf. version is liable to be rejected without any consideration.**
 - b) The sender is required to mention the following in the **SUBJECT COLUMN of the mail:**
New Manuscript for Review in the area of (e.g. Finance/Marketing/HRM/General Mgt./Engineering/Economics/Computer/IT/ Education/Psychology/Law/Math/other, please specify)
 - c) There is no need to give any text in the body of the 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 expected to be below **1000 KB**.
 - e) Only the **Abstract 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 within twenty-four hours** and in case of non-receipt of acknowledgment from the journal, w.r.t. the submission of the manuscript, within two days of its submission, the corresponding author is required to demand for the same by sending a separate mail to the journal.
 - g) The author (s) name or details should not appear anywhere on the body of the manuscript, except on the covering letter and the cover page of the manuscript, in the manner as mentioned in the guidelines.
2. **MANUSCRIPT TITLE:** The title of the paper should be typed in **bold letters, centered and fully capitalised**.
 3. **AUTHOR NAME (S) & AFFILIATIONS:** Author (s) **name, designation, affiliation (s), address, mobile/landline number (s), and email/alternate email address** should be given underneath the title.
 4. **ACKNOWLEDGMENTS:** Acknowledgements can be given to reviewers, guides, funding institutions, etc., if any.
 5. **ABSTRACT:** Abstract should be in **fully italic printing**, ranging between **150 to 300 words**. The abstract must be informative and elucidating the background, aims, methods, results & conclusion in a **SINGLE PARA**. **Abbreviations must be mentioned in full**.
 6. **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 stop at the end. All words of the keywords, including the first one should be in small letters, except special words e.g. name of the Countries, abbreviations etc.
 7. **JEL CODE:** Provide the appropriate Journal of Economic Literature Classification System code (s). JEL codes are available at www.aea-web.org/econlit/jelCodes.php. However, mentioning of JEL Code is not mandatory.
 8. **MANUSCRIPT:** Manuscript must be in **BRITISH ENGLISH** prepared on a standard A4 size **PORTRAIT SETTING PAPER**. **It should be free from any errors i.e. grammatical, spelling or punctuation. It must be thoroughly edited at your end.**
 9. **HEADINGS:** All the headings must be bold-faced, aligned left and fully capitalised. Leave a blank line before each heading.
 10. **SUB-HEADINGS:** All the sub-headings must be bold-faced, aligned left and fully capitalised.
 11. **MAIN TEXT:**

THE MAIN TEXT SHOULD FOLLOW THE FOLLOWING SEQUENCE:**INTRODUCTION****REVIEW OF LITERATURE****NEED/IMPORTANCE OF THE STUDY****STATEMENT OF THE PROBLEM****OBJECTIVES****HYPOTHESIS (ES)****RESEARCH METHODOLOGY****RESULTS & DISCUSSION****FINDINGS****RECOMMENDATIONS/SUGGESTIONS****CONCLUSIONS****LIMITATIONS****SCOPE FOR FURTHER RESEARCH****REFERENCES****APPENDIX/ANNEXURE****The manuscript should preferably be in 2000 to 5000 WORDS, But the limits can vary depending on the nature of the manuscript.**

12. **FIGURES & TABLES:** These should be simple, crystal **CLEAR, centered, separately numbered** & self-explained, and the **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.**
13. **EQUATIONS/FORMULAE:** These should be consecutively numbered in parenthesis, left aligned with equation/formulae number placed at the right. The equation editor provided with standard versions of Microsoft Word may be utilised. If any other equation editor is utilised, author must confirm that these equations may be viewed and edited in versions of Microsoft Office that does not have the editor.
14. **ACRONYMS:** These should not be used in the abstract. The use of acronyms is elsewhere is acceptable. Acronyms should be defined on its first use in each section e.g. Reserve Bank of India (RBI). Acronyms should be redefined on first use in subsequent sections.
15. **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 may follow Harvard Style of Referencing. **Also check to ensure that everything that you are including in the reference section is duly cited in the paper.** 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 italic printing. 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 parenthesis.
 - **Headers, footers, endnotes and footnotes should not be used in the document.** However, **you can mention short notes to elucidate some specific point**, which may be placed in number orders before the references.

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, 19-23

UNPUBLISHED DISSERTATIONS

- 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 Gas Policy, Political Weekly, Viewed on January 01, 2012 <http://epw.in/user/viewabstract.jsp>

WORKING OF NEURONS IN ARTIFICIAL NEURAL NETWORKS

MAMTA SHARMA
DEPARTMENT OF COMPUTER SCIENCE
RESEARCH SCHOLAR
ARNI UNIVERSITY
KANGRA

ABSTRACT

The biologically inspired methods of computing are thought to be the next major advancement in the computing industry. Even simple animal brains are capable of functions that are currently impossible for computers. Computers do rote things well, like keeping ledgers or performing complex math. But computers have trouble recognizing even simple patterns much less generalizing those patterns of the past into actions of the future. This paper includes brain modeling also promises a less technical way to develop machine solutions.

KEYWORDS

artificial neural networks, computing industry.

1. INTRODUCTION

Artificial Neural Networks are relatively crude electronic models based on the neural structure of the brain. The brain basically learns from experience. It is a natural proof that some problems that are beyond the scope of current computers are indeed solvable by small energy efficient packages. This brain modeling also promises a less technical way to develop machine solutions. This new approach to computing also provides a more graceful degradation during system overload than its more traditional counterparts.

Now, advances in biological research promise an initial understanding of the natural thinking mechanism. This paper shows that brains store information as patterns. Some of these patterns are very complicated and allow us the ability to recognize individual faces from many different angles. This process of storing information as patterns, utilizing those patterns, and then solving problems encompasses a new field in computing. This field, as mentioned before, does not utilize traditional programming but involves the creation of massively parallel networks and the training of those networks to solve specific problems. This field also utilizes words very different from traditional computing, words like behave, react, self-organize, learn, generalize, and forget.

2. ANALOGY TO THE BRAIN

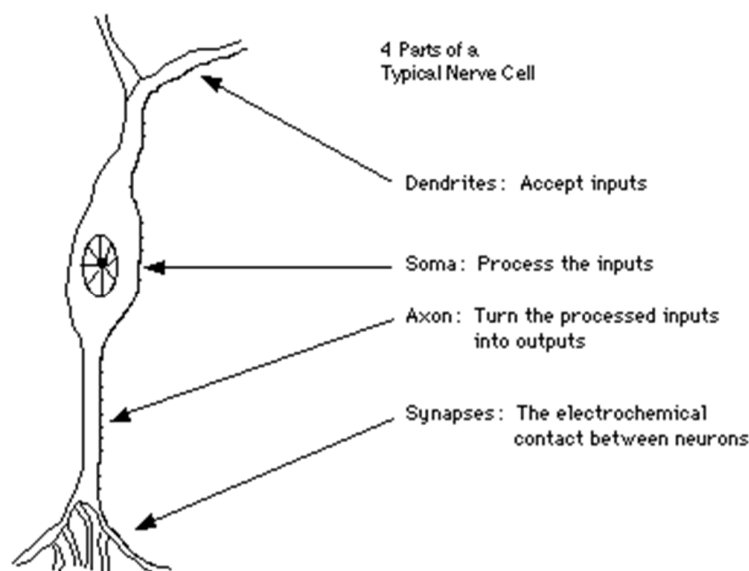
The exact workings of the human brain are still a mystery. Yet, some aspects of this amazing processor are known. In particular, the most basic element of the human brain is a specific type of cell, which, unlike the rest of the body, does not appear to regenerate. Because this type of cell is the only part of the body that isn't slowly replaced, it is assumed that these cells are what provide us with our abilities to remember, think, and apply previous experiences to our every action. These cells, all 100 billion of them, are known as neurons. Each of these neurons can connect with up to 200,000 other neurons, although 1,000 to 10,000 is typical. The power of the human mind comes from the sheer numbers of these basic components and the multiple connections between them. It also comes from genetic programming and learning.

The individual neurons are complicated. They have a myriad of parts, sub-systems, and control mechanisms. They convey information via a host of electrochemical pathways. There are over one hundred different classes of neurons, depending on the classification method used. Together these neurons and their connections form a process, which is not binary, not stable, and not synchronous. In short, it is nothing like the currently available electronic computers, or even artificial neural networks.

3. ARTIFICIAL NEURONS AND HOW THEY WORK

The fundamental processing element of a neural network is a neuron. This building block of human awareness encompasses a few general capabilities. Basically, a biological neuron receives inputs from other sources, combines them in some way, performs a generally nonlinear operation on the result, and then outputs the final result. Figure below shows the relationship of these four parts.

FIGURE 1: A SIMPLE BIOLOGICAL NEURON



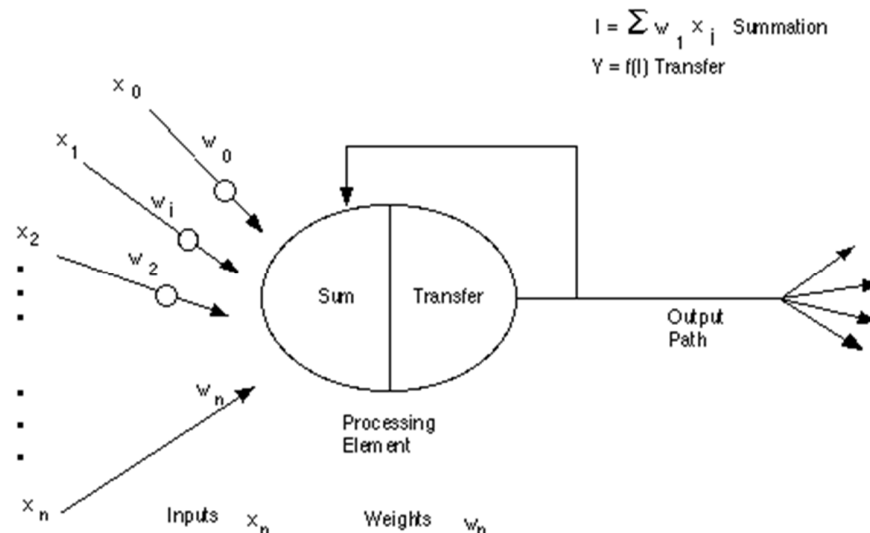
Within humans there are many variations on this basic type of neuron, further complicating man's attempts at electrically replicating the process of thinking. Yet, all natural neurons have the same four basic components. These components are known by their biological names - dendrites, soma, axon, and synapses. Dendrites are hair-like extensions of the soma, which act like input channels. These input channels receive their input through the synapses of other neurons. The soma then processes these incoming signals over time. The soma then turns that processed value into an output, which is sent out to other neurons through the axon and the synapses.

Recent experimental data has provided further evidence that biological neurons are structurally more complex than the simplistic explanation above. They are significantly more complex than the existing artificial neurons that are built into today's artificial neural networks. As biology provides a better understanding of neurons, and as technology advances, network designers can continue to improve their systems by building upon man's understanding of the biological brain.

But currently, the goal of artificial neural networks is not the grandiose recreation of the brain. On the contrary, neural network researchers are seeking an understanding of nature's capabilities for which people can engineer solutions to problems that have not been solved by traditional computing.

To do this, the basic unit of neural networks, the artificial neurons, simulates the four basic functions of natural neurons. Figure below shows a fundamental representation of an artificial neuron.

FIGURE 2: A BASIC ARTIFICIAL NEURON



In above Figure, various inputs to the network are represented by the mathematical symbol, $x(n)$. Each of these inputs are multiplied by a connection weight. These weights are represented by $w(n)$. In the simplest case, these products are simply summed, fed through a transfer function to generate a result, and then output. This process lends itself to physical implementation on a large scale in a small package. This electronic implementation is still possible with other network structures, which utilize different summing functions as well as different transfer functions.

Some applications require "black and white," or binary, answers. These applications include the recognition of text, the identification of speech, and the image deciphering of scenes. These applications are required to turn real-world inputs into discrete values. These potential values are limited to some known set, like the ASCII characters or the most common 50,000 English words. Because of this limitation of output options, these applications don't always utilize networks composed of neurons that simply sum up, and thereby smooth, inputs. These networks may utilize the binary properties of ORing and ANDing of inputs. These functions, and many others, can be built into the summation and transfer functions of a network.

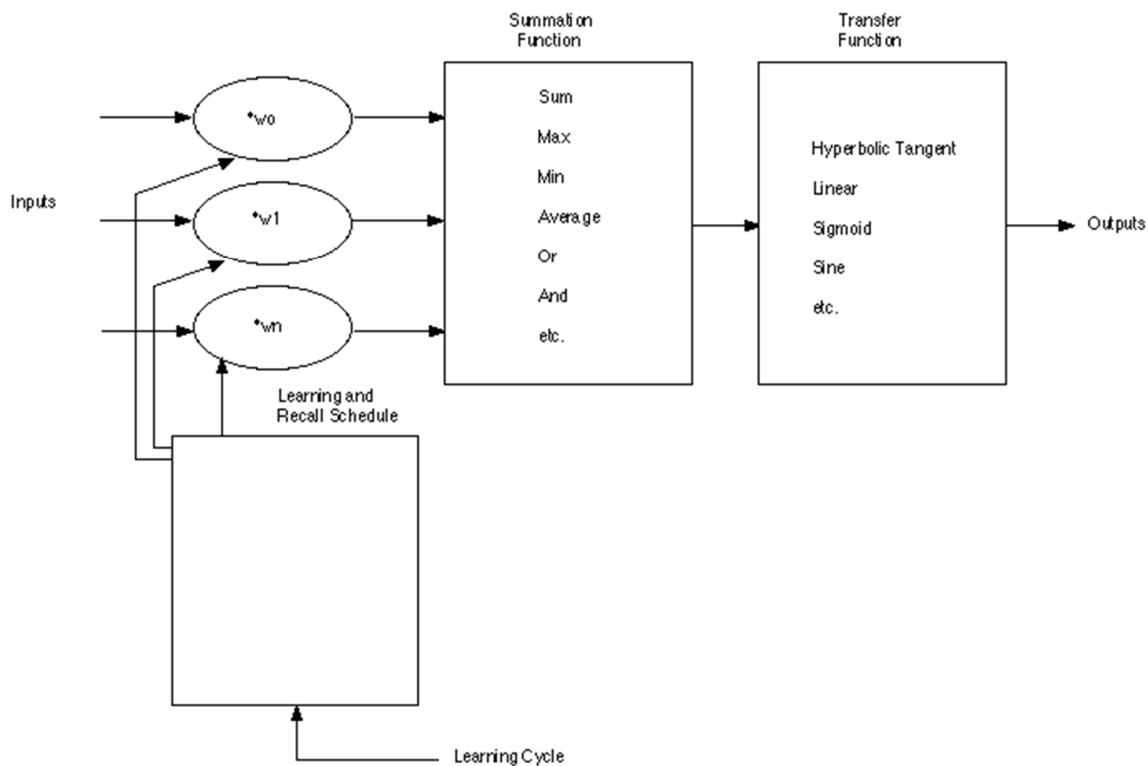
Other networks work on problems where the resolutions are not just one of several known values. These networks need to be capable of an infinite number of responses. Applications of this type include the "intelligence" behind robotic movements. This "intelligence" processes inputs and then creates outputs, which actually cause some device to move. That movement can span an infinite number of very precise motions. These networks do indeed want to smooth their inputs, which, due to limitations of sensors, come in non-continuous bursts, say thirty times a second. To do that, they might accept these inputs, sum that data, and then produce an output by, for example, applying a hyperbolic tangent as a transfer functions. In this manner, output values from the network are continuous and satisfy more real world interfaces.

Other applications might simply sum and compare to a threshold, thereby producing one of two possible outputs, a zero or a one. Other functions scale the outputs to match the application, such as the values minus one and one. Some functions even integrate the input data over time, creating time-dependent networks.

4. ELECTRONIC IMPLEMENTATION OF ARTIFICIAL NEURONS

In currently available software packages these artificial neurons are called "processing elements" and have many more capabilities than the simple artificial neuron described above. Those capabilities will be discussed later in this report. Figure 2.2.3 is a more detailed schematic of this still simplistic artificial neuron.

FIGURE 3: A MODEL OF A "PROCESSING ELEMENT"

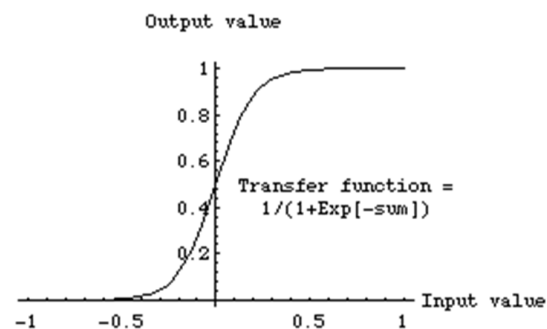


In Above Figure, inputs enter into the processing element from the upper left. The first step is for each of these inputs to be multiplied by their respective weighting factor ($w(n)$). Then these modified inputs are fed into the summing function, which usually just sums these products. Yet, many different types of operations can be selected. These operations could produce a number of different values, which are then propagated forward; values such as the average, the largest, the smallest, the Ored values, the ANDed values, etc. Furthermore, most commercial development products allow software engineers to create their own summing functions via routines coded in a higher-level language (C is commonly supported). Sometimes the summing function is further complicated by the addition of an activation function which enables the summing function to operate in a time sensitive way.

Either way, the output of the summing function is then sent into a transfer function. This function then turns this number into a real output via some algorithm. It is this algorithm that takes the input and turns it into a zero or a one, a minus one or a one, or some other number. The transfer functions that are commonly supported are sigmoid, sine, hyperbolic tangent, etc. This transfer function also can scale the output or control its value via thresholds. The result of the transfer function is usually the direct output of the processing element. An example of how a transfer function works is shown in Figure below.

This sigmoid transfer function takes the value from the summation function, called sum in the Figure below, and turns it into a value between zero and one.

FIGURE 4: SIGMOID TRANSFER FUNCTION



Finally, the processing element is ready to output the result of its transfer function. This output is then input into other processing elements, or to an outside connection, as dictated by the structure of the network.

All artificial neural networks are constructed from this basic building block - the processing element or the artificial neuron. It is variety and the fundamental differences in these building blocks, which partially cause the implementing of neural networks to be an "art."

5. CONCLUSION

The artificial neural networks try to replicate only the most basic elements of this complicated, versatile, and powerful organism. They do it in a primitive way. But for the software engineer who is trying to solve problems, neural computing was never about replicating human brains. It is about machines and a new way to solve problems.

REFERENCES

1. Graham, R. (1966). "Bounds for certain multiprocessing anomalies" (PDF). *Bell System Technical Journal* 1563–1581. <http://www.math.ucsd.edu/~ronspubs/multiprocessing.pdf>.
2. Bäck, T. (1996). "Evolutionary Algorithms in Theory and Practice: Evolution Strategies, Evolutionary Programming, Genetic Algorithms", Oxford Univ. Press.

3. Bäck, T., Fogel, D., Michalewicz, Z. (1997), "Handbook of Evolutionary Computation", Oxford Univ. Press.
4. Langton, C. G. (1992), "Artificial Life", Addison-Wesley., section 1
5. Beni, G., Wang, J. (1989), "Swarm Intelligence in Cellular Robotic Systems", Proceed. NATO Advanced Workshop on Robots and Biological Systems, Tuscany, Italy, 26–30.
6. Waibel M, Floreano D and Keller L (2011), "A quantitative test of Hamilton's rule for the evolution of altruism", *PLoS Biology*, 9(5): e1000615. doi:10.1371/journal.pbio.1000615
7. Marco Dorigo and Thomas Stützle (2004), "Ant Colony Optimization", MIT Press, ISBN 0-262-04219-3
8. Karaboga, Dervis (2010), "Artificial bee colony algorithm", *Scholarpedia*, 5(3): 6915.
9. Kaveh, A.; Talatahari, S. (2010). "A Novel Heuristic Optimization Method: Charged System Search". *Acta Mechanica* 213 (3-4): 267–289. doi:10.1007/s00707-009-0270-4.
10. Yang X.-S. and Deb S. (December 2009). "Cuckoo search via Lévy flights". (NaBIC 2009). IEEE Publications. pp. 210–214. arXiv:1003.1594v1.
11. Yang X. S., (2008), "Nature-Inspired Metaheuristic Algorithms", Frome: Luniver Press. ISBN 1905986106.
12. Shah-Hosseini, Hamed (2009). "The intelligent water drops algorithm: a nature-inspired swarm-based optimization algorithm". In *Journal of Bio-Inspired Computation* 1(1/2): 71–79.
13. Parsopoulos, K. E.; Vrahatis, M. N. (2002). "Recent Approaches to Global Optimization Problems Through Particle Swarm Optimization". *Natural Computing* 1 (2-3): 235–306. doi: 10.1023/A:1016568309421.
14. P.-P. Grassé (1959), "La théorie de la Stigmergie : Essai d'interprétation du comportement des termites constructeurs", *Insectes Sociaux*, numéro 6, p. 41-80.
15. J.L. Deneubourg, J.M. Pasteels et J.C. Verhaeghe (1983), "Probabilistic Behaviour in Ants: a Strategy of Errors?", *Journal of Theoretical Biology*, numéro 105.
16. F. Moyson, B. Manderick (1988), "The collective behaviour of Ants: Example of Self-Organization in Massive Parallelism", *Symposium on Parallel Models of Intelligence*, Stanford, California.
17. S. Goss, S. Aron, J.-L. Deneubourg et J.-M. Pasteels (1989), "Self-organized shortcuts in the Argentine ant", *Naturwissenschaften*, volume 76, pages 579-581.
18. M. Ebling, M. Di Loreto, M. Presley, F. Wieland, et D. Jefferson (1989), "An Ant Foraging Model Implemented on the Time Warp Operating System", *Proceedings of the SCS Multiconference on Distributed Simulation*.
19. M. Dorigo (1992), "Optimization, Learning and Natural Algorithms", PhD thesis, Politecnico di Milano, Italie.
20. M. Dorigo, V. Maniezzo, et A. Colnori (1996), "Ant system: optimization by a colony of cooperating agents", *IEEE Transactions on Systems, Man, and Cybernetics--Part B*, volume 26, numéro 1, pages 29-41.
21. T. Stützle et H.H. Hoos (2000), "MAX MIN Ant System", *Future Generation Computer Systems*, volume 16, pages 889-914.
22. M. Dorigo et L.M. Gambardella (1997), "Ant Colony System : A Cooperative Learning Approach to the Traveling Salesman Problem", *IEEE volume 1*, numéro 1, pages 53-66.
23. R. Schoonderwoerd, O. Holland, J. Bruten et L. Rothkrantz (1997), "Ant-based load balancing in telecommunication networks", *Adaptive Behaviour*, volume 5, numéro 2, pages 169-207.
24. M. Dorigo (1998), "From Ant Colonies to Artificial Ants: First International Workshop on Ant Colony Optimization", *ANTS 98*, Bruxelles, Belgique, octobre 1998.
25. T. Stützle (1998), *Parallelization Strategies for Ant Colony Optimization*, *Proceedings of PPSN-V*, Fifth International Conference on Parallel Problem Solving from Nature, Springer-Verlag, volume 1498, pages 722-731.
26. É. Bonabeau, M. Dorigo et G. Theraulaz (1999), "Swarm intelligence", Oxford University Press.,
27. M. Dorigo, G. Di Caro et T. Stützle (2000), *Special issue on "Ant Algorithms"*, *Future Generation Computer Systems*, volume 16, numéro 8.
28. W.J. Gutjahr (2000), "A graph-based Ant System and its convergence", *Future Generation Computer Systems*, volume 16, pages 873-888.
29. S. Iredi, D. Merkle et M. Middendorf (2001), "Bi-Criterion Optimization with Multi Colony Ant Algorithms", *Evolutionary Multi-Criterion Optimization*, First International Conference (EMO'01), Zurich, Springer Verlag, pages 359-372, 2001.
30. L. Bianchi, L.M. Gambardella et M. Dorigo (2002), "An ant colony optimization approach to the probabilistic traveling salesman problem", *PPSN-VII*, Seventh International Conference on Parallel Problem Solving from Nature, Lecture Notes in Computer Science, Springer Verlag, Berlin, Allemagne.
31. M. Zlochin, M. Birattari, N. Meuleau, et M. Dorigo (2004), "Model-based search for combinatorial optimization: A critical survey", *Annals of Operations Research*, vol. 131, pp. 373-395.
32. D. Karaboga (2005), "An Idea Based On Honey Bee Swarm for Numerical Optimization", Technical Report-TR06, Erciyes University, Engineering Faculty, Computer Engineering Department.
33. Ali Hadidi, Sina Kazemzadeh Azad, Saied Kazemzadeh Azad (2010), "Structural optimization using artificial bee colony algorithm", 2nd International Conference on Engineering Optimization, 2010, September 6 – 9, Lisbon, Portugal.
34. Pisut Pongchairerks (2009), "Particle swarm optimization algorithm applied to scheduling problems", *Science Asia* 35 (2009): 89–94
35. M.Dorigo and G.Di Caro (1999), "The ant colony optimization meta-heuristic", in *New Ideas in Optimization*, McGraw-Hill, pp. 11-32, 1999.
36. M.R.Garey, and D.S (1979), "Computers and Intractability, A Guide to the Theory of NP-Completeness", W.H Freeman and Company.
37. S. Goss, S.Aron, J. L. Deneubourg, and J. M.Pasteels (1990), "Self-organized shortcuts in the Argentine" Ant. *Naturwissenschaften*, 76:579-581.
38. T. Stutzle (1998), "An ant approach for the flow shop problem", In *Fifth European Congress on Intelligent Techniques Soft Computing (EUFIT'98)*, vol.3, Verlag Mainz, Aachen, pp. 1560-1564.
39. D. Merkle and M. Middendorf and H. Schmeck (2002), "Ant Colony Optimization for Resource Constrained Project Scheduling", *IEEE Transactions on Evolutionary Computation*, 6(4):333-346.
40. D. Merkle and M. Middendorf (2003), "Ant Colony Optimization with Global Pheromone Evaluation for Scheduling a Single Machine", *Journal of Applied Intelligence*, Kluwer Academic Publishers, pp. 105-111.
41. L. M, Gambardella, E. Taillard and G. Agazzi (1999), "MACS-VRPTW: A Multiple Ant Colony System for Vehicle Routing Problems with Time Window", *New Ideas in Optimization*, pp.63-76, McGraw-Hill, London.,
42. Colnori A., M. Dorigo, V. Maniezzo and M. Trubian (1994), "Ant system for Job-shop Scheduling", *JORBEL -Belgian Journal of Operations Research, Statistics and Computer Science*, 34(1):39-53.
43. S.van der Zwaan, C. Marques (1999), "Ant Colony Optimization for Job Shop Scheduling", In *proceedings of Third workshop on Genetic Algorithms and Artificial Life*.
44. C. Blum and M. Sampels (2002), "An ant Colony Optimization Algorithm for FOP Shop Scheduling: A case study on different pheromone representations", *Proceedings of the 2002 Congress on Evolutionary Computation*, CEC'02, pp.1558-1563.
45. Sjoerd van der Zwaan (2004), "Ant Colony Optimisation for Job Shop Scheduling", *proceedings on scheduling' 04*.
46. Apinanthana Udomsakdigool (2011), "Ant colony algorithm for multi-criteria job shop scheduling to minimize makespan, mean flow time and mean tardiness" ISSN 1750-9653, England, UK, *International Journal of Management Science and Engineering Management*, 6(2): 117-123, <http://www.ijmse.org>
47. Chin Soon Chong (2006), "Bee colony algorithm for job shop scheduling *Proceedings of the 2006 Winter Simulation Conference*.
48. Gere, W. S.(1966), Jr., "Heuristics in jobshop scheduling," *Management Science*, Vol. 13, No. 1 (1966), pp. 167-175.
49. Rajendran, C. and Holthaus (1999), O., "A comparative study of dispatching rules in dynamic flowshops and jobshops," *European Journal of Operational Research* Vol. 116, No. 1 (1999), pp. 156-170.
50. Jain. A. S. and Meeran. S. (1999), "Deterministic job shop scheduling: past, present and future," *European Journal of Operational Research*, Vol. 113, No. 2 (1999), pp.390-434

REQUEST FOR FEEDBACK

Dear Readers

At the very outset, International Journal of Research in Commerce, IT & 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 to an appropriate consideration.

With sincere regards

Thanking you profoundly

Academically yours

Sd/-

Co-ordinator

DISCLAIMER

The information and opinions presented in the Journal reflect the views of the authors and not of the Journal or its Editorial Board or the Publishers/Editors. Publication does not constitute endorsement by the journal. Neither the Journal nor its publishers/Editors/Editorial Board nor anyone else involved in creating, producing or delivering the journal or the materials contained therein, assumes any liability or responsibility for the accuracy, completeness, or usefulness of any information provided in the journal, nor shall they be liable for any direct, indirect, incidental, special, consequential or punitive damages arising out of the use of information/material contained in the journal. The journal, neither its publishers/Editors/ Editorial Board, nor any other party involved in the preparation of material contained in the journal represents or warrants that the information contained herein is in every respect accurate or complete, and they are not responsible for any errors or omissions or for the results obtained from the use of such material. Readers are encouraged to confirm the information contained herein with other sources. The responsibility of the contents and the opinions expressed in this journal are exclusively of the author (s) concerned.

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

