

# INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT

I  
J  
R  
C  
M



A Monthly Double-Blind Peer Reviewed Refereed 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.](#), Index Copernicus Publishers Panel, Poland,

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

as well as in [Cabell's Directories of Publishing Opportunities, U.S.A.](#)

Circulated all over the world & Google has verified that scholars of more than Hundred & Thirty Two 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

[www.ijrcm.org.in](http://www.ijrcm.org.in)

# CONTENTS

Sr. No.	TITLE & NAME OF THE AUTHOR (S)	Page No.
1.	SOCIO-ECONOMIC INFLUENCE OF SHARI'AH ON CONSUMERS' MOTIVES AND PERCEPTION IN ZAMFARA STATE, NIGERIA <i>DR. HALIRU BALA</i>	1
2.	EFFECTIVENESS OF COMPUTER ASSISTED INSTRUCTION IN RELATION TO THE LEARNING OUTCOMES OF THE ENGINEERING MANAGEMENT STUDENTS OF UNIVERSITY X <i>MA. TEODORA E. GUTIERREZ</i>	4
3.	IDENTIFYING TECHNOLOGICAL PARAMETERS EFFECTIVE ON COMPETITIVENESS OF SMALL AND MEDIUM-SIZED RESIN COMPANIES ACCORDING TO UNIDO MODEL: CASE STUDY OF IRAN KEATON POLYESTER MANUFACTURING COMPANY <i>EHSAN GHASEMI, SEYED REZA HEJAZI, ABOLGHASEM ARABIOUN &amp; REZA ALIBAKHSHI</i>	6
4.	IMPACT OF ISLAMIC BUSINESS ETHICS ON FAMILY CONSUMPTION DECISION MAKING IN ZAMFARA STATE, NIGERIA <i>DR. HALIRU BALA</i>	12
5.	ETHICAL ISSUES AND CONSUMER PERCEPTION ABOUT BRANDED AND UNBRANDED MILK PRODUCTS: THE EMERGING SCENARIO <i>DR. ASHOK AIMA &amp; NARESH SHARMA</i>	15
6.	SOFTWARE PROJECT MANAGEMENT - BEST PRACTICES <i>DR. K. A. PARTHASARATHY</i>	19
7.	RECALLING ANCIENT WISDOM FOR A SUSTAINABLE DEVELOPMENT <i>DR. PADMA SHANKAR</i>	23
8.	RADIO FREQUENCY IDENTIFICATION (RFID) <i>TANAJI D. DABADE, DR. SHIVAJI U. GAWADE &amp; ALEKHA CHANDRA PANDA</i>	27
9.	SERVICE QUALITY MODELS IN HEALTHCARE - A REVIEW (1990-2010) <i>K. VIDHYA, DR. C. SAMUDHRA RAJKUMAR &amp; DR. K. TAMILIYOTHI</i>	34
10.	A I R E P: A NOVEL SCALED MULTIDIMENSIONAL QUANTITATIVE RULES GENERATION APPROACH <i>SAPNA JAIN, DR. M. AFSHAR ALAM &amp; DR. RANJT BISWAS</i>	45
11.	AN ANALYSIS OF ONLINE IDENTITY MANAGEMENT TECHNIQUES <i>APARAJITA PANDEY &amp; DR. JATINDERKUMAR R. SAINI</i>	53
12.	PAPR REDUCTION OF OFDM BASED ON ADAPTIVE ACTIVE CONSTELLATION EXTENSION <i>NEELAM DEWANGAN &amp; MANGAL SINGH</i>	56
13.	ANALYZING THE OUTPERFORMING SECTOR IN THE VOLATILE MARKET <i>DR. SANDEEP MALU, DR. UTTAM RAO JAGTAP &amp; RAHUL DEO</i>	60
14.	AN ANALYTICAL STUDY OF JOB STRESS AMONG SOFTWARE PROFESSIONALS IN INDIA <i>DR. SURENDRA KUMAR</i>	65
15.	PROCESS FRAMEWORK FOR BUSINESS VALUE ENHANCEMENT BY IMPROVING OPERATIONAL EFFICIENCY <i>RAMAKRISHNAN. N</i>	71
16.	AN OVERVIEW OF SUPPLY CHAIN MANAGEMENT PRACTICES IN INDIAN AUTOMOBILE SECTOR <i>R.VENKATESHWAR RAO</i>	75
17.	AN EMPIRICAL STUDY OF BRAND PREFERENCE OF MOBILE PHONES AMONG COLLEGE AND UNIVERSITY STUDENTS <i>DR. DINESH KUMAR</i>	81
18.	ICT IN BANKING SECTOR: DISASTER AND RECOVERY OF INFORMATION <i>GAGAN DEEP, SANJEEV KUMAR &amp; ROHIT KUMAR</i>	86
19.	CREDIT CARDS AND ITS IMPACT ON BUYING BEHAVIOUR: A STUDY WITH REFERENCE TO RURAL MARKET <i>P.MANIVANNAN</i>	89
20.	EMERGING APPLICATIONS AND SECURITY FOR VoIP: A STUDY <i>HEMA JANDSALAR &amp; DR. B. S. JANGRA</i>	93
21.	SUCCESSION PLANNING IN INDIAN BANKING SYSTEM: A STUDY CONDUCTED AMONG BANK OFFICERS OF COIMBATORE <i>DR. RUPA GUNASEELAN &amp; S.DHANA BAGIYAM</i>	96
22.	A CONCEPTUAL STRUCTURE FOR KNOWLEDGE MANAGEMENT MODEL IN HIERARCHICAL DISTRIBUTED ENVIRONMENT: CASE STUDY OF KNOWLEDGE SHARING AMONG DIFFERENT GOVERNMENT ORGANIZATION WORKING FOR PLANNING AND FACILITATING WATER RESOURCES IN UTTARAKHAND STATE <i>JATIN PANDEY &amp; DARSHANA PATHAK JOSHI</i>	99
23.	A DNA-BASED ALGORITHM FOR MINIMUM SPANNING TREE PROBLEM USING TEMPERATURE GRADIENT TECHNIQUE <i>B.S.E.ZORAIDA</i>	102
24.	MARKET BASKET ANALYSIS: A DATA MINING TOOL FOR MAXIMIZING SALES & CUSTOMER SUPPORT <i>KALPANA BABASO SALUNKHE, MURLIDHAR S. DHANAWADE &amp; SACHIN PATIL</i>	107
25.	FAULT DETECTION IN NETWORKS BASED ON DYNAMIC INTERVAL BASED ACTIVE PROBING <i>BANUMATHI R</i>	110
26.	ISSUES AND CHALLENGES IN ELECTRONIC WASTE <i>DR. KUNTAL PATEL &amp; NIRBHAY MEHTA</i>	113
27.	STUDY ON CSR OF WIPRO, TATA & RIL <i>SHWETA PATEL &amp; ZARNA PATEL</i>	116
28.	EMPOWERING RURAL WOMEN – ROLE OF MICROFINANCE <i>DR. NANU LUNAVATH</i>	119
29.	ROLE OF E-LEARNING IN EDUCATION: A STUDY OF UNIVERSITY OF JAMMU <i>ANJU THAPA</i>	126
30.	ADVERTISING: DO THEY HELP CONSUMERS IN MAKING SOUND PURCHASE DECISIONS? <i>PINKI</i>	130
	REQUEST FOR FEEDBACK	132

## CHIEF PATRON

**PROF. K. K. AGGARWAL**

Chancellor, Lingaya's University, Delhi  
Founder Vice-Chancellor, Guru Gobind Singh Indraprastha University, Delhi  
Ex. Pro Vice-Chancellor, Guru Jambheshwar University, Hisar

## PATRON

**SH. RAM BHAJAN AGGARWAL**

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

## CO-ORDINATOR

**MOHITA**

Faculty, Yamuna Institute of Engineering & Technology, Village Gadholi, P. O. Gadhola, Yamunanagar

## 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

## CO-EDITOR

**MOHITA**

Faculty, Yamuna Institute of Engineering & Technology, Village Gadholi, P. O. Gadhola, Yamunanagar

## 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, M. M. Institute of Management, Maharishi Markandeshwar University, Mullana

**DR. SHIVAKUMAR DEENE**

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

**DR. BHAVET**

Faculty, M. M. Institute of Management, Maharishi Markandeshwar University, Mullana

***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.

**DR. ASHOK KUMAR**

Head, Department of Electronics, D. A. V. College (Lahore), Ambala City

**ASHISH CHOPRA**

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

**SAKET BHARDWAJ**

Lecturer, Haryana Engineering College, Jagadhri

***TECHNICAL ADVISORS***

**AMITA**

Faculty, Government M. S., Mohali

**MOHITA**

Faculty, Yamuna Institute of Engineering & Technology, Village Gadholi, P. O. Gadholi, Yamunanagar

***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 area of Computer, Business, Finance, Marketing, Human Resource Management, General Management, Banking, Insurance, Corporate Governance and emerging paradigms in allied subjects like Accounting Education; 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; Monetary Policy; Portfolio & Security Analysis; Public Policy Economics; Real Estate; Regional Economics; Tax Accounting; Advertising & Promotion Management; Business Education; Management Information Systems (MIS); Business Law, Public Responsibility & Ethics; Communication; Direct Marketing; E-Commerce; Global Business; Health Care Administration; Labor 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; Public Administration; Purchasing/Materials Management; Retailing; Sales/Selling; Services; Small Business Entrepreneurship; Strategic Management Policy; Technology/Innovation; Tourism, Hospitality & Leisure; Transportation/Physical Distribution; Algorithms; Artificial Intelligence; Compilers & Translation; Computer Aided Design (CAD); Computer Aided Manufacturing; Computer Graphics; Computer Organization & Architecture; Database Structures & Systems; Digital Logic; Discrete Structures; Internet; Management Information Systems; Modeling & Simulation; Multimedia; Neural Systems/Neural Networks; Numerical Analysis/Scientific Computing; Object Oriented Programming; Operating Systems; Programming Languages; Robotics; Symbolic & Formal Logic and Web Design. The above mentioned tracks are only indicative, and not exhaustive.

Anybody can submit the soft copy of his/her manuscript **anytime** in M.S. Word format after preparing the same as per our submission guidelines duly available on our website under the heading guidelines for submission, at the email addresses: [infoijrcm@gmail.com](mailto:infoijrcm@gmail.com) or [info@ijrcm.org.in](mailto:info@ijrcm.org.in).

## 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, 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.

**WEBSITE**

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



**SOFTWARE PROJECT MANAGEMENT - BEST PRACTICES**

**DR. K. A. PARTHASARATHY**  
**PROFESSOR & HEAD**  
**DEPARTMENT OF INFORMATION TECHNOLOGY**  
**APOLLO ENGINEERING COLLEGE**  
**CHENNAI**

**ABSTRACT**

Successful development of projects is of primary business interest to any organizations. Failed or 'runaway' projects cost the organizations huge. It is essential for project managers to acquire the knowledge of risks and minimizing risks of project management to manage projects successfully. Risk management aims to identify the risks and then take actions to minimize their effect on the project. In this paper recognizes the increasing role of risk management in present software projects and aims at providing more support in this area. First we overview the objectives and processes of risk management with the particular stress on the need for effective and continuous communication. Risk management is a structured approach to managing uncertainty related to a threat, a sequence of human activities including: risk assessment, strategies development to manage it, and mitigation of risk using managerial resources. Risk management is the total process of identifying, measuring, and minimizing uncertain events affecting resources. This paper was written to help in the objective analysis of the risk management process.

**KEYWORDS**

Risk Analysis, Risk Mitigation, Risk Avoidance, Risk Planning.

**INTRODUCTION**

The aim of any software project is to provide the stakeholders with a satisfactory software-based solution of their problem within the schedule and budget limits. The risk of poor product quality and schedule or budget overruns is high which is confirmed by a number of cancelled, delayed or overpaid projects. Effective management of those risks is presently perceived as one of the most important areas of project management [1, 10]. Still, current software processes leave a considerable space for improvement. As process improvement aims at maximizing process quality and effectiveness while minimizing its risks, therefore the support for identification of the most risky process areas and their potential improvement is especially worthwhile. Good project management cannot guarantee success, but poor management on significant projects always leads to failure.

Current risk identification practices adopt primarily two techniques: checklists and group effort (e.g. brainstorming). Checklists such as [3,5,13] help to control the identification scope and protect from overlooking significant risks but they are often too general and do not relate well to actual software processes. Group effort studied e.g. by J.Kontio [4] benefits from synergetic use of human intuition and experience but it exhibits problems with scope focusing and control. Consequently, both existing approaches provide limited output aimed at the process improvement.

**PROJECT INTERFACES**

Project managers must identify the people or groups the project deals with, both within the parent organisation and outside. A project may have interfaces to:

- initiators;
- end users;
- suppliers;
- subcontractors;
- the prime contractor;
- other subsystem developers.

**OVERVIEW OF RISK MANAGEMENT**

Risk is formulated in the context of an undertaking, activity or opportunity (e.g. an investment or a project), because risks threaten the success of the undertaking meant by reaching the specified goals [2, 3, 13]. A project takes an opportunity to achieve success and create new value for the client, so it is automatically exposed to the risk of failure. No project is free of risk. A project without risk management recognises that there was a risk after the risk materialises as a real problem (e.g. it becomes obvious that the project overruns the budget or misses the deadline). Then the project team usually reacts and strives to minimise the negative consequences of the problem. As the rule, it is expensive and time-consuming. This price could have been much less if the risk was coped with before it converted to the problem. The lack of open communication, forward-looking attitude, team involvement in the management and the knowledge of typical problems, expose the project to a great risk of failure [4].

The essential factors of the project success are the quality, the time and the budget [13]. In the essential project aspects, the lack of risk management results in:

- schedule slippage,
- budget overrun,
- unsatisfactory quality of the product,
- failure to accomplish business goals of the project,
- disappointment of the employees and breakdown of their careers.

All of these failures refer to the primary project objectives, so they are unacceptable under ordinary circumstances. In some conditions, they may even be critical. The only way to avoid serious consequences of a risk when it materializes is to catch the risk as early as possible and minimise its impact on the project. Though this advice sounds simple, it may be only realised through a defined set of activities focused on risk resolution. Altogether, it calls for a definition and elaboration of a systematic and explicit approach to risk management [9].

The process starts with the identification of existing risks. Once the risks are identified, they are evaluated and prioritised and then appropriate corrective actions are planned and executed. To reach the acceptable level of success guarantee, the introduced actions must be controlled and the risks in mitigation must be continuously tracked for their status. This process continues all through the whole project schedule and across all the phases of development. Although the process is recurring, it may implement pipeline processing, when different phases of the risk management are executed in particular project areas.

Effective Risk Management Involves:

- 1) Identifying the risk
- 2) Analyzing each risk to determine its severity
- 3) Prioritizing the identified risks based on their severity
- 4) Creating action plans to deal with the high-priority risks
- 5) Continuous monitoring and followup to ensure that your action plans are mitigating the risk.

## RISK IN SOFTWARE PROJECTS

Risk relates to the possibility to degrade the success of an undertaking. The success is defined by a set of criteria that the outcome or the solution must meet to be considered "successful".

The overall success criteria for most of projects include:

- reaching the adequate functionality and quality that provides for achieving the business objectives of the system,
- finishing the project on time,
- keeping the expenses within the budget,
- achieving sustained customer satisfaction.

In terms of a business outcome, the success criteria can for example mean one or a combination of:

- increasing the market share,
- outrunning the competitors,
- improving the effectiveness or productivity,
- cost reduction,
- capturing a particular segment of the market.

Steering away from these goals results in a diminution of the overall project success. The success criteria are often formulated differently from a point of view of each project stakeholder and it is important that they converge and do not knock the project out of its success space.

For a project as a whole, some of the most important risks and their exemplary consequences include:

- lack of user satisfaction – canceling a project, product rejection;
- poor product quality – high maintenance costs, product rejection, adversely affecting the developer reputation;
- missing the deadline – loss of business opportunity, troublesome social and political atmosphere;
- overrunning the budget – financial losses, project cancellation.

From the developer's point of view there are some risks that reflect its particular concerns, like:

- lack of financial stability at the client, delays in payments,
- the client cannot be "convinced" that the product is satisfactory,
- inquisitive, nosy and demanding client.

On the other hand, there are also some risks that are related to the concerns that are specific for the customer, like:

- supplier is unreliable and does not fulfill its commitments,
- exaggerated financial demands of the supplier,
- the product is useless although meets most of the requirements,
- situation changes and there is no more money to finance (otherwise successful) project.

If we take a closer look on the above we can see that the risks perceived from the customer and developer perspectives can sometimes reflect particular interests of the participating institutions that will not necessarily be willing to share them with the other side. This seems to be in conflict with the general principle of information sharing and team approach to risk management. A right approach seems to be to apply a sort of "filter" that imposes some restrictions on otherwise free information exchange during risk identification and assessment activities. Such a filter can be implemented by a dedicated security policy (see Fig.1). The proposed risk assessment process and security policy are described in the subsequent sections.

A Software Project is always subjected to risk. Often the existence of risks in a Software Development system is identified late, and measures are taken to mitigate the risks. Either the risks are covered and the Project is kept on track or in the worst case, the Project is dropped thus reducing too much of time and money loss spent on the Project. There are always risks we know about and the risks which we are unaware of. For instance, if one of the team members is going on a vacation for about 2-3 weeks and has informed prior, then the Project Manager can think of having an alternative, and ensures that the Project is in track. If the risks are known, well ahead then ways and measures of overcoming the risk can be identified. But usually, the risks that arise in a typical Software Project are unexpected. A few of the commonly occurring risks are discussed here:

### CHANGING REQUIREMENTS

It's obvious to expect a minor/major change in the Requirements obtained from the clients. While coming up with the initial plan, they may not be very clear on how the system should be or it will look like with the requirements incorporated, but when they are shown a sample of the working model they might come up with few suggestions which might look small from the "Change in Requirements" perspective, but, the same change might take few days to implement from the developer point of view. The Project Manager has to make amendments to the requirement document, the design has to be done for it, the test cases for testing this new change has to be written, the documentation team has to update their documents with the new changes and so on. Whenever a new change comes in again the entire Life cycle is repeated again.

The best approach to adapt to changing requirements is to follow an iterative model where the working model is shown to the clients after every iteration. Each iteration will be between 1-4 weeks. This helps to get immediate feedback or any changes the client wants in the screen can be easily communicated and the developer can incorporate them in the next release. This way the changing requirements from the clients can be easily handled.

### LACK OF SKILLS

The Project team may be new to the domain or may be experimenting a new technology. This might consume additional time for the Development process, thus delaying not only the Development phase, but the subsequent phases that follow Development Phase. This can be avoided by either providing training to the Development team before the commencement of the Development Phase or by having appropriate resources who have enough knowledge in the new stream.

### FAULTY TECHNOLOGIES

Sometimes it so happens that the Development Team might have to work on a new technology that might have evolved very recently. In such cases it is not advisable to prefer the technology without experimenting it. A part of the Development team can actually take one of the complex requirements and see if the implementation is possible with the new technology. Rather than blindly taking up the new technology without knowing its pros and cons, its advisable to develop a portion of the requirement in the new technology and check for its feasibility.

### GOLD PLATING

Gold Plating is a term used to refer the requirements being made robust. For example, the client might have stated a simple requirement like designing a Logon page. But the developer might think of providing some additional features in the page with the thought of providing a rich look to the very first page that every end user is given access to. For designing and decorating the page the developer might consume some of his time which will ultimately result in a lag in the Project Schedule.

### UNREALISTIC PROJECT SCHEDULES

There are cases where the client might want to see the working model in a short span and thus might give the Project to a team which bids to give the System in a time within which the Project cannot be completed. The Top Management will pressurize the Project Managers to give short deadlines, the Project Managers in turn the Developers, thus ending up in a state where the Project cannot be delivered in the said deadlines. Hence one of the ways to mitigate risks is to identify all the risks we are aware of and allocate some time to face any unexpected risks. The best approach is to identify all the risks, and check the probability of the risk happening. Then this risk factor can be included in the Project Schedule by multiplying the loss by Probability. For example if one of the screens is underestimated by the developer, and if the Project Manager feels that an additional 15 hours would be required to complete the task accurately, and if the probability of the risk happening is 70%, then a delay of 10.5 hours (70 % probability \* 15 hours) is introduced in the Project Schedule.



## RISK IDENTIFICATION

During the Risk Identification phase, one makes an inventory of potential risks that may have impact on the achievement of the predetermined objectives [36]. The phase starts with preparatory activities for the actual risk elicitation [30]. It continues with the actual risk elicitation using various techniques such as brainstorming, interviews, scenario analysis, prototyping, and the like [12][30]. When doing it, one identifies risks, their consequences, effects, sources, root causes, and categories [12]. Finally, one creates a risk list and circulates it around all the relevant stakeholders for possible complementary additions, improvements, and confirmation.

The conditions of successful risk identification can be summarized as follows:

- providing a constantly open communication channel,
- involvement of all relevant viewpoints,
- application of diverse identification techniques,
- effective control of the scope,
- learning from the past ("memorizing" risk related information).

## RISK ANALYSIS

During the Risk Analysis phase, one analyzes and prioritizes risks [3]. First, one analyzes each risk independently by studying the identified risk and assessing its impact, probability, risk exposure and severity [36]. The analysis can be conducted using different techniques, e.g. matrices, decision trees and scenario analysis [30]. One then groups and analyzes the related risks to facilitate their collective mitigation [30]. Afterwards, one consolidates the risk prioritization and creates a top-priority risk list [3]. Based on the analysis results, one suggests a preliminary plan for managing each risk or risk group. Finally, the prioritized risk list is circulated among the stakeholders for confirmation.

## RISK MANAGEMENT PLANNING

In the Risk Management Planning phase, one creates concrete plans determining strategies, options, and actions relevant for managing the identified risks [12]. As depicted in Fig. 5, one starts the phase with studying the risk list, the analysis results, and the preliminary plan [30]. For each risk or risk group, one first determines appropriate strategies [30], and then creates and documents the following three plans:

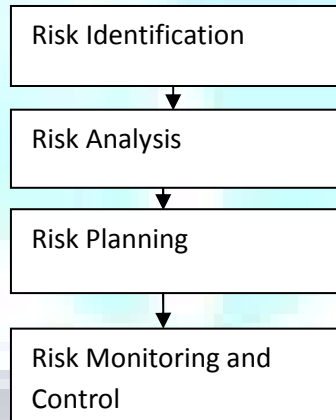
- Control and Monitoring Plan defining relevant measures or metrics for monitoring and controlling the risks [30],
- *Risk Action Plan* determining the actions to be used for treating a certain risk or risk group [36], and
- *Contingency Plan* specifying the actions to be taken in cases when severe risks turn into a serious problem [30].

One then combines all the three plans into one comprehensive *Risk Management Plan* [12]. To ensure that the identified risks get full attention, one prepares contractual agreements, where each risk owner's responsibilities are specified and agreed upon [30]. Finally, one circulates, updates and confirms the plan and its related documentation.

## RISK MONITORING AND CONTROL

In the Monitor and Control phase, one continuously monitors and controls the risks according to the risk management plan. One also continuously identifies new risks. To make certain that risks are effectively monitored and controlled, one first ensures that there are risk monitoring procedures established. For each risk or risk group, one then continuously monitors and records the status [30]. In cases when the status changes, one takes measures as specified in the plan. Finally, one updates and records the risk status [12].

FIG.1: OVERVIEW OF RISK MANAGEMENT STEPS



## RISK MANAGEMENT CHECKLIST

This checklist is provided as to assist you in risk management.

- 1) Prepare the Detailed, Planned and documented approach to risk management.
- 2) Select the experienced project manager for handling complex projects
- 3) Get the top management approval for risk management
- 4) Get the requirements well defined, understandable and stable.
- 5) All the team members should aware of development disciplines.
- 6) Prepare the resource planning from the beginning of the project

## REASONS FOR PROJECT FAILURES

- Lack of user input
- Lack of resources
- Lack of user involvement
- Incomplete requirements and specifications
- Frequently changing requirements and specifications

## REASONS FOR PROJECT SUCCESS

- Make everybody a winner in the project
- Identify and manage the risks

- User Involvement
- Top Management support
- Clear Requirements
- Proper planning and estimating schedules

## CONCLUSIONS

For developing successful software projects, we have to adapt the best minimization risk strategies. In this article we have listed the possible reasons for project success and project failures. We prepared the risk management check list for completing the successful software projects. A risk for a project is a condition whose occurrence is not certain but that can adversely affect the project. Risk management requires that risks be identified and prioritized and, that actions be taken to minimize their impact. In this paper, we have seen how to identify and manage the risks that might affect the success of a project. Risk management is concerned with assessing and prioritizing risks and drawing up plans for addressing those risks before they become problems. Many of the risks affecting software projects can be reduced by allocating more experienced staff to those activities that are affected. Risk management is an excellent way to prepare for daily challenges.

## REFERENCES

- [1] Ahern D., Clouse A., Turner R., *CMMI Distilled*. 2nd Ed. Addison-Wesley, Boston, MA, 2005.
- [2] Beck K., *Extreme Programming Explained: Embrace Change*. 2nd Ed. Upper Sadle River, NJ, Addison-Wesley, 2004
- [3] Boehm B., "Software Risk Management: Principles and Practices". IEEE Software, Vol. 8 (1), 1991, pp. 32-41.
- [4] Brown N., "Industrial-Strength Management Strategies", IEEE Software, Vol. 13(4), 1996, pp. 94-103.
- [5] Carr M.J. et al., "Taxonomy-Based Risk Identification". SEI Technical Report CMU/SEI-93-TR-006 ESC-TR-93-183, SEI/CMU, Pittsburg, PA, 1993.
- [6] Charette R., "Software Engineering Risk Analysis and Management", McGraw Hill, New York, NY, 1989.
- [7] DeMarco T., "Risk Management for Software Projects". The Atlantic Systems Guild, Camden, ME, 2004.
- [8] Eclipse Process Framework (EPF), *OpenUP Process*. URL: <http://www.eclipse.org/epf/>. Accessed November 2007.
- [9] European Cooperation for Space Standardization (ECSS), *Space Project Management*. URL: <http://www.ecss.nl/>. Accessed November 2007.
- [10] Fairley, R., "Risk Management for Software Projects". IEEE Software, Vol. 11 (3), 1994, pp. 57-67.
- [11] Hulett D.T., "Key Characteristics of a Mature Risk Management Process". Proc. of the European Project Management Conf./PMI Europe, 2001.
- [12] IEEE 1540, *IEEE 1540 Standard for Lifecycle Processes-Risk Management*. IEEE, New York, NY, 2001.
- [13] IEEE Software, "Managing Risk" (special issue). IEEE Software, Vol.14 (3), 1997.
- [14] Institute of Risk Management, Association of Insurance and Risk Managers, National Forum for Risk Management in the Public Sector, *A Risk Management Standard*. IRM, UK, 2002.
- [15] International Aerospace Quality Group (IAQG), *UNE: EN 9100:2003 Quality Management Systems-Aerospace-Requirements* (2003). URL: <http://www.iaqg.sae.org/iaqg/publications/standards.htm>. Accessed December 2007.
- [16] International Electrotechnical Commission (IEC), *IEC 61508 Functional Safety of Electrical/Electronic/Programmable Electronic Safety-related Systems*. IEC, Switzerland, 1998.
- [17] International Standardisation Organization (ISO), *ISO/IEC Guide 73 Risk management-Vocabulary-Guidelines for use in standards*. ISO, Switzerland, 2002.
- [18] International Standardisation Organization (ISO), *ISO 9000:2005 Quality management systems-Fundamentals and vocabulary*. ISO, Switzerland, 2005.
- [19] International Standardisation Organization (ISO), *ISO 9001:2000 for Quality management*. ISO, Switzerland, 2000.
- [20] Jones C., *Patterns of Software Systems Failure and Success*. Boston, MA, International Thomson Computer Press, 1995.
- [21] Microsoft, "Microsoft Solutions Framework-MSF Risk Management Discipline". URL: <http://www.microsoft.com/technet//solutionaccelerators/msf/default.mspx>. Accessed November 2007.
- [22] Jones C., *Patterns of Software Systems Failure and Success*. Boston, MA, International Thomson Computer Press, 1995.
- [23] Na K. et al., "Software Development Risk and Project Performance Measurement: Evidence in Korea." The Journal of Systems and Software, Vol. 80, 2007, pp. 596-605.
- [24] Nidumolu, S., "The Effect of Coordination and Uncertainty on Software Project Performance: Residual Risk as an International variable". Information System Research Vol. 6(3), 1995, pp. 191-219.
- [25] Nyfjord J. and Kajko-Mattsson M., "Commonalities in Risk Management and Agile Process Models". Proc. of 2nd Int. Conf. on Software Engineering Advances, France, 2007.
- [26] Nyfjord J. and Kajko-Mattsson M., "Communicating Risk Information in Agile and Traditional Environments". Proceedings of 33rd Euromicro Conference on Software Engineering and Advanced Applications, 2007.
- [27] Nyfjord and Kajko-Mattsson, "Degree of Agility in Pre-Implementation Process Phases". Accepted at the 19th Australian Software Engineering Conference, Australia, March 2008.
- [28] Nyfjord J. and Kajko-Mattsson M., "Software Risk Management: Practice Contra Standard Models". Technical Report, Department of Computer and Systems Sciences, Stockholm University/KTH, Sweden, 2008.
- [29] Pearson N., "How Governance and Risk Management Enables Greater Innovation and Business Value from Information Technologies". URL: [ftp://ftp.software.ibm.com/software/tivoli/presentation/GRM\\_UN\\_Presentation.pdf](ftp://ftp.software.ibm.com/software/tivoli/presentation/GRM_UN_Presentation.pdf). Accessed November 2007.
- [30] Project Management Institute, *A Guide to the Project Management Body of Knowledge (PMBok)*, 3rd Ed. ANSI/PMI 99-001-2004, PMI, Newton Square, PA, 2004.
- [31] Quest Forum, *TL9000 Telecom Total Quality System*. Quest Forum. URL: [http://www.tl9000.org/tl\\_all-docs.htm](http://www.tl9000.org/tl_all-docs.htm). Accessed November 2007.
- [32] Robson C., *Real World Research*. Blackwell Publishing, 2002.
- [33] Ropponen J. and Lyytinen K., "Components of Software Development Risk: How to Address Them? A Project Manager Survey". IEEE Transactions on Software Engineering, Vol. 26 (2), 2000, pp. 98-112.
- [34] SAP, "SAP Solutions for Governance, Risk, and Compliance: SAP GRC Risk Management". URL: <http://www.sap.com/solutions/grc/riskmanagement/index.epx>. Accessed December 2007.
- [35] Spanish Ministry of Defence (DGAM), "PECAL/AQAP-160 Airborne systems embedded SW developed by engineering organizations of EADS-CASA". URL: <http://www.calidaddelsoftware.com/documentos/11%20Semana%20CMMI/03-%20EADS-CASA.pdf>. Accessed November 2007.
- [36] Standards Australia and New Zealand, *Australian/New Zealand Standard Risk Management AS/NZS 4360:2004*. 3rd Ed., Standards Australia/New Zealand, 2004.
- [37] Software Engineering Institute/Carnegie Mellon University (CMU/SEI), "Risk Management". URL: <http://www.sei.cmu.edu/risk/main.html>. Accessed Nov 2007.
- [38] Standards Australia and New Zealand, *Australian/New Zealand Standard Risk Management AS/NZS 4360:2004*. 3rd Ed., Stds Australia/New Zealand, 2004.
- [39] Wallace L. and Keil M., "Software Project Risks and Their Effect on Outcomes. Communications of the ACM Vol. 47(4), 2004, pp. 68-73.
- [40] Walker R., *Applied Qualitative Research*, Gower Publishing Company Ltd, 1985.
- [41] Williams R. et al., "Software Risk Evaluation (SRE) Method Description (Version 2.0)". Technical Report CMU/SEI-99-TR-029, SEI/CMU, Pittsburg, PA, 1999.
- [42] Zdravkovic J., *Process Integration for the Extended Enterprise*, Doctoral Thesis in Computer and Systems Sciences. Royal Institute of Technology, Sweden, 2007

## **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-mails i.e. [infoijrcm@gmail.com](mailto:infoijrcm@gmail.com) or [info@ijrcm.org.in](mailto:info@ijrcm.org.in) 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](mailto: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*

