Sl. No.	Name of the teacher	Title of the book published	Title of the chapters published	Year of publication	ISBN number	Whether at the time of publication Affiliating Institution was same Yes/No	Name of the publisher	Department
3.4.4 Number of books and chapters in edited volumes published per teacher during the last five years								
1	K.Priya	1st IEEE International Conference on Automation, Computing and Renewable Systems, ICACRS 2022	Breast Cancer Segmentation by K-Means and Classification by Machine Learning	2023	978-1-6654- 6083-5	Yes	Mount Zion College of Engineering and Technology (MZCET), Pudukkottai; India.	Computer Science
2	Dr.T.S Ravi Kiran	IEEE	Airline Twitter Sentiment Classification using Deep Learning Fusion	2023	78-1-6654-5499- 5	Yes	https://ieeexplore.ieee.org/document /10084207	Computer Science
3	V.Munni	Creating An Artificial Intelligence-Powered Image Classification Model For specially Abled Persons	Advanced Computing and Communication Systems	2023	979-8-3503-9737 6/23	Yes	International Conference	Computer Science
4	Dr.T.S.Ravi Kiran	Essentials of Python Programming-vol1	Essentials of Python Programming	2023	979-8890672254	Yes	Xpress Publications	Computer Science
5	G.Samrat Krishna	Business Analytics	Business Analytics	2023	979-8890673916	Yes	Notion Press, Xpress Publications,	Computer Science
6	K. Priya & Dr. T. S. Ravi Kiran	Exploring Tomorrow'S Instruction: A System For All Encompassing Instructive Change	Exploring Tomorrow'S Instruction: A System For All Encompassing Instructive Change	2023	978-81-962554-9-7	Yes	Department of Research & Publications A2ZLearningHub LLP	Computer Science
7	Kavuri Sridhar	Office automation tools, programming in C,programming in C++	Office automation tools, programming in C,programming in C++	2023	978-93-5840-476-0	Yes	Himalaya Publishers	Computer Science
8	Dr. Ch. Rajeswari	Linguistics and Stylistics Basics	Linguistics and Stylistics Basics	2023	978-81-969420-5-2	Yes	REST Publisher	English
9	Dr. N.Siva Kumar	Haasya Tarangaalu (Prathyeka Sanchika)	Paaleru Natakam Hasyatmakata	2023	978-93-5626-901-9	Yes	ANJLES PRINTYERS, PRATTIPADU	Telugu
10	Dr. N.Siva Kumar	Jaanapada Sompu (Vyaasa Sankalanam)	Janapada Chaaritraka Parisodhakulu Vidwan Jyothi Chandramouli	2023	978-93-5607-585-6	Yes	Mudrika Printers, Vijayawada	Telugu

11	Dr. Rajesh C. Jampala	Existing Opportunities Facilitating the Preservation, Promotion and Dissemination of Tribal in India	Issues and Challenges of Scheduled Tribal Women in India	2023	978-81-958-704-3-1	Yes	KBN College, Vijayawada,	MBA
12	Dr. K. Santha Kumari	Uplifting the Oppressed	Uplifting the Oppressed	2023	978-62-0550-221-1	Yes	Lambert Academic	English
13	Dr. R. Srinivasa Rao	Proceedings Of National Conference on Emerging Trends in Management (NCETM-23)	A study on the banking industry's contribution to women's empowerment in India	2023	978-93-91303-84-6	Yes	National Conference Proceedings	Commerce
14	Md. S. Rahaman	Impact of Digital Payments on Selected Banks Performance	Impact of Digital Payments on Selected Banks Performance	2023	ISSN: 0094243X ISBN: 9780735447356	Yes	National Conference Proceedings	Commerce
15	Mrs Jhansi Lakshmi vaddelle,Mrs. Munni Venuthurumilli & Mrs.Vijitha.Magam	Retinal Diseases Detection using Deep Learning Algorithms	Journal of Information and Computational Science	2023	1548-7741	Yes	National Conference Proceedings	Computer Science
16	Dr. Rajesh Jampala	Issues and Challenges of Tribal Women in India	The Existing Opportunities Facilitating the Preservation, Promotion and Dissemination of Tribal in India	2023	978-81-958-704-3-1	Yes	KBN College, Vijayawada	Business Management
17	Dr. G. Srilatha	Hemingway and Ecocriticism	Hemingway and Ecocriticism	2022	978-16-80536-90-4	Yes	Academica Press	English
18	Dr. V Srinivas and S. Kanaka Durga	Financial Inclusion: A Inititative to bring the entire country in to the formal banking system	5 Day International Conference on Emerging Trends in Accounting and Finance	2022	978-93-93259-49-3	Yes	National Conference Proceedings	Commerce UG
19	A.S.N Lakshmi	Social Responsibility of Business and Sustainable Development	A Review on Corporate Social Responsibility Initiatives attaining Sustainability Development of IKEA Company	2022	978-93-94428-45-4	Yes	National Conference Proceedings	Commerce
20	Dr. Rajesh C. Jampala	R - R - R (Reduce- Reuse - Recycle) - A Sustainable Solution to Waste Management	A Study on Issues and Challenges in Managing E-waste in India	2022	978-81-958823-0-4	Yes	Tanuku government Degree college.	MBA
21	Dr. Rajesh C. Jampala	Multidisciplinary Perspectives Towards Building a Digitally Competent Society	A Study on the Impact of COVID-19 on Street Vendors in India	2022	978-1-6684-5274-5	Yes	IGI Global Publisher	MBA
22	Dr. Rajesh C. Jampala	Artificial Intelligence - The future of Indian Banking	Artificial Intelligence - The future of Indian Banking	2022	978-81-947453-1-0	Yes	National Conference Proceedings	MBA

23	Dr. Rajesh C. Jampala	Design and Implementation for the Future in Education	A Study on Impact of Mid-Day Meal Program on School Education in India: with reference to Krishna District, Andhra Pradesh, India	2022	978-616-296-265-3	Yes	Srinakharinwirot University, taiwan	MBA
24	G. Srilatha	The Novels of Daya Dissanayake	A critical study on significance of the title Thrist	2022	978-93-5529-140-0	Yes	Authorpress	English
25	Md. S. Rahaman	EMPLOYEE PERCEPTION TOWARDS IMPACT OF HRD PRACTICES IN SELECT POWER UNIT IN TELANGANA REGION	EMPLOYEE PERCEPTION TOWARDS IMPACT OF HRD PRACTICES IN SELECT POWER UNIT IN TELANGANA REGION	2022	1528-2678-26-S6-004	Yes	National Conference Proceedings	Commerce
26	Mrs ASNLakshmi	SodhaPrabha	A study of impact on layoffs on employees and companies	2022	0974-8946	Yes	Sodhaprabha	Commerce
27	Kavuri Sridhar	E-Commerce and Web design	E-Commerce and Web designing	2021	978-93-5840-476-0	Yes	Himalaya Publishers	Computers
28	Kavuri Sridhar	programming with C and C++	Programming with C and C++	2021	978-93-5840-476-1	Yes	Himalaya Publishers	Computers
29	Dr. K. Santha Kumari	Barber the King: An example of Modern Indian English Drama	Rangasthalamanjari	2021	978-8195-226-399	Yes	Telangana Sangeetha Nataka Academi	English
30	Dr. Santha Kumari	Significance of Landscape in Doris Lessing's The Grass is Singing	Eco-literatures : Contemporary Discourses	2021	9.78168E+12	Yes	AcademicaPress	English
31	A.S.N Lakshmi	Modern organizations employee wellness practices	Modern organizations employee wellness practices	2021	978-81-951473-2-8	Yes		Commerce
32	Dr. Rajesh C. Jampala	e-Waste management	Urban Solid Waste Management: Issues and Challenges of Sustainability	2021	819-505-724-1	Yes	Palmview Publishing	MBA
33	Dr. Rajesh C. Jampala	Performance of Mutual Funds: A Study of Large Cap funds growth of Selected Schemes	Recent Developments and advancements in Finance	2021	978-93-5457-696-6	Yes	Immortal Publications	MBA
34	Dr. A. V. Ramana Murthy	Pinjaari(shaik Nazaar Aatmakadha)	Telugu Thota 3rd Class Telugu Reader	2021	978-93-5457-741-3	Yes	Visaalandhra Vignana Samithi	Telugu

35	Dr. G. SRILATHA	Eco-Aesthetics Transn	Australian Aborigines and Eco-spirituality	2021	978-1-6805-3793-2	Yes	Academica Press	English
36	Dr. Rajesh Jampala	Dynamic of Work from Home: Impact on Employee Stress Level	Dynamic of Work from Home: Impact on Employee Stress Level	2021	0000-002-5290-922X	Yes	The Electrochemical Society, ECS Transactions, Volume 107,	Business Management
37	Ch Anantha Sai Lakshmi,Dr. G. Srilatha, Dr. Ch. Rajeswari, D.Santha Kumari & K Perachary	Subaltern Theatre: Critical Perspectives on Dr. D.Vizai Bhaskar's Works	Sootha Theatre, A critical Analysis	2020	979-8-6432-1187-7	Yes	Immortal Publications	English
38	Dr.A.V.Ramana Murthy	Sahithya Swaralu	Vyasa Samputi	2020	978-93-65396-365-1	Yes	Krishna sri Charitabul trust	Telugu
39	Dr.M.Manoranjani	Women: the key to ensure food security	Empowering women to achieve food Security	2020	978-93-5396-589-1	Yes	KBN college	Chemistry
40	A.S.N Lakshmi	A Study on Social Distance Consciousness Through Brand Campaigns	A Study on Social Distance Consciousness Through Brand Campaigns	2020	978-93-88568-17-3	Yes	Dr. M.G.R Educational and Research Institute	Commerce
41	A.S.N Lakshmi	A Study on Employee Well Being and Occupational Safety Practices at ITC (Labour Migration Post Covid -19)	A Study on Employee Well Being and Occupational Safety Practices at ITC (Labour Migration Post Covid -19)	2020	978-93-90082-41-4	Yes	Shanlax Publications Madurai	Commerce
42	Dr. Rajesh C. Jampala	The Role of Mahatma Gandhi National Rural Employment Guarantee Programme on Rural Development – An Empirical Study with Special Reference to Krishna District, A.P	The Role of Mahatma Gandhi National Rural Employment Guarantee Programme on Rural Development – An Empirical Study with Special Reference to Krishna District, A.P	2020	978-613-9-83705-2	Yes	LAP LAMBERT Academic Publishing House, Germany	MBA
43	Dr. G. SRILATHA & Dr. K. Santha Kumari	Subaltern Theatre	Politics and Democracy in The Return of Gandhi, "Subaltern Theatre: Critical Perspectives on Dr. D. Vizai Bhaskar's Works	2020	979-8-6432-1187-7	Yes	Immortal Publications	English
44	Dr. Rajesh Jampala	The Role of Micro Finance In The Empowerment of Women in AP., India	The Role of Micro Finance In The Empowerment of Women in AP., India	2020	978-613-9-83705-2	Yes	LAP LAMBERT Aca	Business Management
45	Dr. G. Srilatha	The Writings of Amitav Ghosh	A Paradoxical Reading of The Shadow Lines with Reference to Tha'mma	2019	978-81-269-2943-6	Yes	Atlantic	English
46	Dr. G. Srilatha	The Poetry of Raamaa Chandramouli Critical Perspectives	A Humanistic Perspective in as the Window Opens	2019	978-7510-253-8	Yes	Reliance Publishing House	English

47	Dr.M.Manoranjani	Recent Trends in Physics chemistry and Allied Sciences	Role of Water for Sustainable Development with Respect to Upland Area of West Godavari DT, AP State- Alternatives to RO Technology ,Chapter- 1	2019	978-93-86435-86-6	Yes	IRMF, International Publishing house	Chemistry
48	Dr.T.N.V.S.S.Satya Dev	Faculty Development Programme	Effective Teaching	2019	978-620-0-53479-8	Yes	LAP LAMBERT Academic Publishing	Chemistry
49	Dr. P.T.S.R.K. Prasad Rao	Graphene-Based Polymer Nanocomposites for Sensor Applications	Graphene-Based Polymer Nanocomposites for Sensor Applications	2019	978-981-4800-34-1 (Hardcover), 978-0-429-00096-6 (eBook)	Yes	National Conference Proceedings	Chemistry
50	Dr. Rajesh C. Jampala	A Study on Performance Evaluation of Initial Public Offerings (IPOs): India during 2007-13	A Study on Performance Evaluation of Initial Public Offerings (IPOs): India during 2007-13	2019	978-613-8-38730-5	Yes	Lap Lambert Academic Publishing House	MBA
51	Dr. Rajesh C. Jampala	A Study on Artificial intelligence in Human Resoruce Management	Future of Work (FoW) in Changing Business Landscape	2019	97-893-5361-738-7	Yes	P B Siddhartha College of Arts & Science	MBA
52	Dr. G. Srilatha	The Nativist Vision of Life in the Works of Basavaraj Naikar	Heroism of Rani Chennamma in The Queen of Kittur	2018	978-93-87281-55-4	Yes	Authors Press	English
53	Dr. G. Srilatha	English Language and Literature in the Era of Globalization	Ecoconsciouness in A Natural History of the Dead	2018	978-93-87651-03-6	Yes	Authors Press	English
54	Dr. G. Srilatha	Literary Techniques in the Short Stories of P. Raja	A Review on Role of Social Responsibility Initiatives in attaining Sustainability Development of IKEA Company	2018	978-93-87281-91-2	Yes	Authors Press	English
55	Dr. G. Srilatha	A Critical Study of T.V. Reddy's Thousand Haiku Pearls	The Poetry of T. V. Reddy: A Critical Study of Humanistic Concerns	2018	978-1-61599-371-0	Yes	Modern Authors Press, Michigan	English
56	Dr. G. Srilatha	Living Through Mahesh Dattani Plays	Dramatic Devices in Mahesh Dattani's Final Solutions	2018	978-93-88008-19-8	Yes	Authors Press	English
57	Dr. G. Srilatha & Dr. K. Santha Kumari	Postcolonial Studies	Australian Aboriginal Mythology, Lessing's Proper Marriage as a female Buildings Roman Novel	2018	979-86-01-06291-6	Yes	Maruti	English
58	Dr MD S Rahaman & Dr J Durga Prasad	Challenges of New India – Realizing a Billion Aspirations	Application of Technology to Teach Next	2018	978-93-5288-084-3	Yes	National Conference Proceedings	Commerce
59	G.Srilatha	Australian Aborigines and Eco-spiritually	Australian Aborigines and Eco-spiritually	2018	978-16-8053-793-2	Yes	Maruthi Publications	English

60	Dr. N.Siva Kumar	PRAKAASIKA - GURAJADA SAMAGRA SAAHITHYA VYAASA SANKALANAM	Sangha Samskartha Maanavataa Vaadi Gurajada	2018	978-93-87540-23-1	No	Roshan Publications, Visakhapatnam	Telugu

A COMPREHENSIVE EXAMINATION OF THE ADVANTAGES AND DISADVANTAGES OF DIVERSE FLEXIBLE WORK ARRANGEMENTS

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Abstract
The study investigates the pros and downsides of flexible work arrangements in the modern workplace. It employs survey research, integrating literature analysis with survey. The study examines telecommuting, flexible scheduling, reduced workweeks, and job sharing to better understand their consequences for employees, employers, and overall organizational success. The benefits include better work-life balance, higher productivity, talent acquisition and retention, cost savings, and access to a diversified talent pool. Communication barriers, team-building challenges, perceived injustices, security concerns, and the possibility of losing company culture are all disadvantages. The study closes with recommendations for organizational adaptation and mitigation, such as utilizing technology, establishing clear communication channels, and implementing inclusive policies. The findings add practical insights to the current discussion about establishing a resilient and inclusive work environment that meets the changing demands of the modern workforce.
Keywords: Flexible work arrangements, telecommuting, scheduling, job sharing, work-life balance, team building.

Introduction
The work landscape has undergone significant changes due to technological advancements, shifting employee expectations, and evolving organizational structures. One prominent change is the rise of flexible work arrangements, offering employees greater autonomy and flexibility in how, when, and where they work. These arrangements, including remote work, flexible hours, compressed workweeks, and job sharing, have become increasingly prevalent in modern workplaces. Flexible work arrangements offer benefits such as improved work-life balance, enhanced employee satisfaction, and productivity gains. Employees can tailor their work schedules to better accommodate personal commitments, leading to increased job satisfaction and morale. They can also expand the talent pool by attracting individuals who may not be able to commit to traditional full-time, on-site employment due to caregiving responsibilities or health constraints. However, flexible work arrangements also pose challenges, such as communication barriers, performance monitoring difficulties, and feelings of isolation among remote workers. Ensuring equitable access to flexible work arrangements and addressing security concerns are additional complexities for employers. This examination aims to provide a comprehensive analysis of the advantages and disadvantages of diverse flexible work arrangements, drawing upon empirical research, theoretical frameworks, and practical insights from organizational experiences. By exploring the interplay between flexibility, productivity, employee well-being, and organizational performance, organizations can harness the benefits of flexible work arrangements while mitigating potential challenges.

Background and Context of Flexible Work Arrangements

Technological Advancements: Internet and advanced communication technologies have enabled remote collaboration, eliminating geographical constraints.

Globalization and Virtual Collaboration: The rise of virtual collaboration has led to the need for flexible work arrangements, allowing companies to leverage individual skills.

Changing Demographics and Employee Expectations: The rise of millennial and Generation Z has led to new expectations for work-life balance, autonomy, and flexibility.

Increased Focus on Employee Well-being: Flexible work arrangements are seen as a means to enhance job satisfaction, reduce stress, and contribute to overall health.

Emergence of a Knowledge-Based Economy: Flexible work arrangements are seen as conducive to unleashing employees' creative potential.

Competitive Talent Landscape: Offering flexible work arrangements is a strategic tool for recruitment and talent retention.

Legislation and Regulatory Changes: Changes in labor laws and evolving societal attitudes towards work have influenced the adoption of flexible work arrangements.

COVID-19 Impact: The pandemic has accelerated the adoption of flexible work models.

Rationale behind the Study

Examining Advantages and Disadvantages of Flexible Work Arrangements

a. The evolving nature of work necessitates understanding how flexible work arrangements align with modern demands.

b. Employee well-being is a key concern for organizations aiming to foster a positive workplace culture.

c. Flexible work arrangements can be leveraged as a strategic tool for Human Resource management.

d. The impact of flexible work arrangements on organizational performance and productivity can be identified.

e. Adapting to Changing Demographics: Understanding the impact of flexible work arrangements on diverse workforce is necessary to ensure inclusivity and accommodate different demographic groups.

f. Influence on Team Dynamics and Collaboration: Understanding the implications of flexible work arrangements on communication, cohesion, and teamwork is vital.

g. Policy Development and Implementation: Evidence-based insights from the study inform the crafting of effective policies related to flexible work arrangements.

h. Preparation for Future Work Trends: Understanding the advantages and disadvantages of diverse flexible work arrangements equips organizations to navigate future challenges and opportunities.

Research Objectives

The following are objectives of the study.

1. To understand how different flexible work arrangements contribute to enhanced work-life balance.
2. To investigate the impact of flexible work arrangements on employee productivity.
3. To assess the role of flexibility in retaining experienced and skilled employees.
4. To identify communication challenges associated with different flexible work arrangements.
5. To investigate the difficulties in team building within flexible work environments.

Literature Review

Historical Overview of Flexible Work Arrangements

Early 20th Century: Part-Time Work and Job Sharing

- Emergence of part-time work and job-sharing due to labour shortages during World War I.
- Job sharing gained traction in certain industries.

Branine, M. (2003), The usage of job sharing and part-time work in the National Health Service (NHS) and its effects on healthcare delivery are examined in this study. It demonstrates that although working part-time saves money, employee discontent has resulted from it. Many women find job sharing beneficial, but not all of them get the chance. In order to draw in and keep top talent, the report recommends that the NHS embrace diversity and support flexible work schedules and family-friendly regulations.

Branine, M. (2004), In order to recruit and retain skilled staff, the report advises that local authorities use work sharing as a component of an equal opportunities strategy. Data from 32 municipalities in Scotland and England, however, reveals a lack of work sharing implementation procedures. The promotion and execution of work sharing has been hampered by the shift in focus from equality to commercial objectives brought about by the new public management in the late 1990s.

Post-World War II Era: Flexible Scheduling

- More common post-World War II, allowing varied start and end times.

- Aimed to accommodate employees' personal needs and improve work-life balance.

J.P Lehoczky (1990), In addition to presenting a generic criterion for task schedulability and worst-case bounds that generalize the 1973 bound, the paper covers fixed priority scheduling of period tasks with variable deadlines and lays the groundwork for creating predictable distributed real-time systems.

R. Davis, A. Wellings (1995), in real-time systems with periodic, irregular, and adaptive jobs with hard deadlines, this study presents a novel approach to scheduling soft deadline tasks. Deferrable Server and Priority Exchange Algorithm are examples of offline techniques that are unable to provide extra capacity as a background service opportunity for soft jobs. In this instance, scheduling soft jobs may be done effectively and efficiently with the help of the Dual Priority technique.

70s-1980s: Telecommuting and Flex Time

- Emergence of telecommuting and Flexitime due to technological advancements.

James A. Breaugh Ph.D. & Angela M. Farabee, (2012) examines the reasons, effects, and alternatives to traditional work arrangements, such as telecommuting and flexi-time, in relation to work-non-work conflict. It emphasizes that these arrangements are not panaceas and that employers must take backup plans, such as supervisor support, into account. Employers may gain ethically from reduced employee turnover and better work-life balance when these agreements are implemented successfully. A program's ability to be designed with input from employees is essential to its successful execution.

Yongjin Sa (2021), investigated and verified the association between public sector employee performance and satisfaction with flexible work schedules. Additionally, it seeks to provide quantitative support for the relationship's moderating role of organizational commitment. Data from the year 2020, Public Service Life Survey was utilized to specifically target government workers who perform managerial, technical, and general administrative tasks. The findings demonstrated that improved performance was correlated with increased satisfaction with flexible work schedules. The favourable correlation between performance and happiness with flexible work arrangements was substantially mitigated by organizational commitment. The study added to the body of knowledge on domestic flexible work arrangement studies by demonstrating a favourable correlation between performance and happiness with flexible work arrangements. In order to strengthen this beneficial connection, the level of organizational commitment must be considered.

90s-2000s: Rise of Remote Work and Technology

- Rise of remote work facilitated by internet, email, and improved telecommunication infrastructure.

José Antonio Almeida Silva, Tamara Larissa Duarte De Albuquerque, Denis De Gois Marques, Felipe Tabosa Da Silva, Wylliams Barbosa Santos, Bruno Bueno De Lira Nepomuceno (2023) The sector might collapse due to a lack of workers with expertise in Software Development (DS). A research looks at Corporate Education (CE) as a means of luring and educating workers in order to overcome this. Action research helped identify issues with workload, levelling, content, and time sufficiency. Positive assessments, high success rates, and the possibility of more studies and initiatives tackling this problem were discovered by the study.

Later 2010s-Present: Hybrid Work and Covid-19 Impact

- Late 2010s brought about hybrid work, combining remote and in-office work.
- COVID-19 pandemic accelerated remote work adoption globally.

Aline Cavalcante Santana, William Ferreira De Barros, Cleyton Mário De Oliveira Rodrigues, Tâmara Larissa Duarte De Albuquerque Dallegrave, Ivaldir Honório De Farias Junior, Wylliams Barbosa Santos (2023), Increased worldwide rivalry for people in the technology sector due to the COVID-19 pandemic has resulted in greater turnover rates in small businesses such as XYZW. The purpose of the study was to confirm the effect of remote work on XYZW's employee turnover rates and create a plan of action to lower them. The results showed that there were legal issues in addition to a 382% pay gap between the corporation and the market. The report suggests taking quick steps to lower turnover risks and valorise the IT industry.

Theoretical Frameworks Related to Work Flexibility

Work flexibility is a concept that has been analysed using various theoretical frameworks. These frameworks provide insights into the factors influencing the adoption of flexible work arrangements, the impact on individuals and organizations, and the broader societal implications. Key frameworks include boundary theory, resource-based view (RBV), social exchange theory, human capital theory, role theory, transaction cost economics, and social identity theory.

1. Boundary theory examines the permeability of boundaries between work and non-work domains, influencing work-life balance.
2. Resource-based view (RBV) suggests that an organization's success is driven by strategic allocation and utilization of resources, such as human capital, knowledge, and technology.
3. Social exchange theory posits that social interactions involve a give-and-take relationship, where individuals exchange resources, support, or benefits.
4. Human capital theory views individuals as assets, with investments in education, skills, and experiences contributing to their value.
5. Role theory examines how individuals enact various roles in different social contexts, influencing their roles as employees, family members, and community members.
6. Transaction cost economics helps organizations evaluate the costs and benefits of implementing flexible work arrangements, considering factors such as communication technology and monitoring mechanisms.
7. Social identity theory helps analyse how flexible work arrangements impact the social identity of individuals within teams and organizations.

Methodology

Description of the Survey Research

Survey research is a method used in various fields to gather data on attitudes, opinions, behaviours, and demographics. It involves defining the research objectives, selecting a representative sample, developing a survey instrument, conducting pilot testing, administering the survey, analysing the data, reporting and presenting the findings, and adhering to ethical considerations.

Details of the Empirical Research Design, Including Sampling, Data Collection, and Analysis Methods

Research Approach

Survey Research Method: Gathers qualitative data to understand how flexible work arrangements enhance work-life balance.

Sampling Strategy

Cluster Sampling: After the population has been divided into groups or clusters (such as departments or geographical areas), a random sample of the clusters is selected. Subsequently, data is collected from each individual within the selected categories. The population of the Bhagathsingh Nagar region in Kukatpally division of Hyderabad is 7000, and the sample size is 2% of the total population. This tactic might be useful.

Data Collection

One popular technique for gathering information on opinions, experiences, and attitudes about flexible work schedules is through surveys. To get in-depth answers, surveys can be given online using multiple-choice, Likert scale, and open-ended questions. A total of 154 members took part in the survey.

Ethical Considerations

The study's ethical guidelines include informed consent, confidentiality, respect for privacy, avoiding harm, fair treatment, and disclosure of potential conflicts of interest, transparency, and maximizing research benefits while minimizing risks. It ensures participants are fully informed about the study's nature, purpose, rights, and risks, and maintains anonymity and confidentiality. The goal is to minimize harm, minimize harm, and maximize benefits.

Data Analysis

The data was analysed by performing statistical analysis using appropriate methods.

Section 1: General Information

Current sector of the respondents in which they are employed

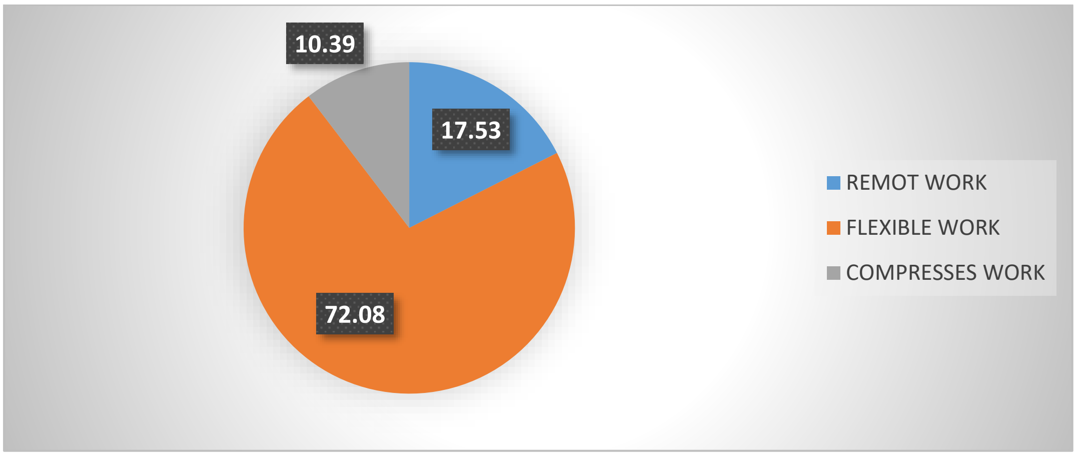
When the poll was conducted, the employees responded from many sectors i.e., the Information Technology, Banking, Pharmaceutical, Education sectors and Marketing function.

No. of years of professional experience the respondents

Employees ranging in experience from 15 years to freshers are included in my poll.

Do you currently have a flexible work arrangement?

Options	Remote Work	Flexible Work	Compresses Work	Total
Respondents	27	111	16	154
Percentage	17.53%	72.08%	10.39%	100%

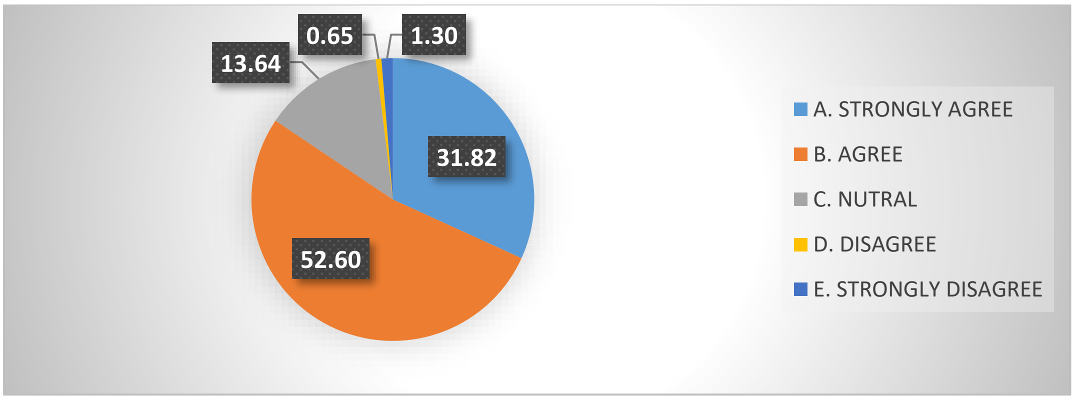


The majority of respondents (72.08%) have a flexible work arrangement, allowing them to adjust their work schedules to some extent. A smaller portion (17.53%) work remotely, indicating that they are not required to be physically present in a traditional office setting. Additionally, a minority (10.39%) have compressed work schedules, implying that they condense their work hours into fewer days or hours per week.

Section 2: Advantages of Flexible Work Arrangements

To what extent do you agree that flexible work arrangements have contributed to an improved work-life balance for you?

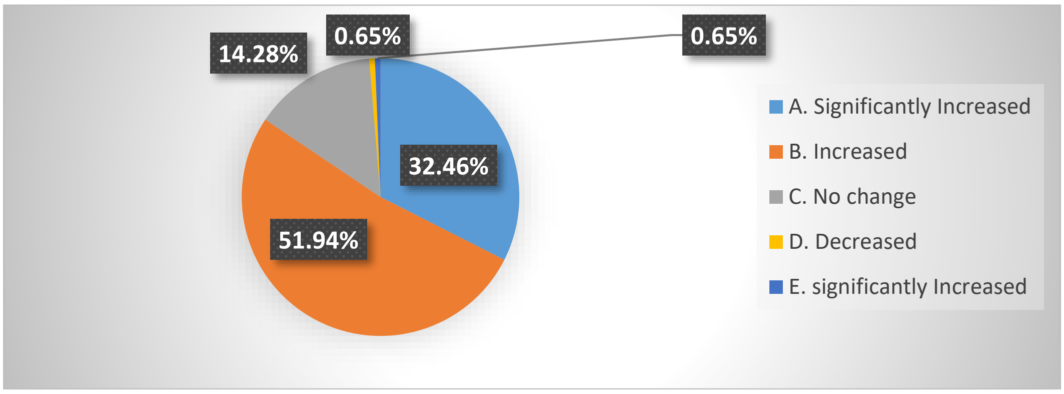
Options	A. Strongly agree	B. Agree	C. Neutral	D. Disagree	E. Strongly disagree	Total
Respondents	49	81	21	1	2	154
Percentage	31.82%	52.60%	13.64%	0.65%	1.30%	100 %



The majority of respondents (84.42%) either strongly agree or agree that flexible work arrangements have contributed to an improved work-life balance for them. This suggests that a significant portion of individuals perceive flexible work arrangements positively in terms of balancing their professional responsibilities with personal life. Only a small proportion of respondents (1.95%) express disagreement with this statement, indicating that for the vast majority, flexible work arrangements are seen as beneficial for achieving a better work-life balance.

Opinion about an increase in productivity since the implementation of flexible work arrangements

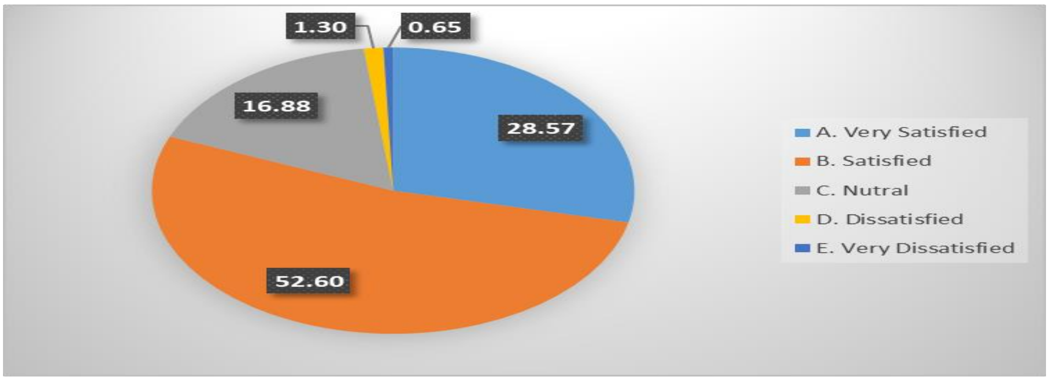
Options	A. Significantly Increased	B. Increased	C. No change	D. Decreased	E. significantly Increased	Total
Respondents	50	80	22	1	1	154
Percentage	32.46%	51.94%	14.28%	0.65%	0.65%	100%



The majority of respondents (84.42%) report an increase in productivity since the implementation of flexible work arrangements. This includes both those who perceive a significant increase (31.82%) and those who indicate a general increase (52.60%) in productivity. Only a small portion (2.95%) of respondents report a decrease in productivity, with an even smaller fraction (0.65%) indicating a significant decrease. This suggests that for the vast majority of individuals, flexible work arrangements have positively impacted their productivity levels.

Satisfaction Levels about current flexible work arrangement

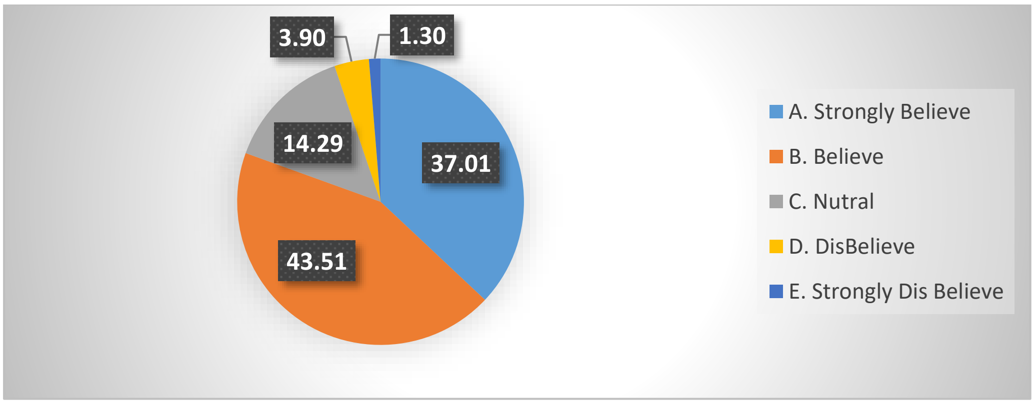
Options	A. Very Satisfied	B. Satisfied	C. Neutral	D. Dissatisfied	E. Very Dissatisfied	TOTAL
Respondents	44	81	26	2	1	154
Percentage	28.57%	52.60%	16.88%	1.30%	0.65%	100%



The majority of respondents (81.17%) express satisfaction with their current flexible work arrangements. This includes both those who are very satisfied (28.57%) and those who are satisfied (52.60%). A smaller portion of respondents (16.88%) feel neutral about their flexible work arrangements. Dissatisfaction is reported by only a minor fraction of respondents, with 1.30% indicating dissatisfaction and 0.65% expressing strong dissatisfaction. Overall, the data suggests that the majority of individuals are content with their current flexible work arrangements.

Opinion about offering flexible work arrangements enhances the organization's ability to attract and retain talent

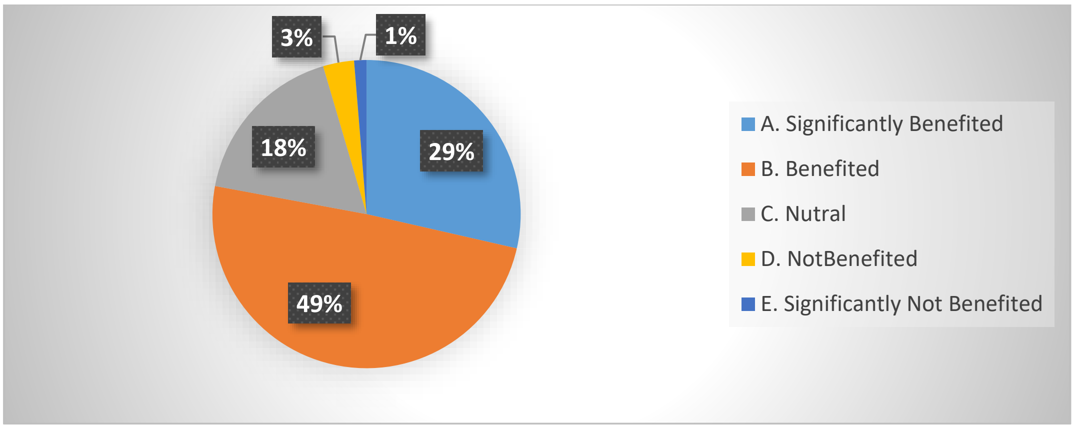
Options	A. Strongly Believe	B. Believe	C. Neutral	D. Disbelieve	E. Strongly Disbelieve	Total
Respondents	57	67	22	6	2	154
Percentage	37.01%	43.51%	14.29%	3.90%	1.30%	100%



The majority of respondents (80.52%) either strongly believe or believe that offering flexible work arrangements enhances the organization's ability to attract and retain talent. This indicates a widespread perception among respondents that flexible work arrangements are beneficial for talent acquisition and retention efforts. A smaller portion of respondents (18.19%) express a neutral or negative stance regarding the impact of flexible work arrangements on talent attraction and retention. Overall, the data suggests that there is strong support for the idea that offering flexible work arrangements is advantageous for organizations in terms of attracting and retaining talent.

The extent that the organization has been benefited from a more diverse talent pool due to flexible work arrangements

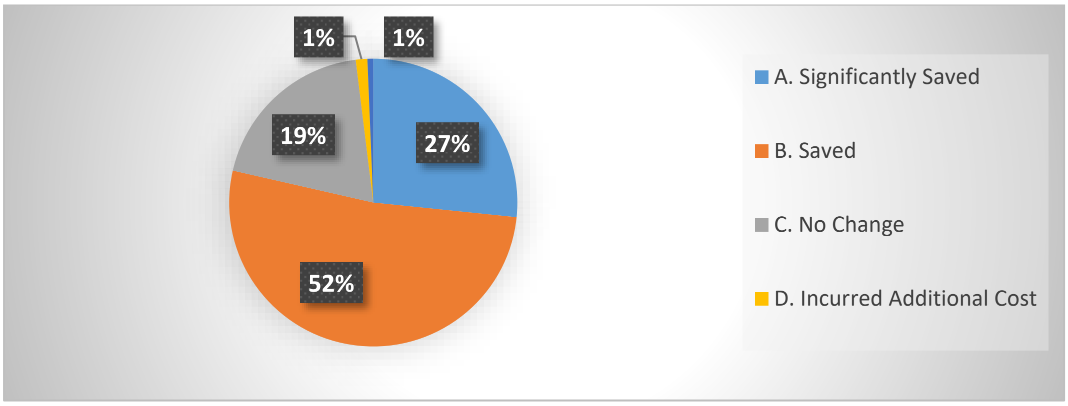
Options	A. Significantly Benefited	B. Benefited	C. Neutral	D. Not Benefited	E. Significantly Not Benefited	Total
Respondents	44	76	27	5	2	154
Percentage	28.57%	49.35%	17.53%	3.25%	1.30%	100%



The majority of respondents (77.92%) believe that the organization has benefited from a more diverse talent pool due to flexible work arrangements. This includes both those who perceive a significant benefit (28.57%) and those who indicate a general benefit (49.35%). A smaller portion of respondents (17.53%) feel neutral about the impact of flexible work arrangements on diversifying the talent pool, while only a minor fraction (4.55%) express a negative view, stating that the organization has not significantly benefited or has significantly not benefited from a more diverse talent pool due to flexible work arrangements. Overall, the data suggests that there is a positive perception regarding the role of flexible work arrangements in enhancing diversity within the talent pool of the organization.

Personal experience about 'cost savings if any' as a result of your flexible work arrangement (e.g., reduced commuting costs etc.)

Options	A. Significantly Saved	B. Saved	C. No Change	D. Incurred Additional Cost	E. Significantly Incurred Additional Cost	Total
Respondents	41	80	30	2	1	154
Percentage	26.62%	51.95%	19.48%	1.30%	0.65%	100%

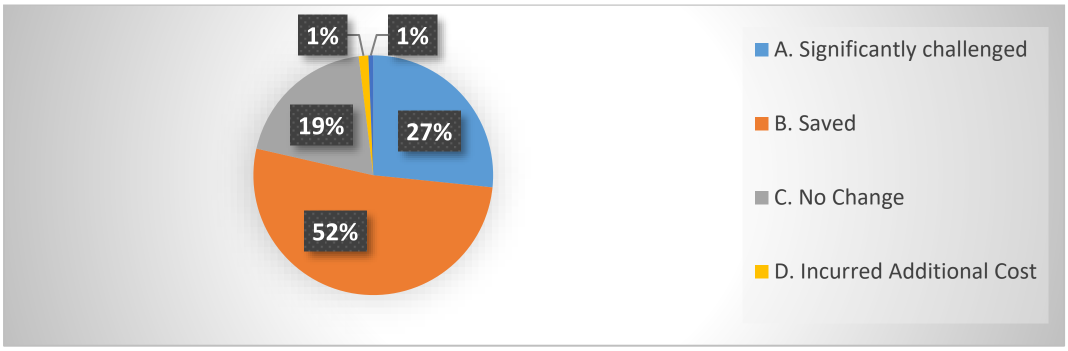


The majority of respondents (78.57%) report experiencing some form of cost savings as a result of their flexible work arrangements. This includes both those who have significantly saved (26.62%) and those who have saved (51.95%). A notable portion of respondents (19.48%) indicate that they have not experienced any change in costs due to their flexible work arrangements. A very small fraction of respondents (1.95%) were reported that they are incurring additional costs, and an even smaller fraction (0.65%) stating that they have significantly incurred additional costs. Overall, the data suggests that flexible work arrangements often lead to cost savings for individuals, primarily through reduced commuting expenses.

Section 3: Disadvantages of Flexible Work Arrangements

Perception about the communication challenges associated with flexible work arrangements (e.g., team communication, collaboration)

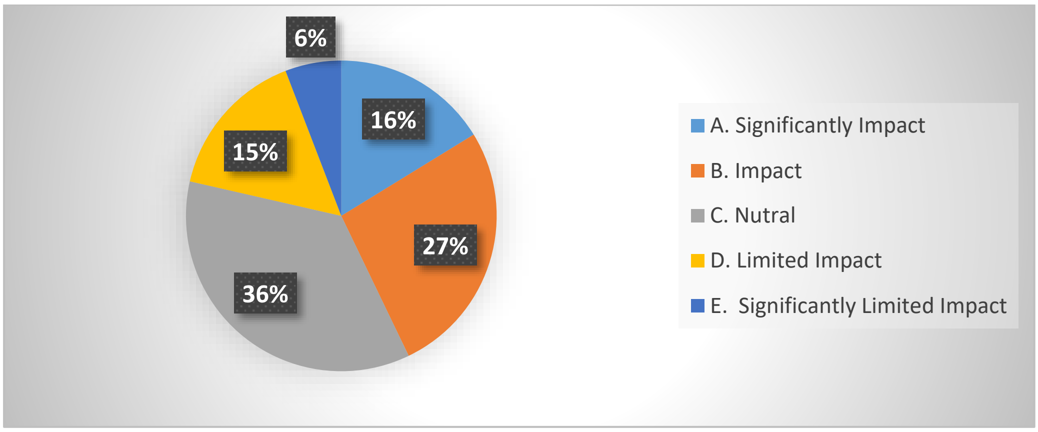
Options	A. Significantly challenged	B. Saved	C. No Change	D. Incurred Additional Cost	E. Significantly Incurred Additional Cost	Total
Respondents	41	80	30	2	1	154
Percentage	26.62%	51.95%	19.48%	1.30%	0.65%	100%



The majority of respondents (78.57%) perceive some level of communication challenges associated with flexible work arrangements. This includes both those who feel significantly challenged (26.62%) and those who perceive some level of challenge (51.95%). A significant portion of respondents (19.48%) indicate that they have not observed any change in communication challenges due to flexible work arrangements. However, a small fraction of respondents (1.95%) report incurring additional costs related to communication challenges, with an even smaller fraction (0.65%) stating that they have significantly incurred additional costs. Overall, the data suggests that while many individuals perceive communication challenges with flexible work arrangements, a sizable portion also experiences no change in this aspect.

Opinion about flexible work arrangements impact team cohesion within the organization

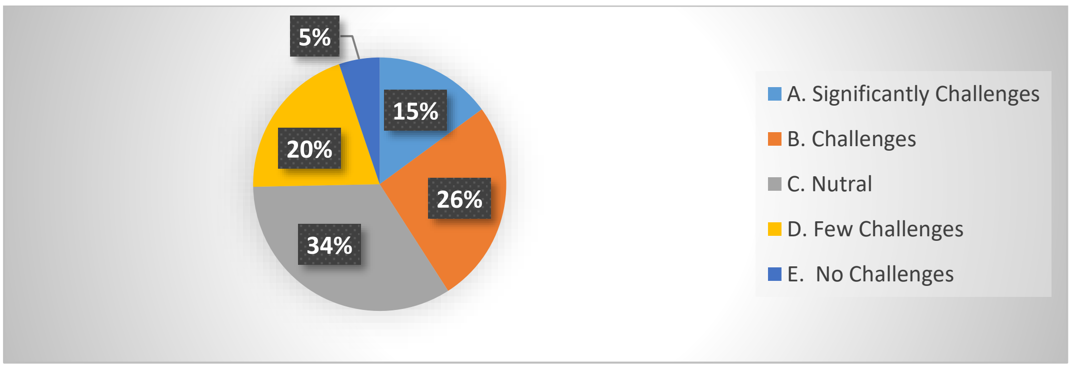
Options	A. Significantly Impact	B. Impact	C. Neutral	D. Limited Impact	E. Significantly Limited Impact	Total
Respondents	25	41	55	24	9	154
Percentage	16.23%	26.62%	35.71%	15.58%	5.84%	100%



The perceptions regarding the impact of flexible work arrangements on team cohesion within the organization vary among respondents. A significant portion of respondents (42.85%) perceive some level of positive impact, with 16.23% stating that flexible work arrangements significantly impact team cohesion and 26.62% indicating an impact. On the other hand, a considerable number of respondents (21.42%) express a negative view, with 15.58% stating that flexible work arrangements have limited impact on team cohesion and 5.84% indicating that they significantly limit team cohesion. Additionally, a substantial portion of respondents (35.71%) felt neutral about the impact of flexible work arrangements on team cohesion. Overall, the data suggests that while some individuals perceive flexible work arrangements as beneficial for team cohesion, others believe that they may have limited or even negative effects on team dynamics.

Managers faced challenges in overseeing and managing remote or flexible teams

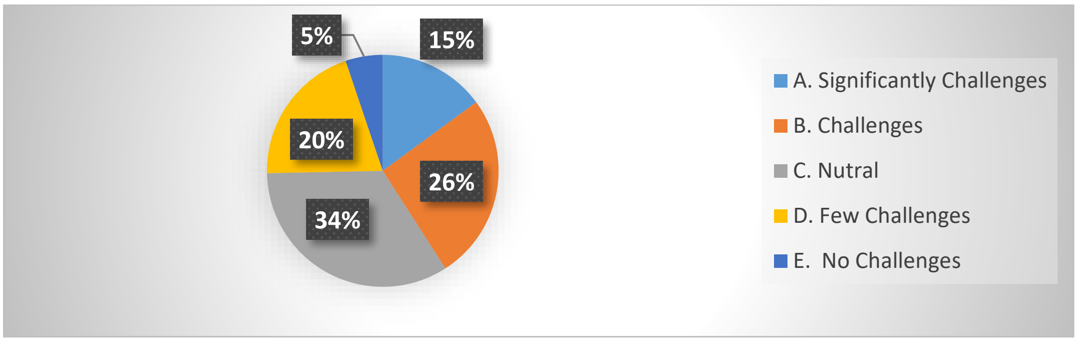
Options	A. Significantly Challenges	B. Challenges	C. Neutral	D. Few Challenges	E. No Challenges	Total
Respondents	23	40	52	31	8	154
Percentage	14.94%	25.97%	33.77%	20.13%	5.19%	100%



The data suggests that a majority of managers have faced some level of challenges in overseeing and managing remote or flexible teams, with 40 individuals (25.97%) indicating challenges and 23 individuals (14.94%) stating that they have faced significant challenges. Additionally, a substantial portion of respondents (33.77%) feel neutral about this issue, indicating that they neither strongly agree nor disagree with the statement. However, there are also respondents who report fewer challenges (20.13%) or even no challenges (5.19%) in managing remote or flexible teams. Overall, the data reflects a mixed perception among managers regarding the difficulties they encounter when overseeing and managing remote or flexible teams.

To what extent do you feel isolated or lonely as a result of flexible work arrangement?

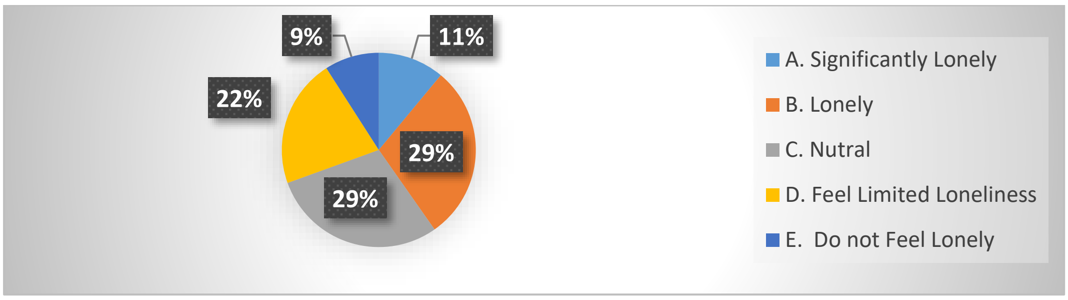
Options	A. Significantly Challenges	B. Challenges	C. Neutral	D. Few Challenges	E. No Challenges	Total
Respondents	23	40	52	31	8	154
Percentage	14.94%	25.97%	33.77%	20.13%	5.19%	100%



The data indicates that a significant portion of respondents (40 individuals, 25.97%) feel isolated or lonely to some extent as a result of their flexible work arrangements. This includes both those who feel significantly isolated and lonely (23 individuals, 14.94%) and those who perceive some level of isolation or loneliness (25.97%). Additionally, a substantial number of respondents (33.77%) feel neutral about this aspect, indicating that they neither strongly agree nor disagree with the statement. However, there are also respondents who report experiencing fewer challenges (20.13%) or even no challenges (5.19%) in terms of feeling isolated or lonely due to their flexible work arrangements. Overall, the data suggests that while a considerable portion of individuals experience feelings of isolation or loneliness, there are also those who do not perceive this as a significant challenge.

Feel isolated or lonely as a result of flexible work arrangement

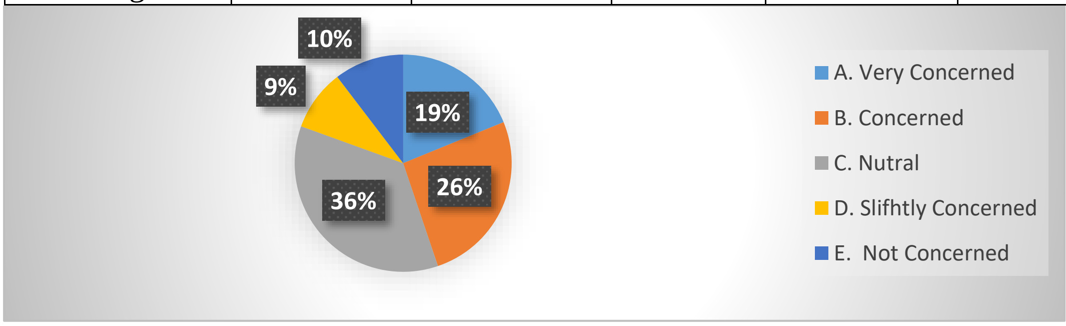
Options	A. Significantly Lonely	B. Lonely	C. Neutral	D. Feel Limited Loneliness	E. Do not Feel Lonely	Total
Respondents	17	45	45	33	14	154
Percentage	11.04%	29.22%	29.22%	21.43%	9.09%	100%



The data indicates that a considerable portion of respondents (40.26%) feel some degree of loneliness as a result of their flexible work arrangements. This includes both those who feel significantly lonely (11.04%) and those who perceive some level of loneliness (29.22%). Additionally, there is a substantial number of respondents (21.43%) who feel limited loneliness. However, there are also respondents who report feeling neutral (29.22%) or do not feel lonely at all (9.09%) due to their flexible work arrangements. Overall, the data suggests that while a significant portion of individuals experience feelings of loneliness, there are also those who do not perceive this as a significant challenge.

Concern about security and privacy issues associated with flexible work arrangements

Options	A. Very Concerned	B. Concerned	C. Neutral	D. Slightly Concerned	E. Not Concerned	Total
Respondents	29	40	55	14	16	154
Percentage	18.83%	25.97%	35.71%	9.09%	10.39%	100%

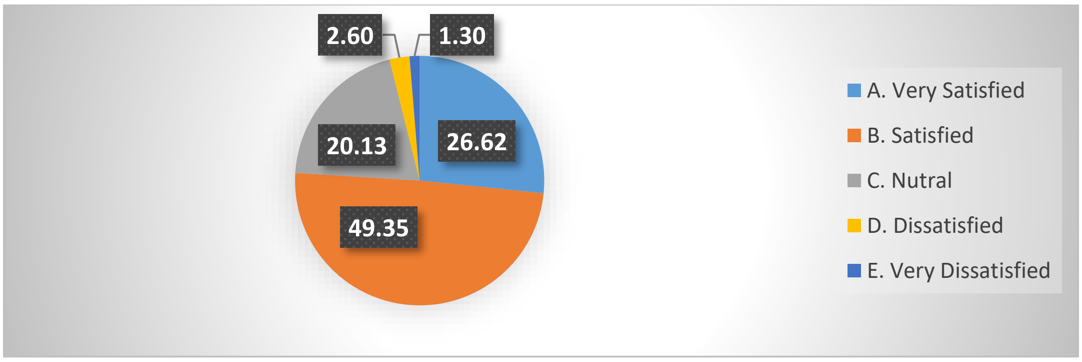


The data indicates that security and privacy concerns associated with flexible work arrangements are a significant consideration for a majority of respondents. A notable portion of respondents (44.80%) express some level of concern, with 18.83% stating they are very concerned and 25.97% indicating they are concerned. Additionally, there is a substantial number of respondents (35.71%) who feel neutral about this issue, suggesting they neither strongly agree nor disagree with the statement. However, there are also individuals who report feeling slightly concerned (9.09%) or not concerned at all (10.39%) about security and privacy issues associated with flexible work arrangements. Overall, the data suggests that security and privacy are important considerations for many individuals in the context of flexible work arrangements.

Section 4: Overall Satisfaction and Suggestions

Overall satisfaction about the implementation of flexible work arrangements within the organization

Options	A. Very Satisfied	B. Satisfied	C. Neutral	D. Dissatisfied	E. Very Dissatisfied	Total
Respondents	41	76	31	4	2	154
Percentage	26.62%	49.35%	20.13%	2.60%	1.30%	100%



The majority of respondents (75.97%) express satisfaction with the implementation of flexible work arrangements within the organization. This includes both those who are very satisfied (26.62%) and those who are satisfied (49.35%). A smaller portion of respondents (20.13%) feel neutral about the implementation, indicating that they neither strongly agree nor disagree with it. Dissatisfaction is reported by only a minor fraction of respondents, with 2.60% indicating dissatisfaction and 1.30% expressing strong dissatisfaction. Overall, the data suggests that the majority of individuals are content with how flexible work arrangements have been implemented within the organization.

Limitations

Study Limitations on Flexible Work Arrangements

❖ Subjectivity in Perceptions: Survey responses on flexible work arrangements are influenced by individual experiences and biases.

❖ Limited Scope: Studies may focus on specific industries, organizations, or demographics, limiting generalizability.

❖ Self-Reporting Bias: Respondents may provide socially desirable responses or inaccurately recall experiences, leading to biased data.

❖ Response Rate and Sample Size: Low response rates or small sample sizes compromise the study's representativeness and statistical power.

❖ Temporal Factors: Perception of flexible work arrangements may evolve over time.

❖ Influence of Organizational Culture: The impact of flexible work arrangements can vary.

❖ Confounding Variables: Other factors like individual job roles, personal circumstances, and external stressors can confound the relationship.

❖ Inability to Capture Complex Dynamics: Quantitative surveys may not fully capture nuanced dynamics.

❖ Long-Term Impact Assessment: Long-term studies are required.

Advantages of Flexible Work Arrangements

After the outcome of the survey, the following are the finding of the study.

Key Advantages for Employees and Employers

- Work-Life Balance Benefits
- Improves work-life balance, reducing stress and improving mental health.
- Increases employee satisfaction by allowing work to be tailored to individual preferences.
- Attracts and retains talent by attracting and retaining skilled professionals.
- Boosts productivity by reducing distractions and aligning work hours with productive times.
- Contributes to cost savings by reducing expenses on commuting, work attire, and meals.
- Enhances employee well-being by tailoring work schedules to personal needs.
- Provides access to a diverse talent pool.
- Offers geographical flexibility for working from different locations.
- Increases employee autonomy, leading to increased job satisfaction and motivation.
- Reduces commuting stress and environmental impact.
- Enhances business continuity and resilience.
- Demonstrates commitment to adapting to diverse needs.
- Increases access to global talent.
- Supports better work-life integration.

Disadvantages of Flexible Work Arrangements

Remote Work Challenges

- Communication: Difficulty in project coordination, information sharing, and collaboration.
- Management: Requires strong leadership and effective communication.
- Isolation and Loneliness: Employees may experience feelings of isolation and loneliness.
- Inequitable Workload Distribution: Challenges in distributing workloads among team members.
- Security and Privacy Concerns: Working outside traditional office environment poses security and privacy risks.
- Monitoring Productivity: Employers may struggle to monitor productivity of remote workers.
- Limited Access to Resources: Remote workers may have limited access to office resources.
- Miscommunication: Digital communication can lead to misinterpretation.
- Building Company Culture: Maintaining a strong company culture can be challenging.
- Dependence on Technology: Technical issues can disrupt workflows and impact productivity.
- Legal and Compliance Challenges: Implementing flexible work arrangements may involve legal and compliance issues.
- Resistance to Change: Some employees and managers may resist the transition to flexible work arrangements.

Organizational Adaptation and Mitigation Strategies

Organizational Adaptation and Mitigation Strategies for Flexible Work Arrangements

- Flexible Work Policies and Guidelines
- Establish clear policies and guidelines for flexible work arrangements.
- Provide employee training and education on benefits and challenges of flexible work.
- Invest in robust technology infrastructure for remote work.
- Implement strong cyber security measures to protect sensitive information.
- Establish clear performance metrics and monitoring mechanisms for accountability and productivity.
- Create channels for continuous feedback from employees and managers.
- Provide managerial training on leading remote or flexible teams effectively.
- Foster a culture of inclusivity by incorporating remote team members into decision-making processes.
- Implement flexible scheduling options and provide remote work support services.
- Consider implementing a hybrid work model combining remote and in-office work.
- Redefine performance metrics to focus on outcomes and deliverables.
- Establish a culture of regular and transparent communication.
- Design flexible return-to-office plans considering employee preferences.
- Ensure legal compliance with relevant labour laws and regulations.
- Develop crisis preparedness plans that account for flexible work arrangements.
- Implement employee recognition programs.
- Regularly review and update flexible work policies.

Conclusion

In modern workplaces (i.e.) flexible work arrangements has the benefits and as well as drawbacks. While providing autonomy, flexibility and improved work-life balance, the organisations should address the present challenges like communication issues, performance monitoring difficulties, isolation, security risks, and access inequities. To overcome these, organizations and policymakers should invest in technology, training, development, regulatory frameworks, monitoring, evaluation, work-life integration, collaboration, and cultural shift. By embracing these recommendations, organizations can create supportive environments that empower employees to thrive in diverse flexible work arrangements, promoting workforce flexibility, resilience, and innovation. Future research should focus on longitudinal studies, cross-cultural comparisons, sector-specific research, diversity and inclusion, hybrid work models, technological innovations, managerial practices, well-being, organizational change management, and policy evaluation. The ultimate goal is to leverage flexible work arrangements to create environments where employees thrive, organizations succeed, and society benefits.

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Predicting Sleep Disorders for Improved Health Care—A Comprehensive Study

Udayasri Kompalli, T. Srinivasa Ravi Kiran, Gandham Mani Saketh, and Abdul Faheem

Abstract All around the world there are wide range of people who are suffering from the sleeping disorder problems such as insomnia and apnea. The people who are suffering from this kind of sleep disorders are highly impacted with both physical and mental illnesses. Sometimes the people don't know by what they are suffering from, in that case the people should consider a doctor for diagnosing the problem. Our idea is that can a person identify whether he is having disorder or not on his own? Well, it is possible by the combination of both AI technology and health care. In our study, we used supervised machine learning algorithms and built a model that which can guide the user whether he is having sleep disorder or not. The model is trained with the dataset which we collected from Kaggle and we started our study by analyzing the data and we found crucial insights which are very helpful for building our model. After verifying all these insights and with satisfactory results, we trained our data with various supervised classification algorithms, among all of them the both Naive Bayes and random forest had given better accurate and promising results and we also applied XGBoost for improving the performance of our model. Additionally, we further tested our model with real-world data which we collected from our classmates, faculty, and other individuals irrespective of their age groups through Google Forms. Finally, we developed a live application with the random forest model because, as though the Naïve bayes model performs well, naïve bayes model will give the outcomes basing on the probabilities. Based on the probabilities it is not preferable to guide a person regarding his health state. So, instead naïve bayes we have preferred random forest model for our application and deployed it on the Streamlit platform. Our main aim is to reduce the traffic to the doctor and to make the person well aware of his health state. As if a person is not suffering from the disorder, then it's waste of time to the doctor, instead in that time he might can be treated to other person who is really suffering from the disorder.

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A. E. Hassanien et al. (eds.), *Innovative Computing and Communications*, Lecture Notes in Networks and Systems 1020, https://doi.org/10.1007/978-981-97-3588-4_23

Keywords Sleeping disorder · Machine learning · Classification algorithms · Health care

1 Introduction

Generally, what is sleep? Sleep is a state of rest through which our mental, physical activities, and consciousness were all comes under rest state to gain some energy to perform well in our daily life. The quality of sleep determines our performances in a day. If we come to the sleep disorder, the sleep disorder ruins that quality of sleep which we require and can cause both physical and mental illnesses for the person who is suffering with the sleep disorder. As per our findings, all around the world we found that there are around 80 different kinds of sleep disorders that are identified, where different people at different age groups are affected by these sleep disorders. If a person gets a sleep disorder, then not only that person will suffer from it but their family members and his friends also will have the impact by his mental health and by his behavior and the relationships between his close ones might be affected.

There are several causes in which the sleep disorder will have high impact which are like decision making. When we experience the sleep disorder, we are poor in quality of sleep in that state we can't take any decision correctly. As, like there are sudden situations in our life like where we might die due to traffic accidents, due to low quality of sleep we might caught into some accidents which might lead to our death sometimes. When we come to our health, having sleeping disorders can cause various other health problems such as diabetes, Cancer, Hypertension, Cardiovascular incidents, Hypertension, like these there are many other health issues that are caused due to sleep disorders. Especially, nowadays in this generation most of the kids are not sleeping during nights which has been gradually becoming their habit some of them consider it a hobby but if we look closely at their health conditions might reveal that some of them are suffering with insomnia, which is a kind of sleeping disorder which cannot make the person fall asleep. Similarly, there are many people who are not aware about that they are having a problem instead they are considering it as hobby. If this continues, then it might lead to some serious health problems for the person who neglects and treat it as habit. There are already numerous cases of people experiencing health problems which were gradually arisen due to the sleeping disorders which they neglected in their young days.

1.1 Machine Learning in Health Care

As we all know, machine learning is a process through which computers can be trained without being explicitly programmed. As we also know, machine learning is a trial-and-error process, which involves building various types of models based on data, continuously training them with different algorithms and selecting the best algorithm among them which had given high accuracy and better results. Based on the type of data the algorithm will be been chosen, and finally, we build the model based on the data. Nowadays, machine learning is integrated in every field and for that purpose different models are being developed for performing different kinds of tasks.

But when machine learning was integrated with health care, it brought about a revolution that which made everything easy and improved the accuracy of diagnostic processes. Techniques such as X-ray and MRI scans have become more precise and faster, as these machine learning models trained on billions of data points through which it can identify diseases rapidly, as this capability is critical in health care where inaccurate predictions could lead to life-threatening consequences (Fig. 1).

Numerous applications have already been developed by various organizations and are currently in use. Recently, in 2023, Google worked on a project enabling a machine to predict an individual's cardiovascular risks over the next five years through a single retinal scan. Similarly, we are having many applications which are already developed and currently in use. Additionally, there are many MNCs which are actively engaged in machine learning projects within the healthcare sector.

Fig. 1 Significance of machine leaning in health care

2 Review of Literature

The study titled "Sleeping and Anxiety Disorders During COVID-19 Pandemic in a Wide Distribution of People Differentiated by Age and Life Strata: An Online Web-Based Study" by Anbarasi et al. [1] analyzed sleeping and anxiety disorders caused by COVID-19 pandemic-induced stress. The study concluded that there is a positive correlation between stress, sleep disorders, and anxiety. The study also highlighted the connectivity between lower social status and mental health issues.

The authors Desjardins and Tanguay-Labonte [2] conducted a systematic review on the effects of exercise, its intensity, its frequency, and its timing and sleep outcome. They found that to improve the general quality of sleep among adolescents and adults, individuals should engage in physical activity at any time of day. It also appears very advantageous to engage in long-term physical activity to maintain the positive effects on sleep. Nonetheless, it seems that sedentary individuals can also benefit from occasional physical activity to improve the quality of their subsequent sleep period.

According to Sigurdson and Ayas [3], sleep deprivation and medical disorders of sleep are widespread in today's society, with significant public health implications. They highlight three specific issues related to the public health and safety consequences of sleep disorders. First, sleep restriction has been linked to a variety of adverse physiologic and long-term health outcomes, including all-cause mortality, diabetes, and cardiovascular disease. Second, therapy for obstructive sleep apnea, the most common respiratory disorder of sleep, has been shown to be an extremely efficient use of healthcare resources. Finally, the extreme work schedules of house staff (physicians in training) have potential adverse patient and occupational safety impacts.

Liberati [4] has provided an overview of different modalities that can be used to objectively assess sleep quality and quantity, including actigraphy, heart rate variability, hormone deconvolution, and central nervous system analysis via electroencephalogram or Near Infrared Spectra. He suggests that using a combination of these tools can help in better diagnosing and monitoring therapy modalities for sleep disorders.

ISRUC-Sleep: A Comprehensive Public Sleep Dataset by Khalighi et al. [5] introduces an open-access sleep dataset that can be used for performance comparison of new methods for sleep pattern analysis. The dataset includes data from healthy subjects, subjects with sleep disorders, and subjects under the effect of sleep medication. It comprises three groups of data, making it useful for studies involving changes in PSG signals over time and comparison of healthy subjects with patients suffering from sleep disorders. The article also presents the results of applying a subject-independent automatic sleep stage classification method on ISRUC-Sleep dataset to evaluate and compare new contributions using the dataset as a benchmark.

The study titled "Prevalence of Daytime Sleepiness Among Medical College Students in Jordan and Its Association with Academic Performance" was conducted by Alqudah et al. [6] and published in Volume 2022. The study aimed to assess the prevalence of daytime sleepiness among medical college students in Jordan and its association with academic performance. The study concluded that daytime sleepiness is highly prevalent among medical students in Jordan and suggested intervention strategies to resolve sleep disturbances in college students.

3 Methodology

Our journey into the world of sleep medicine begins with a comprehensive exploration of the Sleep Health and Lifestyle Dataset, a valuable resource teaming with insights (Fig. 2) [7]. This dataset comprises 374 rows and 13 columns, providing a holistic view of various dimensions related to sleep and daily habits. It offers a lens into four primary domains:

Key Features of the Dataset

Comprehensive Sleep Metrics: Within this dataset, we delve into sleep duration, quality, and factors that intricately influence sleep patterns.

Lifestyle Factors: Our analysis extends to encompass physical activity levels, stress levels, and BMI categories, unraveling the intricate web of how lifestyle choices impact sleep.

Cardiovascular Health: The dataset further opens the door to a thorough examination of cardiovascular health, allowing us to explore blood pressure and heart rate measurements in our quest to understand their interplay with sleep.

Sleep Disorder Analysis: As we navigate through the dataset's rich terrain, we keenly identify the presence or absence of sleep disorders such as insomnia and sleep apnea, shedding light on the prevalence of these conditions.

Person ID	Gender	Age	Occupation	Sleep Duration	Quality of Sleep	Physical Activity Level	Stress Level	BMI Category	Blood Pressure	Heart Rate	Daily Steps	Sleep Disorder
1	Male	27	Software Engineer	6.1	6	42	6	Overweight	126/83	77	4200	None
2	Male	28	Doctor	6.2	6	60	8	Normal	125/80	75	10000	None
3	Male	28	Doctor	6.2	6	60	8	Normal	125/80	75	10000	None
4	Male	28	Sales Representative	5.9	4	30	8	Obese	140/90	85	3000	Sleep Apnea
5	Male	28	Sales Representative	5.9	4	30	8	Obese	140/90	85	3000	Sleep Apnea
6	Male	28	Software Engineer	5.9	4	30	8	Obese	140/90	85	3000	Insomnia
7	Male	29	Teacher	6.3	6	40	7	Obese	140/90	82	3500	Insomnia
8	Male	29	Doctor	7.8	7	75	6	Normal	120/80	70	8000	None

Fig. 2 Sleep health and lifestyle dataset

This dataset, aptly represented in Fig. 2, serves as the bedrock of our research, providing a data-driven foundation upon which we build our insights and predictive models in the realm of sleep disorder diagnosis and treatment.

3.1 Data Preprocessing

In our dataset, we were fortunate to encounter minimal data preprocessing requirements. After a thorough examination, we identified and subsequently dropped two columns that were deemed irrelevant for our sleep disorder prediction task. This process ensured that our dataset remained clean, with no missing values or duplicate entries, providing a solid foundation for subsequent modeling and analysis additionally, to facilitate the use of machine learning algorithms, we performed Label Encoding to convert string or object-type data into numeric values, streamlining the data for efficient computation and modeling.

3.2 Insightful Data Discovery

In our study, we have gathered data from 374 individuals, examining the prevalence of sleep disorders within the male and female populations. This count plot (Fig. 3) visually represents the distribution of sleep disorders, specifically sleep apnea and insomnia, across gender categories.

Males (137 in Total)

A majority of males (137) do not exhibit symptoms of any sleep disorder, indicating that they enjoy relatively restful nights. However, 11 males are suffering from sleep apnea, a condition characterized by interrupted breathing during sleep. Additionally, 41 males experience insomnia, a sleep disorder marked by difficulties in falling asleep or maintaining restful sleep.

Females (237 in Total)

A significant portion of females (82) does not report any sleep disorder, suggesting that a substantial number experience uninterrupted sleep patterns. In contrast, 67 females are diagnosed with sleep apnea, highlighting the prevalence of this disorder among female participants. Furthermore, 36 females are affected by insomnia, showcasing the challenges many women face when it comes to sleep quality.

This count plot provides a quick and insightful overview of how sleep disorders are distributed across genders within our dataset. It highlights the distinct prevalence rates between males and females and underscores the importance of further investigation into the factors contributing to these differences. Our analysis aims to shed light on the intricate relationship between genders and sleep disorders, potentially informing future research and healthcare interventions in this domain. Understanding these

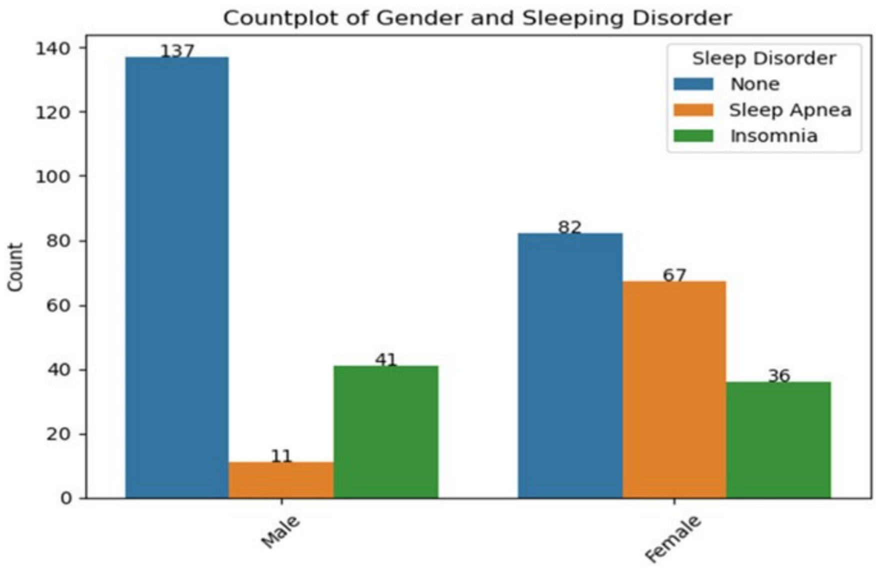

Fig. 3 Count plot based on gender

patterns can ultimately lead to more tailored and effective approaches to address sleep disorders and improve overall sleep health for both males and females.

Evaluating the Relationships Between Features

The correlation heat map (Fig. 4) presented here serves as a powerful visual tool, unraveling intricate relationships and dependencies among various features within our sleep dataset.

Fig. 4 Correlation heatmap

Each cell in the heat map represents the correlation coefficient between two variables, with values ranging from − 1 to 1. A positive correlation indicates that as one variable increases, the other tends to increase as well, while a negative correlation suggests an inverse relationship [11].

Key Findings from Our Correlation Analysis Include

- *Sleep Duration and Sleep Quality* (*Positive Correlation*)*:* As expected, there is a positive correlation between sleep duration and sleep quality. Individuals who report longer sleep durations tend to experience higher sleep quality, indicating the importance of adequate rest.
- *Stress Level and Sleep Quality* (*Negative Correlation*): An intriguing observation is the negative correlation between stress levels and sleep quality. This suggests that individuals with higher stress levels may experience lower sleep quality, possibly due to factors like exhaustion or overexertion.
- *BMI Category and Physical activity Level* (*Positive Correlation*): The relation between BMI category and physical activity level shows a strong positive relationship. As BMI increases, physical activity tends to rise. However, correlation doesn't prove cause and effect; it merely highlights a connection between the two factors.
- *Heart Rate and Stress Level* (*Positive Correlation*): As stress levels elevate, there's a corresponding tendency for the heart rate to increase. This moderate correlation suggests that higher stress might contribute to an elevated heart rate, reflecting their intertwined impact on physiological responses.
- *Blood Pressure and BMI Category* (*Positive Correlation*): As BMI category increases, there's a notable tendency for blood pressure to rise. This correlation suggests that higher BMI categories may be linked to elevated blood pressure levels, indicating their interconnected influence on health parameters.
- *Age and Blood Pressure* (*positive correlation*): As age increases, there's a tendency for blood pressure levels to rise, suggesting that age might play a role in influencing blood pressure. This correlation implies that older individuals might have higher blood pressure compared to younger individuals, but it's important to consider other factors that can also impact blood pressure.
- *Stress Level and Sleep Duration* (*Negative Correlation*): This means that as stress levels increase, the duration of sleep tends to decrease significantly. It suggests that individuals experiencing higher stress might likely have shorter sleep durations, reflecting a considerable impact of stress on the quality and quantity of sleep.

4 Model Training and Testing for Multiple Classification Algorithms

In order to predict sleep disorders accurately, an essential step involves the training and evaluation of machine learning models. The dataset was carefully divided into two subsets: a training set consists 70% of the data and a testing set comprising the remaining 30%. This partitioning ensured that we had distinct datasets for model training and independent validation.

4.1 Training

The training set was used to instruct each algorithm on the underlying patterns in the data. This phase involved feeding the algorithm with feature data and corresponding sleep disorder labels. The training process involved iterative adjustments of model parameters and the application of algorithm-specific techniques. While we did not perform hyper parameter tuning in this study, our primary objective was to assess the algorithms' inherent capabilities before further optimization. The models absorbed knowledge from the training data; we closely monitored their performance and generalization abilities. As our primary goal is to make our models more generalized, to make accurate predictions when exposed to unseen data.

4.2 Testing

After the training phase, we will provide the test set to the model for evaluating the model's predictive power. which are different from the training set. After getting predictions then we have evaluated our model by comparing the actual values with the predicted values by using various metrics like accuracy, precision, recall, and f1-score for finding the effectiveness of our model.

Our study went through various classification algorithms which enabled us to observe the insights of their behavior and effectiveness in making predictions. Let's explore all these insights in depth in the results section.

5 Results and Analysis

After training our data with various machine learning algorithms, we obtained brilliant results with great performance scores by our classification models.

The following table showcases the classification report (accuracy scores of various metrics) achieved by the classification models with the testing set (Table 1).

The classification report revealed that themodel performed well by achieving 87.6% accuracy by obtaining the balanced precision, recall, and $F1$-scores. Furtherly, both random forest and XGBoost equally performed well by showing improvement in the performance by achieving 89.3% accuracy, which showcases the improved predictive power than the naïve bayes model. These insights, indicating that XGBoost and random forest achieved better precision, recall, and f1-score values across multiple classes suggests that these models are more suitable for our dataset.

5.1 Real-World Data

Following rigorous model testing, we expanded the scope by collecting data through a Google Form [12] from a diverse group, including friends, faculty, and other participants. Our model successfully identified instances of sleep apnea in two individuals within this dataset. This dataset served as a real-world assessment, enabling the evaluation of model predictions against actual responses. By applying the developed models to this new dataset, we aimed to validate their efficacy in practical scenarios. The process culminated in predictions based on this acquired data, providing valuable insights into the model's applicability and effectiveness in real-life contexts. However, with an accuracy rate of 89%, there remains a possibility of around 11% inaccuracies in predictions, emphasizing the need for further refinement and consideration of potential inaccuracies in real-world applications.

Table 1 Classification report

Models\Metrics	Features	Precision	Recall	$F1$ Score	Support	Accuracy (%)
Naïve Bayes	0	0.74	0.74	0.74	23	87.6
	1	0.91	0.91	0.91	65	
	2	0.92	0.92	0.92	25	
Random forest	0	0.84	0.7	0.76	23	89.3
	1	0.91	0.95	0.93	65	
	2	0.88	0.92	0.9	25	
XGBoost	0	0.84	0.7	0.76	23	89.3
	1	0.91	0.95	0.93	65	
	2	0.88	0.92	0.9	25	

5.2 *Real-World Application*

After evaluating the results from various classification models, we moved on to the application development phase. The initial step is to select a model for our real-time application. We chose the random forest model due to its excellent performance and superior accuracy during training. All though the naïve bayes model also performed well, it fundamentally predicts the outcomes basing on the probability scores, which may not be a definitive method for health status advisories. The random forest model, with its architecture of numerous decision trees, offers robust decision-making capabilities by analyzing a wide array of decision paths before making prediction. This standout feature of random forest led us to prefer it over other models.

After selecting the model we developed our application using Streamlit, one of the Python's magnificent frameworks for deploying machine learning models. Our application features a user-friendly, chat-style interface with a bot named Astra. Astra interacts with the users, collects necessary information through questions related to the features of our trained dataset. Based on this input, Astra predicts whether a person might be suffering from the disorder.

The following Fig. 5 shows the interface of our model Astra.

Below are the two sample reports generated by our model Astra (Figs. 6 and 7).

This application is beneficial for both users and doctors. It can potentially reduce unnecessary hospital visits by identifying the patients who really need the medical attention, thereby saving doctors time by allowing them to focusing on patients requiring immediate attention. However, because our model is based on the data it was trained on, it might not always be accurate. Not every prediction it makes should

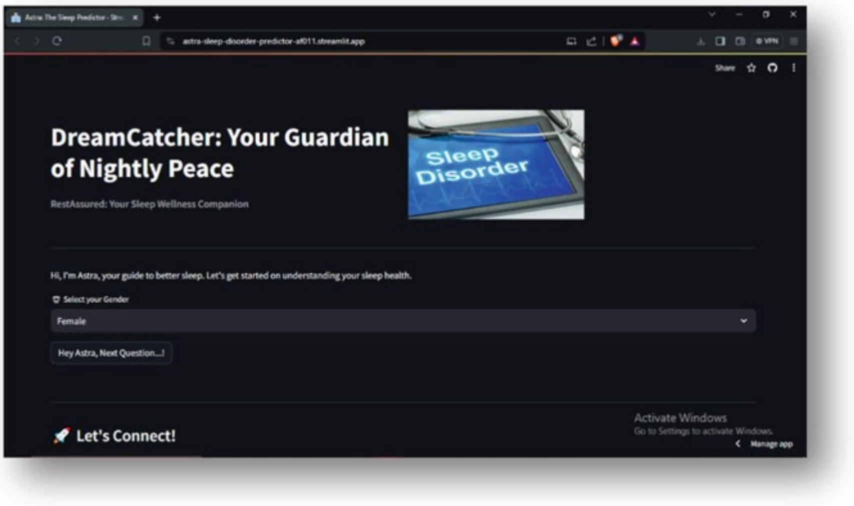

Fig. 5 Interface of our model Astra

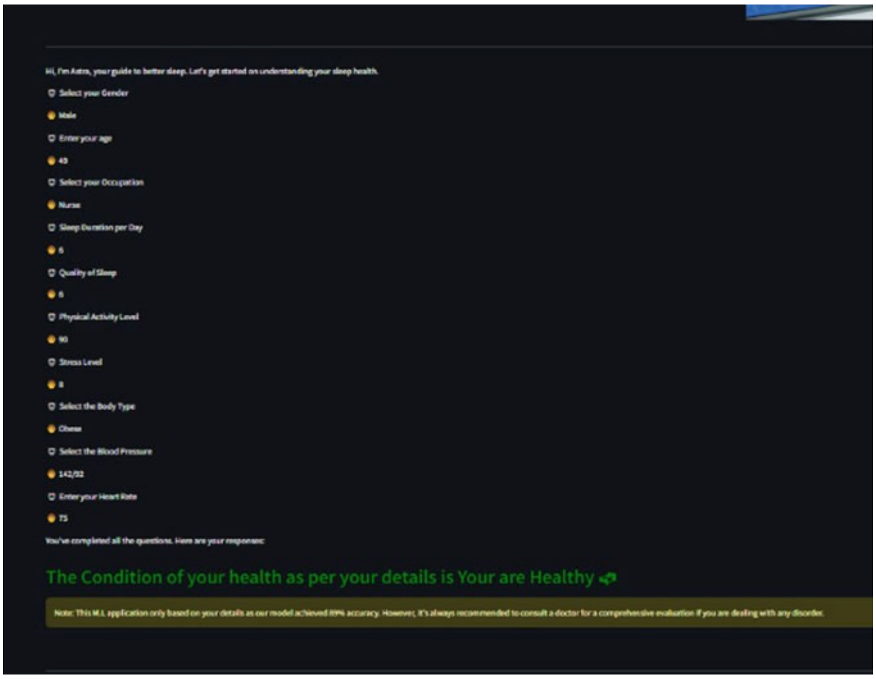

Fig. 6 Healthy report generated by Astra

be considered as final diagnosis. We strongly advice users to consult a doctor for accurate medical advice, as our application serves as a primary screening tool. Our study proves that the view of replacing doctors with AI is false. Instead, we aim to make healthcare processes more efficient and lighten the workload for medical professionals. This project represents our initial move, and we intend to improve our application by integrating it with hardware for better functionality, and improve its accuracy and health advice as we move forward.

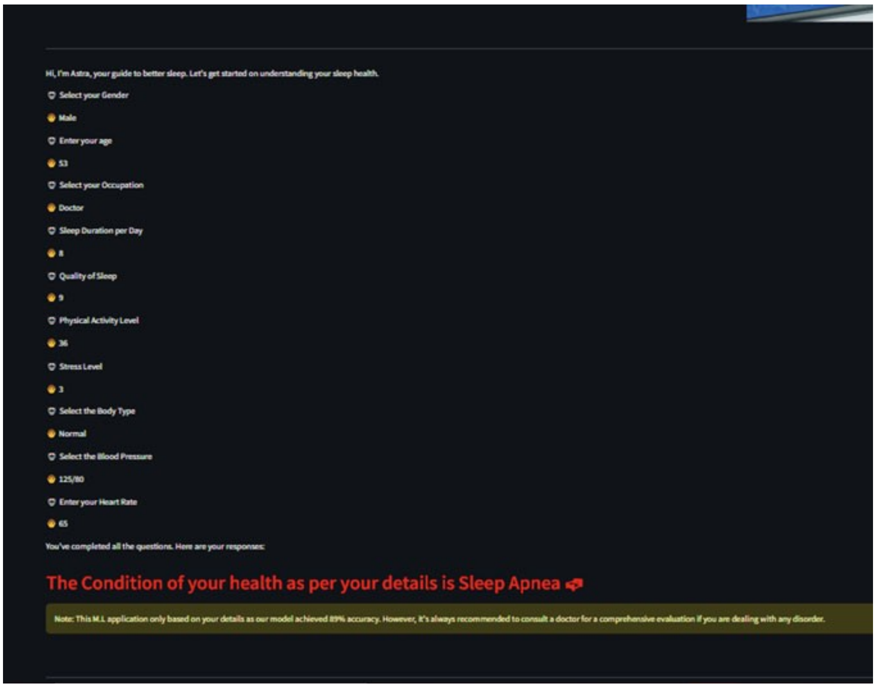

Fig. 7 Sleep apnea report generated by Astra

6 Conclusion

In order to predict sleep disorders accurately, our study indicates the power of various classification algorithms like random forest, XGBoost and naïve bayes. The random forest and XGBoost delivered the better performance with 89.3% accuracy than the other models. As though the naïve bayes slightly behind, it also performed really well by giving the accurate results with the score of 87.6% which are very close to the random forest and XGBoost, and we had selected random forest for our application because the naïve bayes model predicts the outcomes basing on the probabilities. It is not advisable to determine whether a person has a disorder or not based on probabilities. Overall, these findings offer promising prospects for the integration of machine learning in sleep disorder diagnosis and pave the way for improved healthcare outcomes. Our journey through the intricate landscape of sleep disorders, powered by the fusion of cutting-edge machine learning algorithms and comprehensive sleep data, has led us to a pivotal destination. We reflect on the significant strides made and the profound impact these findings hold for the realm of health care. Furthermore, we collected real-world data via a Google Form from a diverse group, enabling predictions based on this authentic dataset. This study reflects significant strides, underscoring the potential impact on health care by merging technology and medicine.

In conclusion, our journey has been one of discovery, innovation, and hope. It highlights the immense potential that arises when technology and healthcare converge.. If unknowing we say that the person had no sleeping disorder and the model may classify him with having disorder, the person has to believe in the machine as it is trained with above 89% accuracy and care must be taken, but we still need to improve our model by taking more features clinical related and increase the accuracy of finding the problem and guide them in a right path. As this is a sample study of machine learning still research is continued for identifying the new features and improves the behavior of the model. As the realm of sleep medicine continues to evolve, this study remains a guiding light, illuminating the path toward more accurate sleep disorder identification, better patient care, and a brighter future for all. As we advance in the understanding and identification of sleep disorders, this journal stands as a cornerstone in the ongoing pursuit of better healthcare solutions and improved sleep disorder identification.

7 Future Work

As we wrap up our study on predicting sleep disorders with machine learning models, we've unlocked new possibilities for more precise and accurate health diagnostics. Let's discuss our next steps in this section at a glance.

7.1 Exploring the Unstructured Data

In our present study, we mainly focused on structured data, but in the future there will be a greater need for real-time data, which we can acquire from the wearable devices like smart watches and sleep trackers, along with unstructured data sources such as text and audio integrating these different data types will allow us to achieve a more comprehensive understanding of sleep disorders.

7.2 Implementation of Deep Learning

As per now we have only applied machine learning techniques. Furtherly by moving forward, we need to focus on implementing deep learning approaches such as convolutional neural network (CNN) architectures and many other approaches, through which we can obtain more promising results than those achieved by traditional machine learning models.

7.3 Collaborating with Doctors

Coming from a machine learning background, we have limited knowledge about data collection for sleep disorders. Therefore, we aim to collaborate with doctors to obtain real-time clinical data and discover new insights through the process.

7.4 Integrating Our Model with Hardware

Our aim is to enhance our application by adding more functionalities and embedding it into hardware devices. We want to implement additional functionalities in our application such as continuous monitoring of a person's sleep health and delivering timely notifications about their sleep status. The device will automatically provide personalized suggestions based on the user's sleep patterns and overall sleep health, promoting individuals sleep wellness.

In simple terms, there's a huge potential for improving sleep disorder predictions with machine learning. By using new technologies, working together across different fields, and by taking ethical considerations, we can make sleep medicine better.

Acknowledgements We would like to express our heartfelt gratitude to **Dr. Kompalli Udayasri,** M.B.A., M.Sc., (IT), MTech. (CSE), M.A. (Astro), Ph.D., Gold Medal, World Book of Records, FSIESRP, for her invaluable guidance and mentorship. Her vast knowledge and unwavering support have illuminated our path throughout this research journey. Additionally, we extend our thanks to our peers and fellow students for their encouragement and collaborative spirit. Their discussions and feedback have enriched our work and inspired us to expand our horizons. We're also grateful for the insightful reviews provided by the reviewers, which have been valuable in refining the quality of our study.

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10.48047/IJIEMR/V12/ISSUE 09/20

Title **A study on Stock Market Price Analysis**

Volume 12, ISSUE 09, Pages: 179-185

Paper Authors **Dr. UdayaSri Kompalli, Sudhir K**

International Journal for Innovative Engineering and Management Research
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A study on Stock Market Price Analysis

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***Abstract*—Machine Learning plays an important role in the society. It is increasing the dependency on the ML techniques to increase the efficiency and accurate decision making on investments. One of the places where the smart decision is to be applied is the Stocks. Stocks are the main instruments of investment in the market which are helpful to the society and also to the individual. There is a saying that "Right Decision at Right Time" will effect the financial position with in no time. If wrong decision is taken this may lead to problems. A simple Calculation of predicting the price fluctuations in the Stock Market is the main smart decision to follow. So, for this situation, in this study we are trying to apply the Machine Learning Techniques for correct guidance in decision Making. As this is related to Time series data, ie., recording the previous day to day transaction and making the machine learn the things and predict for the future dates. . In this paper we propose a Machine Learning (ML) approach that will be trained from the available stocks data and gain intelligence and then uses the acquired knowledge for an accurate prediction. In this context this study uses a machine learning technique called Support Vector Machine (SVM) to predict stock prices.**

Keywords—Time Series, Machine Learning, Stock Market, Prediction, Logistic Regression, Support Vector Machine, XG Boost.

I. INTRODUCTION

Stock Markets play an important role in the society to build the financial status. Prediction of the Stock Market is a challenging task. Due to the fluctuating nature of the stock, the stock market is too difficult to predict. Stock prices are fluctuating every day. Estimating of the stock market has a high demand for investors. The prediction of the stock market is a costliest game play where an individual can get profit or even too much of loss with wrong decision. In this paper we are trying to design a model which will support the investor to take right decision with Machine Learning Algorithms, Machine Learning is a branch of Artificial Intelligence which will make the machine to learn the things by its own on historic data and prepare a model which is able to predict the future basing on the past data. As the stock market plays vital role in building the financial position of the society.

Machine Learning is the field of study that gives computers the capability to learn without being explicitly programmed. ML is one of the most exciting technologies that one would have ever come across. As it is evident from the name, it gives the computer that makes it more similar to humans: The ability to learn.

II. LITERATURE SURVEY

[1] In this paper the author has discussed about the stock market analysis using linear regression and SVM with time series data. The data was taken from the Coca-Cola company and compared the results of the both linear regression and SVM. An overview of all the techniques is discussed in this paper by the author.
[3] In this paper the author have analysed the stock market price using Linear Regression on companies with S&G 500 index. The analysis was taken from real time data and applied VIF , Linear Regression and also R2 and RMSE [2] In this paper the author have implemented different algorithms for measuring the accuracy and found that the logistic regression algorithm is ideal for predicting the market price of a stock based on

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various data points from the historical data. The algorithm will be a great asset for brokers and investors for investing money in the stock market since.

III. PROPOSED METHODOLOGY

Machine learning is actively being used today, perhaps in many more places than one would expect. It is the
learning and building of algorithms that can learn from and make predictions on data sets that are provided to the model to learn There are two branches of machine learning.

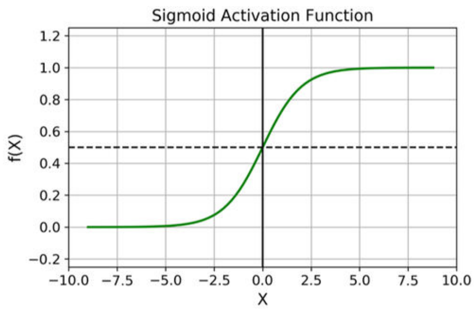
1. Supervised Learning
2. Unsupervised Learning

Supervised machine Learning on a predefined set of training samples, which then facilitate its ability to reach an accurate conclusion when given new data. When the data is divided or classified based on the class manually and let the model learn from the given data which is known. Unsupervised machine learning bunch of data and must find path there in. When the data is unclassified the model itself learns the path and pattern from the given data and predicts the results.

In this paper we are trying to apply three algorithms and evaluate the best model to predict with highest accuracy. We applied three algorithms as Logistic Regression, Support Vector Classifier and XGBClassifier.

Logistic Regression

Logistic Regression is a statistical procedure for predicting the value of a dependent variable from an independent variable when the relationship between the variables can be described with a discrete data. Logistic regression is a fundamental classification technique that belongs to the group of linear classifiers and is similar to polynomial and linear regression. Logistic regression is fast and relatively uncomplicated, to interpret the results. As it's a method for binary classification, it can also be applied to multiclass problems. To implement Logistic Regression one must have an idea about sigmoid curve. Where linear regression is a straight line passing through x and y axis Sigmoid curve shows the data as either 0 or 1. The logistic regression of some dependent variable x on the set of independent variables x = (x_1 , …, x_r), where r is the number of predictors (or inputs), start with the known values of the predictors x_i and the corresponding actual response (or output) y_i for each observation i = 1, …, n.



Logistic regression is a linear classifier, so we use linear function $f(x)=b_0+b_1x_1+\ldots b_nx_n$, also called the logit. The variables $b_0,b_1,\ldots b_n$ are the estimators of the regression coefficients, which are also called the predicted weights or just coefficients. The logistic regression function (**x**) is the sigmoid function of (**x**): (**x**) = 1 / (1 + exp(−f(**x**)). As such, it's often close to either 0 or 1. The function (**x**) is often interpreted as the predicted probability that the output for a given **x** is equal to 1. Therefore, 1 − (x) is the probability that the output is 0. Logistic regression determines the best predicted weights b_0 , b_1 , …, b_r such that the function p(x) is as close as possible to all actual responses y_i, i = 1, …, n, where n is the number of observations. The process of calculating the best weights using available observations is called model raining or fitting. There's one more important relationship between (**x**) and (**x**), which is that log(p(**x**) / (1 − p(**x**))) = f(**x**). This equality explains why (**x**) is the logit. It implies that (**x**) = 0.5 when (**x**) = 0 and that the predicted output is 1 if (**x**) > 0 and 0 otherwise.

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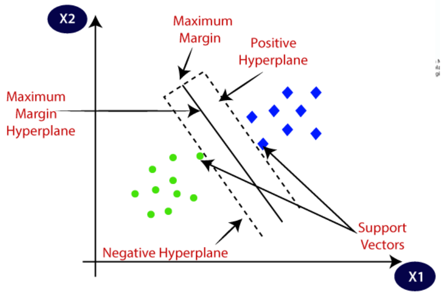
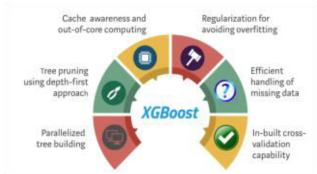
SVM – Support Vector Machine (Classifier)

An SVM maps input (real valued) feature vectors into a higher dimensional feature space through some nonlinear mapping. SVMs are developed on the principle of structural risk minimization [16]. -Structural risk minimization seeks to find a hypothesis (h) for which one can find lowest probability of error whereas the traditional learning techniques for pattern recognition are based on the minimization of the empirical risk, which attempt to optimize the performance of the learning set.



XGBClassifier

The XGBoost or Extreme Gradient Boosting algorithm is a decision tree based machine learning algorithm which uses a process called boosting to help improve performance. regularly produces results that outperform most other algorithms, such as logistic regression, the random forest model and regular decision trees. This is an boosting algorithm which is used for Hyper Parameter Tuning and improve the accuracy.



IV. IMPLEMENTATION

In this paper we used the dataset which is realtime data of Quote-Equity-TATAGLOBAL-EQ-01-08-2021-to-21-08-2023. from https://www.nseindia.com/get-quotes/equity?symbol=TATAGLOBAL. The dataset is having the following structure

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 495 entries, 0 to 494
Data columns (total 14 columns):
 #   Column    Non-Null Count  Dtype
---  ------    --------------  -----
 0   date      495 non-null    object
 1   series    495 non-null    object
 2   open      495 non-null    float64
 3   high      495 non-null    float64
 4   low       495 non-null    float64
 5   prevc     495 non-null    float64
 6   ltp       495 non-null    float64
 7   close     495 non-null    float64
 8   vwap      495 non-null    float64
 9   wh        495 non-null    float64
 10  wl        495 non-null    float64
 11  volume    495 non-null    float64
 12  value     495 non-null    float64
 13  ntraders  495 non-null    float64
dtypes: float64(12), object(2)
memory usage: 54.3+ KB
```

The dataset contains total of 14 features and 495 rows.

The sample data of first 10 records is

```
df = pd.read_csv('stock.csv')
df.head()
```

	date	series	open	high	low	prevc	ltp	close	vwap	wh	wl	volume	value	ntraders
0	2023-08-18	EQ	845.00	848.95	835.50	844.25	843.4	842.55	843.26	883.95	686.6	1145798.0	9.662015e+08	38556.0
1	2023-08-17	EQ	835.00	845.95	835.00	840.70	844.9	844.25	841.71	883.95	686.6	1105325.0	9.303646e+08	51743.0
2	2023-08-16	EQ	840.90	843.45	836.80	844.70	838.0	840.70	840.15	883.95	686.6	360863.0	3.031787e+08	14680.0
3	2023-08-14	EQ	838.85	845.90	829.65	836.90	845.0	844.70	840.85	883.95	686.6	754694.0	6.345808e+08	32827.0
4	2023-08-11	EQ	849.70	853.85	835.00	850.55	835.8	836.90	840.05	883.95	686.6	909080.0	7.636749e+08	31864.0

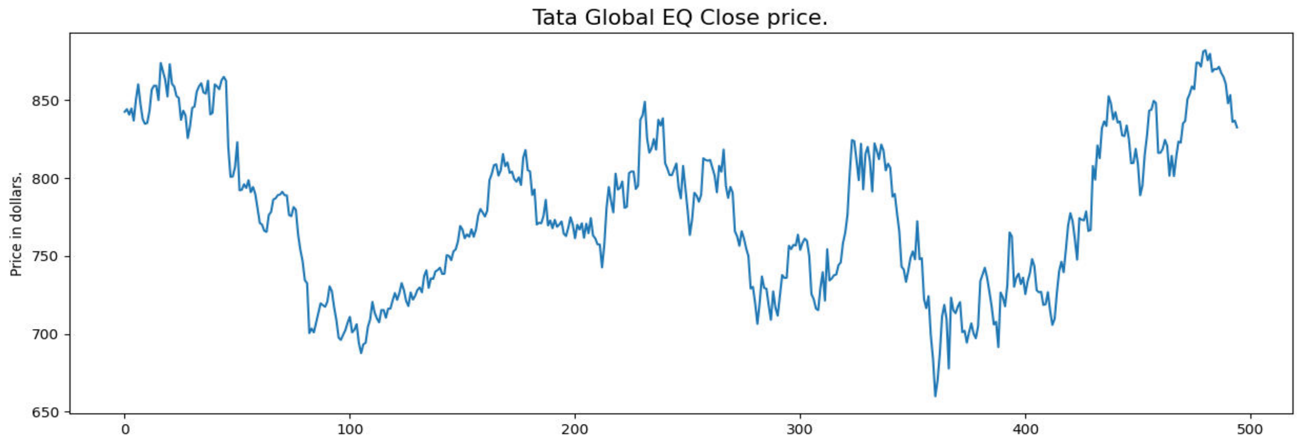
V. RESULTS

After collecting the real time data of TATA Global EQ stock market price. The structure is observed and after the data cleaning process is done on the data set. As the data is realtime data there are no null values. Calculating the summary of the numeric data by using the describe() in python.

```
df.describe()
```

	open	high	low	prevc	ltp	close	vwap	wh	wl	volume	value
count	495.000000	495.000000	495.000000	495.000000	495.000000	495.00000	495.000000	495.000000	495.000000	4.950000e+02	4.950000e+02
mean	778.317273	786.057475	769.150505	777.339596	777.276667	777.33000	777.539616	877.498384	617.134040	1.683535e+06	1.311442e+09
std	50.296256	49.847300	49.742622	49.765291	49.584685	49.75223	49.732458	13.025648	70.426311	1.299805e+06	1.022388e+09
min	659.000000	673.500000	650.200000	659.850000	662.000000	659.85000	661.970000	852.400000	458.950000	1.758370e+05	1.457256e+08
25%	736.000000	743.400000	725.850000	734.850000	734.975000	734.85000	734.695000	861.150000	577.050000	9.811900e+05	7.580008e+08
50%	774.300000	781.950000	765.850000	774.350000	774.250000	774.35000	774.530000	889.000000	650.200000	1.351519e+06	1.074242e+09
75%	815.000000	823.250000	804.125000	814.550000	813.025000	814.55000	814.635000	889.000000	650.200000	1.936892e+06	1.497975e+09
max	885.000000	889.000000	877.600000	882.100000	880.200000	882.10000	881.850000	889.000000	691.750000	1.535813e+07	1.213913e+10

After describing it is observed the data as there are total 495 records. The mean of open is 778.31 and mean of high is 786.05 and so on. Here we need to observe the most important column is the closing price of each day by which we can predict the next opening price and take the decision to where to buy or sell the stocks. This helps in taking right decision. For this we observe graphically what is the impact of closing price on each day.



Next step is to observe the histograms of each column and identify how the market is going on. Open is the opening price , High is the highest price it reached on the day, Low is the lowest price reached on the day,

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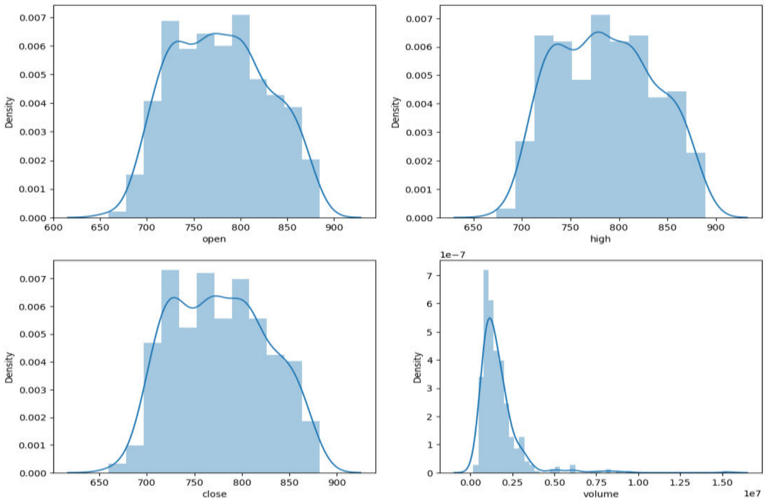
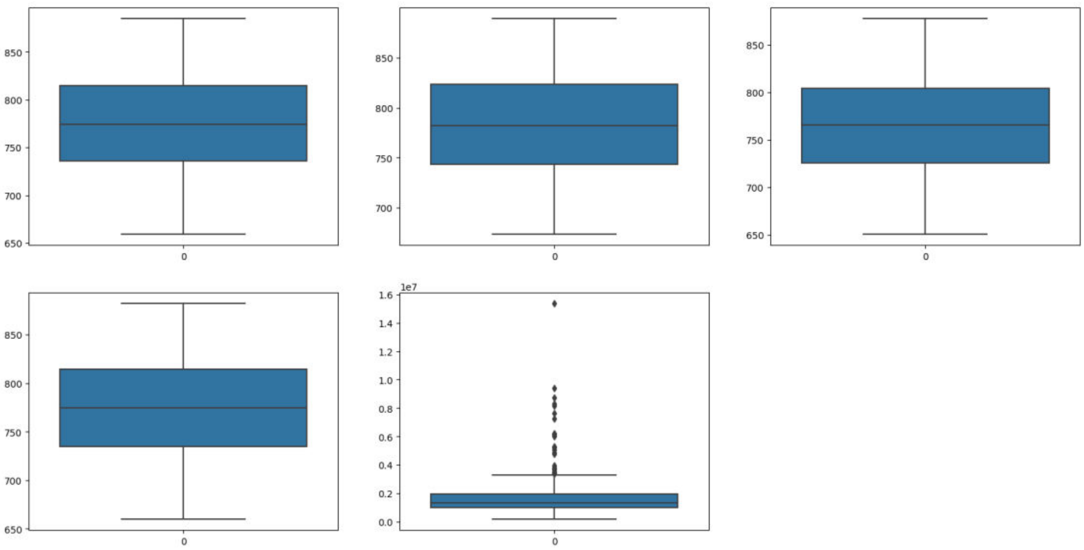
Close is the closing price of the day and volume is the number of investors who invested in the stocks.



Next step is to check the outliers in the data. For this we draw boxplot for each and identify the outliers in the given data



It is observed that only volume data have outliers. The next step is to observe the year wise average fluctuation in the prices.

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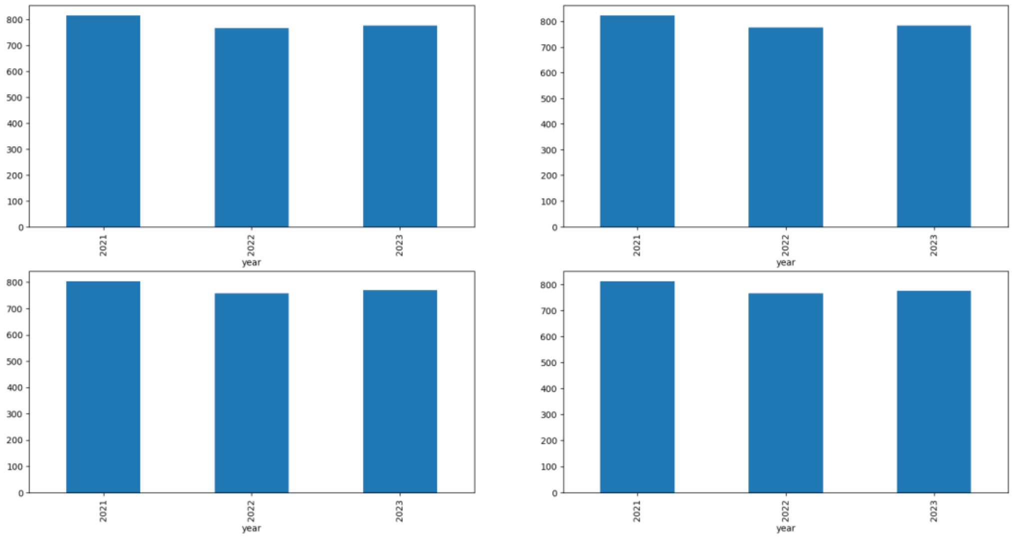
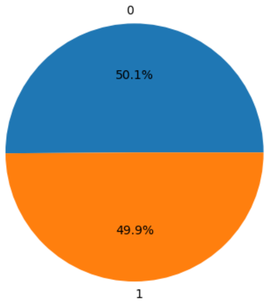


Now basing on this analysis we can now see whether an investor is buying or selling the stocks. How is taking the decision basing on these data



It is observed that 49% chances are to buy and 50% chances are to retain the stocks. Now after applying the training and testing on the collected data and the train_test_split is taken as 70% and 30%. Now apply different Machine Learning algorithms as Logistic Regression, SVClassifier, and XGBoost and test the accuracy of each model.

```
LogisticRegression() :
Training Accuracy :  0.9454387524240466
Validation Accuracy :  0.8782051282051282

SVC(kernel='poly', probability=True) :
Training Accuracy :  0.9432167097608274
Validation Accuracy :  0.8541666666666667

XGBClassifier(base_score=None, booster=None, callbacks=None,
              colsample_bylevel=None, colsample_bynode=None,
              colsample_bytree=None, early_stopping_rounds=None,
              enable_categorical=False, eval_metric=None, feature_types=None,
              gamma=None, gpu_id=None, grow_policy=None, importance_type=None,
              interaction_constraints=None, learning_rate=None, max_bin=None,
              max_cat_threshold=None, max_cat_to_onehot=None,
              max_delta_step=None, max_depth=None, max_leaves=None,
              min_child_weight=None, missing=nan, monotone_constraints=None,
              n_estimators=100, n_jobs=None, num_parallel_tree=None,
              predictor=None, random_state=None, ...) :
Training Accuracy :  0.9999595992243051
Validation Accuracy :  0.8429487179487178
```

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After implementing the models the

Model	Training Accuracy	Validation Accuracy
Logistic Regression	0.94	0.87
SVClassifier	0.94	0.85
XGBoost	0.99	0.84

VI. CONCLUSION

In this paper we have implemented only the fundamental idea to predict the Stock market price on real time data. It is observed that the accuracy is being increased when the boosting algorithms are applied. By identifying and tuning the Hyper Parameters it is observed that the accuracy may be increased which helps in right Decision at Right Time. This is the most useful to take smart decision while investing in stocks. As the study of the market is changing from time to time with in seconds a keen observation is required on the process, This analysis may help the investor to take decision.

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SECURITY CHALLENGES AND MEASURES OF IoT DEVICES AND ITS NETWORKS

By

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Date Received: 11/01/2023   Date Revised: 04/04/2023   Date Accepted: 17/04/2023

ABSTRACT

The Internet of Things (IoT) illustrates physical objects with sensors, processing capabilities, software, and other technologies that attach and swap data with other devices and systems over the Internet or other communication networks. The use of IoT devices is widespread across all domains. In this article, various types of attacks on IoT devices by intruders or hackers to gain access to IoT devices were discussed. In addition, various measures have been formulated to minimize attacks on IoT Devices. In-depth analysis of the likelihood of security threats and various possibilities to minimize security threat hacking were analyzed in detail, and possible measures are stated to overcome security threats.

Keywords: Security, Threat, Protocol, Attacks, Fuzzy Logic, Network.

INTRODUCTION

The movement of IoT is significant in the present era and is part of the Internet. The IoT has a global network infrastructure with an identity for every object that is physically connected to the Internet and can communicate with other devices on the Internet. There are a few devices such as computers, cell phones, tabs, and washing machines. The IoT is a vast network of interconnected "things." The device contains a microchip that connects all devices. These microchips track the environment and report this information to both networks and humans (Husamuddin & Qayyum, 2017).

There are a few devices, such as computers, cell phones, tabs, and washing machines. IoT is a large network of interconnected devices, and its devices contain microchips that interconnect all devices. These microchips track the surroundings and report the same in the network, as well as in humans. The best part of IoT is that each and every physical entity can be communicated and accessible through the Internet (Husamuddin & Qayyum, 2017). As a result of the low-cost Internet, a large number of devices are connected to the Internet. According to a research company, there were 4.48 billion devices connected to the Internet, and the growth in 2016 was expected to be 30%. By 2020, it is expected to reach 50 billion. These devices provide a surface for attackers (Husamuddin & Qayyum, 2017).

1. Features of IoT

Vignesh and Samydurai (2017) illustrated some important IoT features from four aspects: description, threat, challenges, opportunities, and solutions, as depicted in Figure 1.

- *Description:* This describes the vulnerabilities in IoT security across networks or in the cloud and describes the distinct security measures to safeguard the resources (Zhou et al., 2018).
- *Threat:* It discusses the latent threats and vulnerabilities of IoT devices as well as the major consequences of these threats (Siddiqui et al., 2020).
- *Challenges:* It outlines the possible difficulties in accessing IoT devices and addresses the threats to

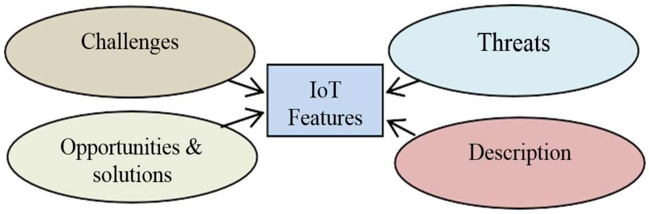

Figure 1. Features of IoT

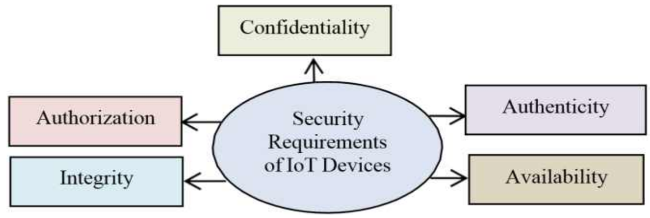

Figure 2. Security Requirements of IoT Devices

be solved (Siddiqui et al., 2020).

- *Opportunities & Solutions:* This paper outlines the current security problems and strategies for solving them in IoT devices and also highlight its shortcomings. In addition, we present a few new security approaches and concepts as opportunities to address the difficulties and risks in IoT devices (Zhou et al., 2018)..

2. Security Requirements of IoT Devices

IoT links private, commercial, industrial, and public- sector together so that information can be sorted and processed, stored (Assiri & Almagwashi, 2018). The security related issues for IoT devices are the main security requirements of IoT are discussed in various aspects. The requirements of security IoT devices are shown in Figure 2 and summarized as follows.

- *Confidentiality:* Most sensitive information of IoT devices can be protected from hacker or intruders across the network (Suo et al., 2012).
- *Authorization:* IoT devices across the network can be accessed by the user who right access privileges.
- *Authenticity:* Only legal users are allowed to access most sensitive information of IoT devices connected to network (Huang et al., 2016).
- *Integrity:* Maintaining accuracy of data and completeness and secure it from unauthorized user (Nguyen et al., 2015).
- *Availability:* To keep away from all operational breakdowns or interruptions and the auto recovery must be provided even in case of failures.

3. Types of Attacks in IoT

IoT attacks occur when intruders or hackers try to compromise the security of an Internet of Things (IoT) device or network. When devices are compromised, attackers can steal or modify sensitive data (Li & Xin, 2013). Table 1 explains the types of possible attacks and their percentages of vulnerability to IoT devices. Figure 3 shows the types of attacks in the IoT, which are summarized as follows.

- *Protocol Based Attacks:* These types of attacks utilize the internal protocol-based structure of the IoT components that crash the communication medium

Sl.No.	Types of Attacks Possible on IoT Devices	Percentage of Vulnerability of IoT Devices
1	Protocol Based Attacks	7
2	Attacks on Communication Protocol	3
3	Network Protocol Based Attacks	12
4	Data Based Attacks	10
5	Denial of Service/Distributed Denial of Service Attack	17
6	Traffic Sniffing Attacks	23
7	Masquerade	6
8	Message Replay Attack	3
9	Port Scanning	19
Vulnerability before the implementation of Proposed Security Measures		100

Table 1. Types of possible Attacks on IoT Devices

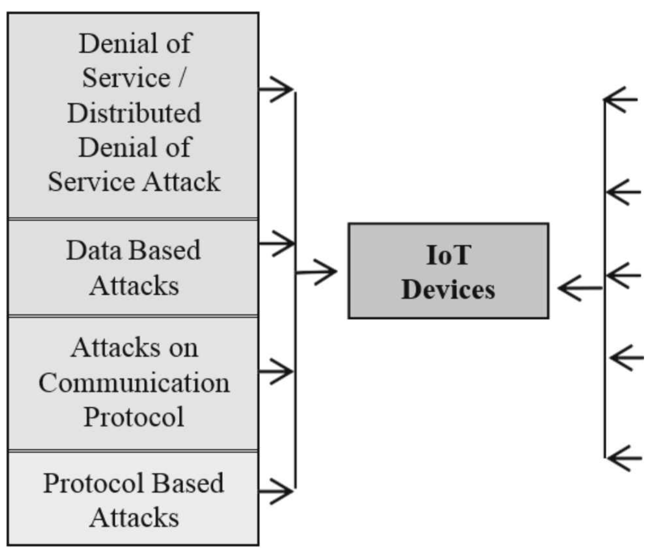

Figure 3. Possible IoT Attacks

and the forwarding channels of the embedded system.

- *Attacks on Communication Protocol:* This explains various forms of exploitation occurring during the transient phases among nodes. These include flooding, asymmetric key, and sniffing attacks.
- *Network-Protocol-Based Attacks:* This begins the exploitation occurring in the connection establishment. Attacks include wormhole, selective forward, and sniffing attacks.
- *Data-Based Attacks:* Data-based attacks contain threats pertaining to Master Data Packets and Messages Travelling at Node Sites. Hash Collision, DoS, Malicious Node VM Creation, and Data Exposure are among the most afflicted security exploitations.
- *Denial of Service/Distributed Denial of Service Attack:* In terms of IoT, DDoS is well known because it affects the network's availability security parameters. Botnets are created to implement a DDoS attack that targets sensor nodes or weakly configured nodes in a physical environment. Acquiring access from these weak points, infected packets from various sources traverse network data paths that finally congest the entire link architecture and render servers unavailable in the process. It is highly dangerous in energy transmission sectors, military communication, emergency operations, and the worst affected are healthcare facilities (Vasilomanolakis et al., 2015).
- *Traffic Sniffing Attacks:* Traffic sniffing attacks come under the threat of active data gathering, in which critical system information is captured and later utilized for attacks such as botnet attacks. Information assets such as usernames, passwords, unencrypted data information, authentication type, and hardware details are scrutinized with the assistance of advanced tools during such a penetration attack. Most IoT devices currently in the market are not sufficiently intelligent to mitigate such threats and easily become targets of such threats.
- *Masquerade:* Masquerade attack uses a fake network ID to gain unauthorized access to target node information via a legitimate access identification process. Devices with weak authorization processes are at high risk of vulnerability. Such attacks utilize stolen passwords and user credentials by locating logical spaces within programs or finding alternatives to the existing authentication process. The access levels through masquerade attacks depend on the level of authorization that the penetrator attains.
- *Message Replay Attack:* A replay attack can be organized in three steps: eavesdropping on the secure communication link between IoT devices or Gateway, Interception of the acknowledgments or connection establishment components, and fraudulent misdirection or delays through the replay of the message. This affects the normal working of the devices in the network, making them implement functions that they are not supposed to, or the result is directed in the way an attacker wants them to. It is easier to implement because, after packet seizing, further steps do not require advanced skills for message decryption because the entire message can be replayed to gain access to the server.
- *Port Scanning:* Port scanning has components such as SYN requests, target ports, sources, firewalls, packets, open nodes, and listening nodes. The commonly used method is SYN scans, which involves establishing a partial connection to the host node present on the target port by transmitting an SYN packet for the initial response evaluation of the host system.

4. Proposed Work

The proposed security methods using Arduino and Raspberry Pi safeguard IoT devices from various security attacks. Figure 5 shows the procedure to safeguard IoT devices, such as Arduino and Raspberry Pi, from various security attacks.

- *Confidentiality with Data Encryption:* Store data in cloud or server by encrypting it with standard encryption algorithms.
- *Use Fuzzy Logic Algorithms when formulating the*

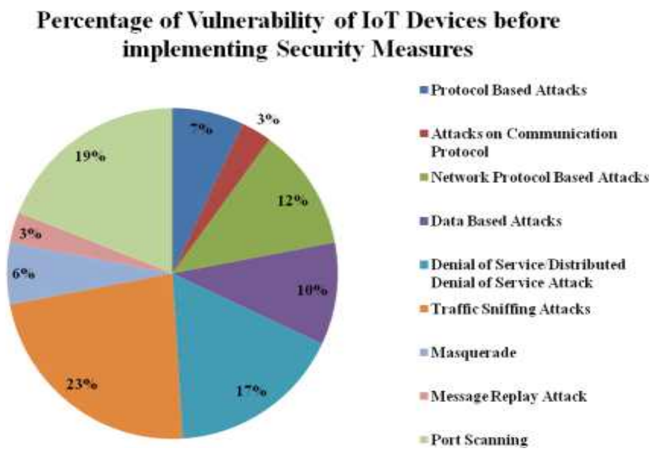

Figure 4. Likelihood of Vulnerability before Executing Security Measures

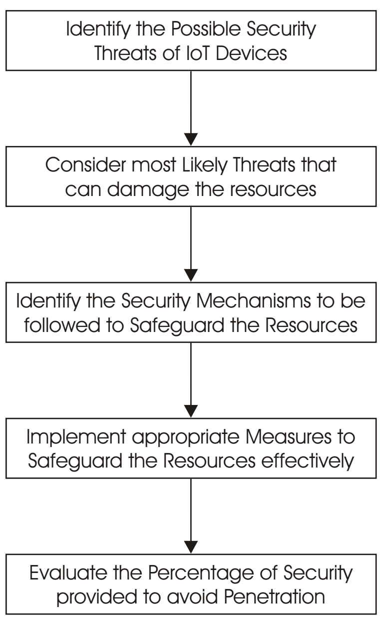

Figure 5. Procedure to Safeguard IoT Devices From Security Attacks

Solution: Fuzzy Logic is the most valued logic. The user formulates multiple solutions for each problem statement. When a malicious user attempts to access the existing solution, another solution is deployed to solve the problem.

- *Multilevel Data Encryption:* Most sensitive data can be encrypted using multiple encryption algorithms at multiple levels.
- *Include Vulnerability Scanner:* Antivirus software should be installed to secure sensitive data of IoT devices.
- *Swapping Default Passwords:* The primary step in improving IoT security is through a reasonable approach. It is suggested that businesses implement procedures that allow for changes in default passwords. This action should be implemented for every IoT device in the network.

Algorithm

Step 1: Start

Step 2: Identify possible security threats to IoT devices.

Step 3: Consider the most likely threats that can damage resources.

Step 4: Identify the security mechanisms to be followed to safeguard resources.

Step 5: Implementing appropriate measures to effectively safeguard resources.

Step 6: Evaluate the percentage of security provided to avoid penetration.

Step7: Stop

5. Results and Analysis

After implementing all the aforementioned security mechanisms, the security of IoT devices across the network was enhanced to 70 %. Still, 30% of the security is left, and this situation may be taken over by the hacker or intruder to access. Figure 6 shows the percentage of vulnerabilities of IoT devices after implementing security measures.

Conclusion and Future Work

Several security measures have been implemented using

Sl.No.	Types of Attacks Possible on IoT Devices	Percentage of Vulnerability of IoT Devices
1	Protocol Based Attacks	7
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8	Message Replay Attack	3
9	Port Scanning	19
Vulnerability after the implementation of Proposed Security Measures		100

Table 2. Vulnerability of IoT Devices after implementing Security Measures

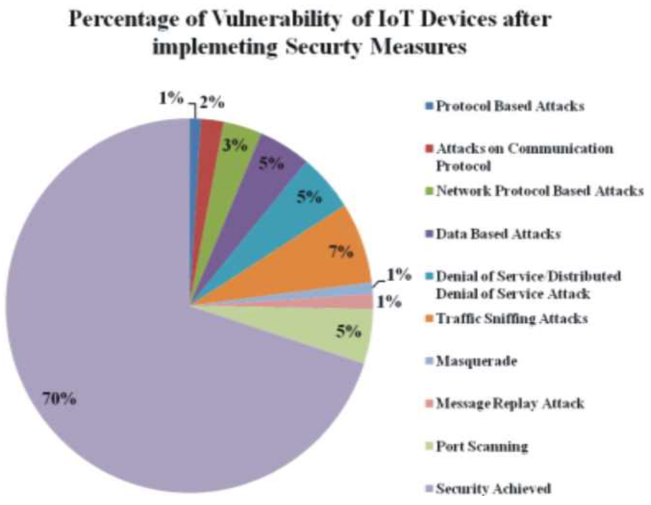

Figure 6. Likelihood of Vulnerability after Executing Security Measures

security protocols or firewalls that can protect IoT devices from vulnerability. The proposed security methods using Arduino and Raspberry Pi safeguard IoT devices from various security attacks. As IoT device usage has increased, privacy and security challenges will affect their usage. To protect the security and integrity of IoT devices, several new security measures, protocols, and firewalls must be developed and deployed effectively to challenge unauthorized access. An in-depth analysis of the likelihood of security threats and various possibilities to minimize security threat hacking were analyzed in detail, and the possible measures were stated to overcome security threats.

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RESEARCH PAPER

SECURITY THREATS AND MEASURES TO OVERCOME IN SUPERIOR CLOUD

By

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Date Received: 11/01/2023 Date Revised: 04/04/2023 Date Accepted: 17/04/2023

ABSTRACT

Cloud computing is among the most widely used technologies due to its ability to reduce costs, reliability and fast access with increasing flexibility and scalability for computer processes. In recent years, cloud computing has grown rapidly in the IT industry, and IT organizations have expressed concerns regarding security issues with cloud computing. Cloud Computing has some level of risks because essential services are frequently outsourced to a third party, and as third party handles the data stored in the cloud it is harder to maintain data security and confidentiality. This paper provides an overview of security issues or menaces in the cloud and proposes some measures to address them.

Keywords: Cloud Computing, Security, Threats, Confidentiality.

INTRODUCTION

The provision of computing services such as servers, storage, databases, networking and software are through the cloud, and cloud computing is a network for storage and sharing resources. Cloud computing is a network for storage and sharing resources. In cloud, one can pay only for cloud services they use thus helping lower the operating costs, and in turn organizations run effectively. In cloud environments, several kinds of virtual machines are hosted on the same physical server as infrastructure.

Most IT organizations fear that risks of external data storage, reliance on the public internet, lack of control, multi- tenancy, and integration with internal security are all sources of concern. Compared to outdated technologies, the cloud has many specific features, such as its large scale and resources in cloud are completely distributed, and completely visualized. Security mechanisms such as proper authentication, confidentiality for personal information and prevention of data loss are essential in cloud computing.

Virtualization

Cloud computing uses the concept of virtualization, in which multiple virtual machines can share a single physical computer and run various applications and operating systems.

Renting out individual physical resources to each customer results in overhead costs for cloud service providers. Virtualization can be a beneficial strategy for effectively utilizing cloud resources. Figure 1 shows the hypercycle of cloud security in 2020.

Types of Cloud Environments: Public, Private, Hybrid and Community clouds.

Public Cloud: A public cloud is a standard model in which providers make several resources, such as applications and storage, available to the public. Public cloud services may be free or not.

Private Cloud: Resources for cloud computing that are used exclusively by a single company or organization are referred to as private cloud. A private cloud can be physically located in the business's on-site data center, or some businesses may choose to make payments to third-

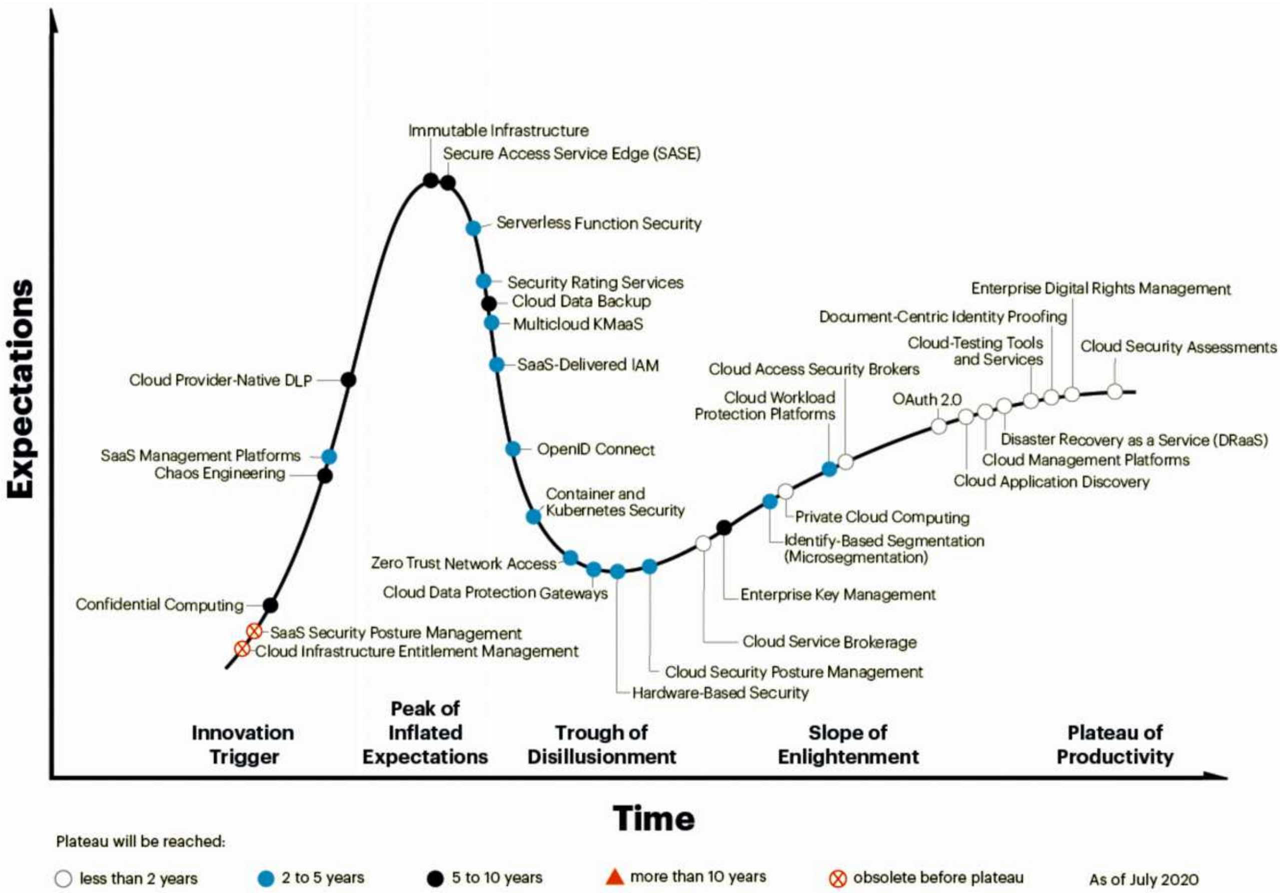

Figure 1. Hyper Cycle for Cloud Security, 2020

party service providers to host their private cloud. Services and infrastructure are maintained in a private network in a private cloud (Alouffi et al., 2021).

Hybrid Cloud: A hybrid cloud is a combination of both public and private clouds that allows for internal control of certain resources while also providing some resources for public use.

Community Cloud: Cloud infrastructure is shared among organizations that have similar concerns, such as missions, security requirements, and policies. It may be owned by multiple organizations and can exist on premises or off-premises.

1. Types of Cloud Services

Cloud services can generally be classified into three main categories: Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS).

1.1 Infrastructure as a Service (IaaS)

IaaS is the most basic category of cloud computing services. With pay-as-you-go pricing, the IT infrastructure can be rented from a cloud provider, such as servers, Virtual Machines (VMs), storage, networks, and operating systems.

1.2 Platform as a Service (PaaS)

Platform as a Service (PaaS) is a type of cloud computing service that provides an environment for developing, testing, delivering, or managing software applications. PaaS is designed to simplify the process of creating websites or mobile apps, as developers do not need to worry about setting up or managing the underlying infrastructure of servers, storage, networks, and databases required for development.

1.3 Software as a Service (SaaS)

Software as a Service (SaaS) is a method of delivering software applications over the Internet on demand, where users only pay for the software they use. In SaaS, cloud providers host, manage, and maintain both software applications and the underlying infrastructure. This includes performing any necessary maintenance such as software updates and security patches. Users access the application via the Internet, typically through a web browser on a smartphone, tablet, or a personal computer (Alouffi et al. 2021).

Security is the responsibility of cloud providers in the SaaS model. This is because SaaS relies on a high level of integrated functionality with limited customer control or extensibility, which contributes to the cloud provider's security responsibility. By contrast, the PaaS model provides greater customer control and extensibility (Hashizume et al., 2013).

2. Issues in Service Models

2.1 Software as a Service Security Issues (SaaS)

The distribution model of Software-as-a-Service (SaaS) involves hosting applications by a vendor or service provider, which are then accessed by customers over a network, typically the internet. This delivery model has become increasingly prevalent due to the maturation of underlying technologies that support web services and service-oriented architecture (SOA) and the popularity of new developmental approaches. SaaS is also commonly associated with the pay-as-you-go subscription licensing model. To be effective, SaaS applications must be able to interact with other data and applications in a wide variety of environments and platforms. SaaS is closely related to other service delivery models, and its primary implementation involves offering business software functionality to enterprise customers at a low cost while providing the same benefits as commercially licensed, internally operated software without the complexities of installation, management, support, licensing, and high initial cost (Satyanarayana, 2012). Table 1 lists the types of possible attacks on SaaS.

2.2 Platform-as-a-Service Security Issues (PaaS)

In a PaaS environment, data must be accessed, modified, and stored. This means that the data will require decryption and re-encryption, thus introducing key management issues. Encryption challenges are far from the only security issues with PaaS. Table 2 lists the types of possible attacks on PaaS.

2.3 Infrastructure-as-a-Service (IaaS) Security Issues

IaaS provides a pool of resources, such as servers, storage, networks, and other computing resources, in the form of virtualized systems that are accessed through the Internet (Almorsy et al., 2016). Users are entitled to run any software with full control and management of resources allocated to them. If the virtual machine monitor is free of any security flaws, IaaS cloud users enjoy greater control over security than other cloud models. They are responsible for configuring the security policies correctly and controlling the software running on their virtual machines. Table 3 depicts the types of possible attacks on IaaS.

3. Common Security Threats in Cloud Computing

The cloud computing market is an industry that provides cloud-based services to businesses and individuals. This includes Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) offerings, as well as related technologies and products, such as cloud storage, cloud security, and cloud-based analytics. The market is highly competitive, with major players such as Amazon Web Services (AWS), Microsoft

Threats	Description
Data Access Risk	Data access issue is mainly related to security policies provided to the users while accessing the data. Some of the employees are not given access to certain amount of data.
Identity Theft	Identity theft is the act of a person obtaining information illegally about someone else. They try to find such information as full name, maiden name, address, date of birth, social security number, passwords, phone number, e-mail, and credit card numbers.
Network Security	All data flow over the network needs to be secured in order to prevent leakage of sensitive information. This involves the use of strong network traffic encryption techniques such as SSL and TLS for security.
SQL Injection	An unauthorized user tries to access the confidential data in the database by injecting malicious code in to a standard SQL code. This can be reduced by using automatic generated SQL code. And does not allow unauthorized users to enter the database to access the private data.
Phishing Attacks	Phishing refers to an attempt to steal sensitive information, typically in the form of usernames, passwords, credit card numbers, bank account information or other important data in order to utilize or sell the stolen information.

Table 1. Types of Possible Attacks in SaaS

Threats	Description
Third-party Relationships	If a third party fails to maintain the proper coverage and an uncovered event or situation occurs, your organization may face additional risk.
Malicious Code Injection	Any code in any part of a software system or script that is intended to cause undesired effects, security breaches or damage to a system. Malicious code is an application security threat that cannot be efficiently controlled by conventional antivirus software alone.
Insecure permissions on Cloud Data	Giving permissions to the unauthenticated & unauthorized users may compromise the data security.

Table 2. Types of Possible Attacks in PaaS

Threats	Description
Data Leaks	Data in the cloud is exposed to the same threats while it is being transferred, stored, audited or processed.
Account Hijacking	Account of User or an Organization is hijacked by Hacker/Attacker gains access to a user's credential. Then the hacker has full authority to perform Unauthorized Activities.
Vulnerabilities in Virtual Machine	Possible covert channels in the colocation of VMs, Unrestricted allocation and de allocation of resources with VMs.
Denial of Service Attack	It is a type of attack that tries to make awebsiteor network resource unavailable.

Table 3. Types of Possible IaaS

Azure, Google Cloud Platform, and IBM Cloud vying for market share. The cloud computing market has grown rapidly in recent years as more businesses and organizations have shifted their IT infrastructure and applications to the cloud for greater scalability, flexibility, and cost-effectiveness. Figure 2 shows the global cloud computing market.

Hijacking of Accounts: One of the most rapidly developing forms of cyber-attacks aimed at deceiving end users is account or service hijacking, which is a type of identity theft.

Malware Injection: An attacker tries to inject a malicious service or virtual machine into the cloud in a cloud malware injection attack. In this type of attack, the attacker attempts to incorporate its own malicious service implementation module (SaaS or PaaS) or virtual machine instance (IaaS) into a cloud system. The attacker must take action to make the new service implementation

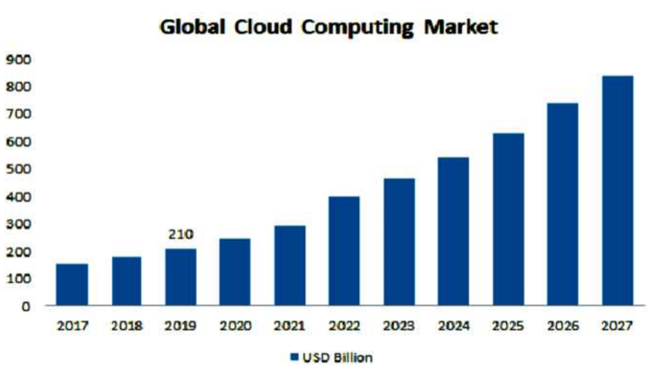

Figure 2. Global Cloud Computing Market

instance one of the valid instances and a valid service for the cloud system. The Cloud automatically sends valid user requests to the malicious service implementation when the attacker is successful and the attacker code begins to run (Priyanka et al., 2019).

Denial of Service Attacks (DoS): This type of attack attempts to stop this website or network resource from working. The attacker sends a large number of packets to the host within a short amount of time, which requires additional processing. This causes the targeted device to waste time waiting for a response that never comes. The target is kept busy dealing with malicious packets that do not respond to routine incoming requests, leaving the legitimate user with denied service.

Data Breach: Data breaches have become a norm over the last few years. A cyber security attack or stealing of data in any other form or usage of data by unauthorized individual's amount to the data breach.

Man in the Middle Attack: A Man-In-The-Middle attack (MITM) is an intrusion in which the intruder relays remotely or probably changes messages between two entities that think they communicate directly with each other. The intruder utilizes network packet sniffer, filtering, and transmission protocols to gain access to network traffic. MITM attack exploits the real-time processing of transactions, conversations, or transfer of other data. It can be reduced using packet filtering by firewall, secure encryption, and origin authentication techniques.

Side Channel Attacks: An attacker attempts to place a malicious virtual machine on the same host as the target virtual machine. Using side channel attack, allows hackers to decode cipher text and calculate cryptography keys. Using secure firewall system can avoid this.

Malicious Insider: A Malicious insider is the person who is part of the organization and intentionally misuse the confidential data for financial gain and thus affect the integrity. Strict privilege planning and security auditing can minimize this security risk that originates from within an organization.

Insecure API: Poorly designed UIs and APIs can provide a leisurely walk through to hackers and give access to sensitive data, thereby resulting in severe financial, reputational, and business losses.

4. Proposed Work

4.1 Measures for Major Threats in Cloud Computing

Several measures can be taken to address the major threats in cloud computing, such as implementing strong authentication mechanisms, regularly updating security protocols and software, using encryption and data backup strategies, monitoring network traffic for anomalies, and educating users on security best practices. Additionally, businesses can choose cloud providers with strong security policies, track records, and perform regular security audits to identify and address potential vulnerabilities.

4.1.1 Up-to-date Intrusion Detection System

To ensure cloud security, it is crucial for the system to detect unusual network traffic and issue early warnings based on both behavioral and credential factors. This can be achieved by setting up a cloud security breach alert system. In the case of an attack, the system can prevent further damage by blocking IP addresses that are identified as the source of the attack. The measures to be handled include selecting a proper and reliable Cloud Provider and patching and updating software as soon as options are available.

4.1.2 Install Proper Encryption System to Ensure the Data Security

Encryption is used to protect the data at rest and during transit. Before the data are transferred to cloud storage, they are encrypted or transformed using cloud encryption. Mathematical algorithms are used to transform data that can conceal them from unauthorized and malicious users.

It is essential to monitor the user behavior with access to the cloud. Organizations should control the encryption process and keys, segregate duties, and minimize access to users. The main measure was to implement proper password management practices. Table 4 shows the reduction in vulnerability after the implementation of the security methods.

4.1.3 Restrict Access to Cloud Services to Authorized Users

Multi-factor authentication systems such as smart cards, OTP, and phone authentication are required for users and operators of a cloud service because such systems make it harder for attackers to log in with stolen passwords, while it is difficult to prevent an attacker from intercepting your connection if they have access to the network, and you can ensure that your communication is strongly encrypted. A password manager should avoid auto-filling passwords on sites. Figure 3 shows the possibility of threats after implementing security measures.

4.1.4 Using the First-Class APIs is the Solution

Conduct regular audits and keep an eye out for unusual activity. Secure the API endpoint with adequate protection.

Conclusion and Future Work

Cloud computing has become a norm for businesses and people in society. Its growth has been observed mainly in the past decade and will continue to evolve. With rapid growth in the cloud computing era, the security

Threats	Impact (High -2, Low -1)	Risk Percentage before Measures	Risk Percentage after Measures
Malicious Insider	2	65	20
Data Leaks	2	36	11
Denial of Service	1	15	5
Vulnerability in Hypervisor	2	25	8
Insecure	2	28	8
Account Hijacking	2	57	17
SQL Injection	2	34	10
Identity	2	70	21

Table 4. Reduction in Vulnerability after Implementing Securing Methods

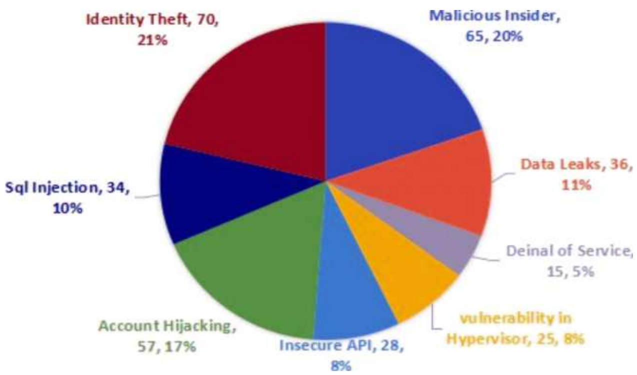

Figure 3. Possibility of Threat after implementing Security Measures

of private data is also essential and should be properly authenticated.

This study surveyed the key security issues of Cloud Computing today and the challenges and opportunities that it brings to the business community. Data security and privacy protection issues associated with cloud computing at all stages of the data life cycle were the subjects of this study's analysis of the exact cloud computing-related issues.

In this paper, we discuss various threats in cloud computing, and some measures are proposed to reduce the risks in cloud computing. The cloud still has much to improve on with security and ease of integration, but cloud computing will continue to grow and advance the ability to share and store data in the technological world.

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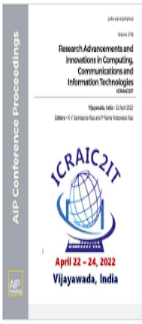
Volume 2796, Issue 1
14 July 2023



RESEARCH ADVANCEMENTS AND INNOVATIONS IN COMPUTING, COMMUNICATIONS AND INFORMATION TECHNOLOGIES: ICRAIC2IT
22 April 2022
Vijayawada, India

RESEARCH ARTICLE | JULY 14 2023

Wireless ad-hoc network routing protocols classification and comparison

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AIP Conf. Proc. 2796, 150001 (2023)
https://doi.org/10.1063/5.0148905

Share Tools

A **wireless ad hoc network** (**WANET**) or **mobile ad hoc network** (**MANET**) is a decentralized wireless network. The network is ad hoc because it does not dependent on a pre-existing infrastructure, such as routers in wired networks or access points in wireless networks. Nodes forwarded data information is made dynamically based on network connectivity and the routing algorithm in use. In the Windows operating system, ad hoc is a communication settingthat allows computers to directly communicate with each system without a router. In mobile ad hoc networks nodes are free to move because they are dynamic. MANET nodes are free to move randomly

RESEARCH ARTICLE OPEN ACCESS

Hierarchical Clustering and Dendrogram Visualization

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ABSTRACT

This paper represents a comprehensive study on data clustering analysis applied to live cosmetic product data obtained from the e-commerce platform Flipkart. The objective of this research is to uncover hidden patterns and groupings within the cosmetic product data, enabling insights for both consumers and businesses. The primary focus is on the generation of dendrogram diagrams that aid in visually understanding the inherent structure and relationships within the cosmetic product dataset.

Keywords: -Hierarchical clustering, Dendrogram, E-commerce

I. INTRODUCTION

Data mining involves the exploration and analysis of large and complex datasets to unearth valuable information that might not be immediately apparent. It draws upon various disciplines such as statistics, machine learning, and database management to uncover patterns, correlations and trends. By leveraging data mining techniques, organizations can gain a deeper understanding of their data, make predictions, and extract actionable insights. Data mining involves collecting raw data, preprocess the data for suitability for analysis, summarize and visualize data, discover hidden patterns, relationships and structures within the data, predict future trends, classify their attributes, group similar data points into clusters, items are discovered to uncover associations and dependencies.

A. S*upervised Learning*:

In supervised learning, the algorithm is trained on a labeled dataset, where the input data is paired with corresponding output labels. Supervised learning needs supervision to train the model, which is similar to as a student learns things in the presence of a teacher. Supervised learning can be used for two types of problems i.e. Classification and Regression.

B. Unsupervised Learning:

Unsupervised learning is another machine learning method in which patterns inferred from the unlabeled input data. The goal of unsupervised learning is to find the structure and patterns from the input data. Unsupervised learning does not need any supervision. Instead, it finds patterns from the data by its own. Unsupervised learning can be used for two types of problems: Clustering and Association.

Clustering:

Clustering is an unsupervised learning method, meaning it doesn’t require pre-labeled data. It deals with the unlabeled data.

Clustering is a specific technique in data mining that focuses on grouping similar data points based on their similarities. The goal is to partition the data into subsets or clusters, where data points with in the same cluster are more similar to each other than to those in other clusters.

Agglomerative clustering:

Agglomerative clustering is a hierarchical clustering technique used in data analysis and machine learning. It is a bottom-up approach to clustering, where individual data points start as their own clusters and are progressively merged together to form larger clusters. This process continues until all all-data points belong to a single cluster

The exponential growth of online retail platforms like Flipkart has led to an enormous influx of data related to products, customer behavior and preferences. In this study, we harness the power of hierarchical clustering to uncover meaningful patterns with in the live cosmetic product data available on Flipkart. The utilization of dendrogram diagrams enhances our ability to comprehend the hierarchical relationships among cosmetic products.

II. METHODOLOGY

Initialization:

Begin by treating each data point as a single cluster, So, if you have ‘n’ data points, you start with ‘n’ clusters, each containing a single data point.

Calculate Pairwise Distances:

Compute the pairwise distances or similarities between all clusters by calculating Euclidean distance.

Merge Closest Clusters:

Based on the distance calculated in the above method merge them into a single cluster, reducing the total number of clusters by one.

Update Distance Matrix:

Recalculate the distances between the newly formed cluster and the remaining clusters. To do this compute the distance between the new cluster and all other clusters using linkage criteria. Repeat the above steps to merging the closest clusters and updating the distance matrix until you have a single cluster that contains all data points. This forms a hierarchical structure represented as a dendrogram.

Dendrogram Construction:

The Dendrogram is a tree like diagram that illustrates the hierarchy of cluster merging. The vertical axis in the dendrogram represents the distances at which cluster were merged. The horizontal axis represents the clusters or data points.

III. IMPLEMENTATION

Data Collection:

We obtained live cosmetic product data from Flipkart through web scraping techniques. To do web scrapping we wrote a code in python to collect data attribute wise. We collect 2pages of data and it will be stored as a .csv file. We collect relevant attributes such as Product name, type, Brand, Original price, discount price, Rating. The following figure shows the .csv file in Microsoft excel format.

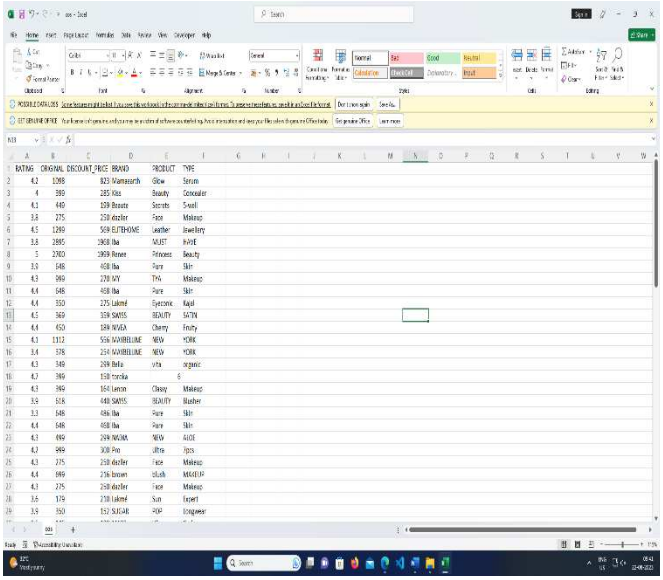


Fig. 1 Cosmetics data in .csv format

Data Preprocessing:

Preprocess the live data to prepare it for clustering. This may involve cleaning the data, handling missing values and converting textual information into numerical features using techniques like term frequency-inverse document frequency for product descriptions.

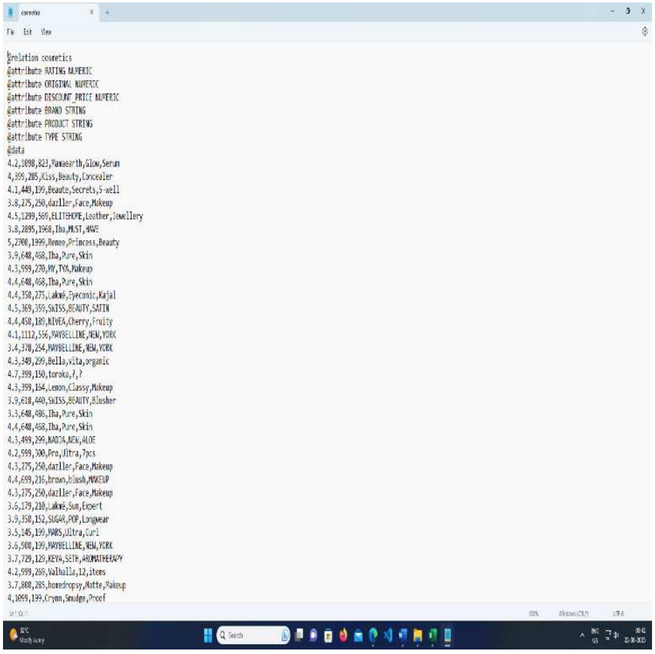
Data Selection:

Depending on the quantity of the data with its brand name, type we use selection method correlation analysis.

Hierarchical clustering:

Open weka and load preprocessed live data. Go to the “cluster” tab and select the “Hierarchical clusterer”. Configure the clusterer settings, including the distance metric and linkage criterion, based on the nature of data.

But here to apply hierarchical clustering uses a Weka tool. So I converted the collected .csv to. arff file.



```
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@attribute RATING NUMERIC
@attribute ORIGINAL NUMERIC
@attribute DISCOUNT_PRICE NUMERIC
@attribute BRAND STRING
@attribute PRODUCT STRING
@attribute TYPE STRING
@data
4.2,1098,823,Mamaearth,Glow,Serum
4,399,285,Kiss,Beauty,Concealer
4.1,449,199,Beaute,Secrets,5-well
3.8,275,250,dazller,Face,Makeup
4.5,1299,569,ELITEHOME,Leather,Jewellery
3.8,2895,1968,Iba,MUST,HAVE
5,2700,1999,Renee,Princess,Beauty
3.9,648,468,Iba,Pure,Skin
4.3,999,270,MY,TYA,Makeup
4.4,648,468,Iba,Pure,Skin
4.4,358,275,Lakmé,Eyeconic,Kajal
4.5,369,359,SWISS,BEAUTY,SATIN
4.4,458,189,NIVEA,Cherry,Fruity
4.1,1112,556,MAYBELLINE,NEW,YORK
3.4,378,254,MAYBELLINE,NEW,YORK
4.3,349,299,Bella,vita,organic
4.7,399,150,toroka,?,?
4.3,399,164,Lenon,Classy,Makeup
3.9,618,440,SWISS,BEAUTY,Blusher
3.3,648,486,Iba,Pure,Skin
4.4,648,468,Iba,Pure,Skin
4.3,499,299,NADJA,NEW,ALOE
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3.7,888,285,homedropsy,Matte,Makeup
4,1099,199,Crynn,Smudge,Proof
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Fig.2 Cosmetics data in .arff format

Perform clustering:

Performed cluster hierarchical clustering on live cosmetic product data.

Cluster Analysis:

Based on the dendrogram and cluster assignments, analyze the clusters to identify patterns and similarities among cosmetic products.

IV. RESULT AND DISCUSSION

From the workflow built to obtain the result, the hierarchical clustering node

Then open the file in Weka tool and applied hierarchical cluster algorithm.

Then visualize the data in dendrogram.

Dendrogram Visualization:

Our approach generates dendrogram diagrams that reveal the hierarchical organization of cosmetic product based on their attributes, each node in the dendrogram represents a cluster, while the vertical axis depicts the dissimilarity between clusters.

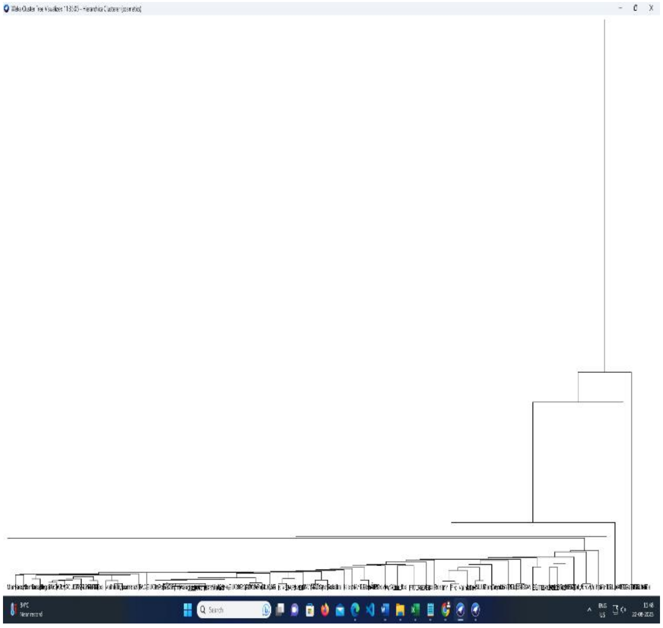

Fig. 3 Dendrogram diagram

Interpretation:

We can analyze the dendrogram to understand how the cosmetic products are hierarchically grouped based on their features and characteristics. We can explore different levels of the dendrogram to determine the number of clusters that make sense for our analysis.

Visualization and Reporting:

Finally based on the results of the hierarchical clustering we create visualizations or reports to stakeholders or for further analysis.

To keep your clustering results up to date

Implications and Applications:

The outcomes of this analysis hold significance for both consumers and businesses. Consumers can make informed purchasing decisions by understanding the grouping of cosmetic products that match their preferences. Businesses, on the other hand, can adapt marketing strategies, pricing tactics, and inventory management based on the identifies clusters.

V. CONCLUSION

This paper demonstrates the utilization of the weka tool for clustering analysis of live cosmetic product data from Flipkart. The dendrogram diagrams provide a visual representation of the underlying patterns and clusters with in the data. The findings contribute to a deeper understanding of consumer preferences and market dynamics in the cosmetic industry.

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LC-MS/MS METHOD FOR SIMULTANEOUS ESTIMATION OF ETHINYL ESTRADIOL AND ETONOGESTREL IN RAT PLASMA AND ITS APPLICATION TO PHARMACOKINETIC STUDY

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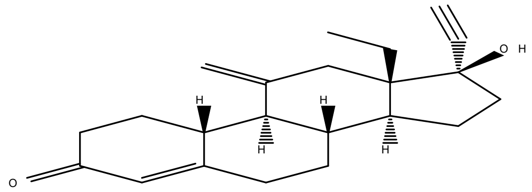
Abstract: Ethinylestradiol is an excellent drug used for the treatment of menopausal symptoms and gynecological disorders. The contraceptive vaginal ring and the etonogestrel implant are two forms of hormonal contraception that use etonogestrel. Because, it is a valuble method to develop a novel and sensitive bioanalytical approach was used for determination of pharmacokinetic studies of etonogestrel and ethinyl estradiol in rat plasma as simultaneous manner by Liquid Chromatography-Mass spectrometry. Separation was achieved on column Symmetry C_{18} column (150x4.6mm, 3.5µm) using isocratic mode with at room temperature, a mobile phase composed of FA and ACN at a ratio of 50:50 and a flow rate of 1 mL/min was made up. Ethinylestradiol was analyzed with a short retention time of 5 minutes over a good linear concentration range of 0.15ng/mL to 3ng/mL (r2 = 0.99989 ± 0.012) and etonogestrel was analyzed within 5 minutes over a linear concentration range of 1.2ng/mL to 24ng/mL (r2 =0.99955 ± 0.005).At various QC concentration levels, the extraction recoveries and matrix effects of Ethinylestradiol and etonogestrel were 98.74, 99.32, 98.12, 99.66% and 98.96, 99.18, 97.78, 99.23% for Ethinylestradiol and etonogestrel, respectively. An electrospray ionization source was used to study Ethinylestradiol and Etonogestrel at m/z 297.4032 → 60.1235, 325.4648 → 93.4218, and IS for m/z 313.4462 → 70.0059, which were ion pairs of mass analysis. This method has successfully applied to explore Ethinylestradiol (0.0003 mg/kg) with its internal standard (Levonogestrel), Etonogestrel (0.002 mg/kg) with its IS (Levonogestrel) extracted from rat plasma using LLE. The validation of the suggested technique was carried out in compliance with USFDA specifications.

Keywords: Ethinyl Estradiol, Etonogestrel, Validation, Bioanalytical Method development, LC-MS, ICH guidelines.

1. INTRODUCTION

When combined with progestins, the oestrogen drug ethinyl estradiol (EE) is a common ingredient in birth control pills [1]. In the past, EE was frequently used to treat a variety of conditions, including menopausal symptoms [2, 3], gynaecological issues, and several hormone-sensitive malignancies [4, 5]. Although it is typically taken by mouth, it can also be applied as a vaginal ring or patch [6]. Breast soreness and enlargement [7] as well as headache, fluid retention, and nausea [8] are a few of the usual adverse effects of EE. Moreover, EE can result in breast development, general feminization, Hypogonadism, and sexual dysfunction in men [9, 10]. And sexual dysfunction [11, 12], blood clots, liver damage, and uterine cancer are all rare but severe side effects. The biological target of Oestrogens like estradiol is the oestrogen receptor, and EE is an oestrogen or an agonist [14] of that receptor. It is a synthetic variant of the natural oestrogen estradiol and varies from it in a number of ways. When compared to estradiol, EE has significantly better oral bioavailability, is more resistant to metabolism, and exhibits comparatively greater effects in the liver and uterine, among other organs. In order to prevent pregnancy after sex, it is most frequently used as birth control in combination oral contraceptives (COC) [15]. In addition to being used to prevent conception, EE's birth control formulation can also be used to treat acne, menstrual symptoms, and absence of menstruation [16, 17]. Symptoms during menstruation, and acne [18, 19].

Women take a drug called etogestrel as a form of birth control. Nexplanon and Implanon are two brands that sell it as an implant that is inserted under the skin of the upper arm. NuvaRing and Circlet are two brands that sell it as a vaginal ring when combined with the oestrogen ethinylestradiol. Etonogestrel is a birth control pill having a three to four year half-life, while some research indicates a five year half-life. Fertility quickly returns after removal. Menstrual abnormalities, breast soreness, mood swings, acne, headaches, vaginitis, and other side effects are etonogestrel side effects [20]. Etonogestrel, a progestin or synthetic progestogen, is an agonist of the progesterone receptor, which is the biological target of progestogens such as progesterone. It inhibits ovulation [21], thickens the mucus around the cervix's opening, and changes the uterine lining. It has no further significant hormonal activity and has extremely mild androgenic and glucocorticoid [22] activity. Etonogestrel is a prodrug of desogestrel in the body, a closely similar and more commonly used progestin. **Figure 1** depicts the chemical compositions of etonogestrel and ethinyl estradiol.



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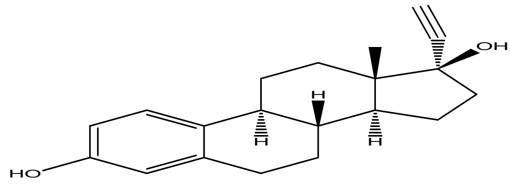

B

Fig. 1: Schematic representation of (A) Etonogestrel and (B) Ethinyl Estradiol

2. MATERIALS AND METHODS

2.1 .Chemicals and Reagents

The following items were purchased from Merck India Ltd., Worli, Mumbai, India: ACN (High Performance liquid chromatography mark), Formic acid (High Performance Liquid Chromatography mark), and water (High Performance liquid chromatography mark). Ethinyl estradiol (purity 99.9%) Levonogestrel (99.9% purity) etonogestrel (purity 99.9%) APIs were purchased from Cipla Pharmaceutical Company in Mumbai.

2.2. Instrumentation and Conditions

For the bioanalytical method formulation and validation, a Waters Acquity Model LC system equipped with a QTRAP 5500 triple quadrupole mass spectrometer (SCIEX) was used. Using an isocratic model and a symmetry C18 (150x4.6 mm, 3.5m) column, chromatographic separation was performed at ambient temperature. As the mobile phase, a mixture of FA (0.1 percent) and ACN (50:50v/v) with a flow rate of 1.0mL/min was used. The injection volume was 10L, and the total run duration was 6 minutes. MS QTRAP 5500 triple quadrupole apparatus with a positive ion electrospray ionization interface was utilized for the analysis.MRM mode was used to monitor mass pair ions: m/z 297.4032 → 60.1235, m/z 325.4648 → 93.4218 for Ethinylestradiol and etonogestrel, m/z 313.4462 → 70.0059 for Levonogestrel (Internal standard of Ethinylestradiol and etonogestrel).**Table. 1** Clears details of LC-MS Instrumentation requirements.

Parameters of Liquid Chromatography		Detailed Parameters of MS	
HPLC	Waters Alliance e-2695	MS	Sciex QTRAP 5500
Isocratic mode	ACN: Formic acid 0.1% in water 50:50 v/v	Ionization source	Drying gas: N_2 gas Drying flow rate: 5 mL/min Pressure: 55 psi
	Flow level: 1 mL/min		Source temperature: 550°C
	Injection volume: 10 µL		Capillary voltage: 5500V
Waters symmetry C_{18}	150mm length	Collision cell gas	Nitrogen with high purity
	4.6 mm ID	Mode	MRM
	3.5 µm PS		
Specimens	Ethinylestradiol	Ethinyl Estradiol Multiple reaction	m/z-297.40 → m/z-60.123 CE– 15V

		monitoring transitions	
	Etonogestrel	Etonogestrel Multiple reaction monitoring transitions	m/z-325.464 → m/z-93.421 CE - 15V
IS	Levonogestrel	Levonogestrel Multiple reaction monitoring transitions	m/z-313.4462 → m/z-70.00 CE – 15V

Table.1: Optimized LC-MS Conditions

2.3. Preparation of Stock, QC and Calibration Specimens

Ethinylestradiol stock solutions at 6 ng/mL and etonogestrel stock solutions at 48 ng/mL were dissolved in FA (0.1%)-ACN (50:50, v/v), with linearity ranging from 0.15-3 ng/mL for Ethinylestradiol and 1.2-24 ng/mL for etonogestrel. The previously described working solutions were distributed and then combined with plasma to produce specimens for calibration and quality control. The concentration of eight calibration specimens were 0.15, 0.38, 0.75, 1.13, 1.50, 1.88, 2.25, 3.00 ng/mL of Ethinylestradiol and 1.20, 3.00, 6.0, 9.0, 12, 15, 18, 24 ng/mL of Etonogestrel and In a similar manner, QC specimens were produced, with final concentrations of 0.75 ng/mL, 6 ng/mL, 1.5 ng/mL, 12ng/mL and 2.25 ng/mL, 18 ng/mL at low, medium and high. All analytes were stored at -20°C before being returned to room temperature for analysis.

2.4. Preparation of Plasma Sample solutions

For sample preparation, 200L aliquots of rat plasma specimens were contaminated with a 500L working solution of an internal standard (IS). After centrifuging the specimens for 15 minutes at 5000 rpm using centrifuging equipment, the supernatant-managed solution was split, collected, and injected into the LC system after being filtered with a 0.45µ nylon syringe filter and plasma is centrifuged at 5000 rpm for thirty minutes. Following the injection of the supernatant into the liquid chromatography column, plasma samples were maintained at a temperature ranging from 2 to 8 degrees Celsius until the finish of the analysis.

2.5. Animals Parameters

Six healthy white albino rodents weighing between 247 and 345 grammes were purchased from Biological E Limited Company Chennai, India for this study. (Reg.No:1250/PO/RcBi/S/07/CPCSEA) the animal ethics committee approved the protocol for the animal study. The animals were housed in controlled laboratory environments and were provided with restricted amounts of endive, carrots, and fresh maize (in limited quantities). The animals were maintained at a temperature of 21 to 24 degrees Celsius and a relative humidity of 50 to 55 percent. Before being subjected to experiments, all animals were required to abstain for one night and were given free access to water. The Pharmacokinetic evaluation of Ethinylestradiol and Etonogestrel solid dispersion tablets was performed. Ethinylestradiol and Etonogestrel were administered orally to all rodents at doses ranging from 0.12mg/kg to 0.0015mg/kg. At 0, 0.5, 1, 2, 4, 6, 8,10,12,14,16,18,24, and 30 hours, 1.5mL of blood was drawn from the rat's body in the concentration range of 12 ng/mL (Ethinylestradiol) and 1.5ng/mL (Etonogestrel), and the plasma was centrifuged at 5000 rpm for 30 minutes. The supernatant was injected into the LC column, and plasma samples were stored between 2 and 8 degrees Celsius until the analysis was complete.

2.6. Validation of developed method

2.6.1. Selectivity, Matrix effect, and Recovery

The retention times of Ethinylestradiol, etonogestrel, and IS were used to determine the selectivity of rat plasma samples from six different rodents in order to test for interference from unidentified specimens. The effects of the Matrix for Ethinylestradiol and etonogestrel were checked by looking at the percentage of peak zone in plasma samples taken from six different medication-free samples and slick recovery samples. Three times, tests were done with six different amounts of plasma at MQC levels with a level of accuracy that was allowed (15%). We found out how well Ethinylestradiol and etonogestrel were extracted by looking at each QC concentration six times. The amount of recovery was judged by comparing the highest points of different guidelines to the highest points of standards that could not be extracted.

2.6.2. Carryover and Integrity of Dilution

The purity of the dilution process was shown by injecting matrix above the upper limit of quality control with a specimen concentration and then diluting this test with blank matrix. Carryover is a term for a sample that is kept by the LC machine while another sample is injected and shows up in a series of blank or unknown analytes.

2.6.3. Precision and Accuracy

Testing was done on QC specimens (n=6) six times to get an LLOQ, LQC, MQC, and HQC level. Except for the LLOQ level, which should be less than 20%, the CV level should be less than 15%.

2.6.4. Stability

By comparing the area response of the analyte in the stability samples to the regional response of the specimen prepared from the fresh stock solution, the durability of the stock solution was determined. Experiments on plasma stability were conducted at LQC and HQC concentrations using six replicates per dose. According to USFDA regulations, the analyte was deemed stable if the variation was less than 15 percent. The stability of spiked rat plasma stored at ambient temperature for 24 hours (benchtop stability) was examined. For twenty-four hours, the stability of enriched rat plasma deposited in an auto sampler at 2-8 °C (Autosampler stability) was evaluated. The autosampler's durability was determined by comparing extract plasma specimens that were injected promptly with samples that were stored for 24 hours at 2-8 °C in the Autosampler. The stability freeze-thaw was examined by comparing samples that were frozen at -30°C and thawed three times with freshly infused QC samples. For the evaluation of durability of freeze-thaw, six aliquots of the LQC and HQC concentration ranges were used. For evaluation of long-term durability, the concentration obtained after twenty four hours was compared with the initial concentration.

3. RESULTS AND DISCUSSION

3.1. Development of Bioanalytical Approach

In this procedure, the ESI mode with the most intense reaction over APCI mode was chosen. The Ethinylestradiol and Etonogestrel ions have been quantified using the MRM mode. Ion pair scan of Ethinylestradiol and etonogestrel m/z 297.402 and m/z 325.4648 produced [M+H] + at m/z 241.3256, m/z 128.6947, and m/z 260.0589, m/z 194.2036.Similarly, Levonogestrel internal standards scan at m/z 313.4462 and 120.5353. Ethinylestradiol and etonogestrel exhibit a favorable positive ion response mode when compared to an ion-negative mode. **Figures 2-4** illustrate the mass spectrum's specifics.

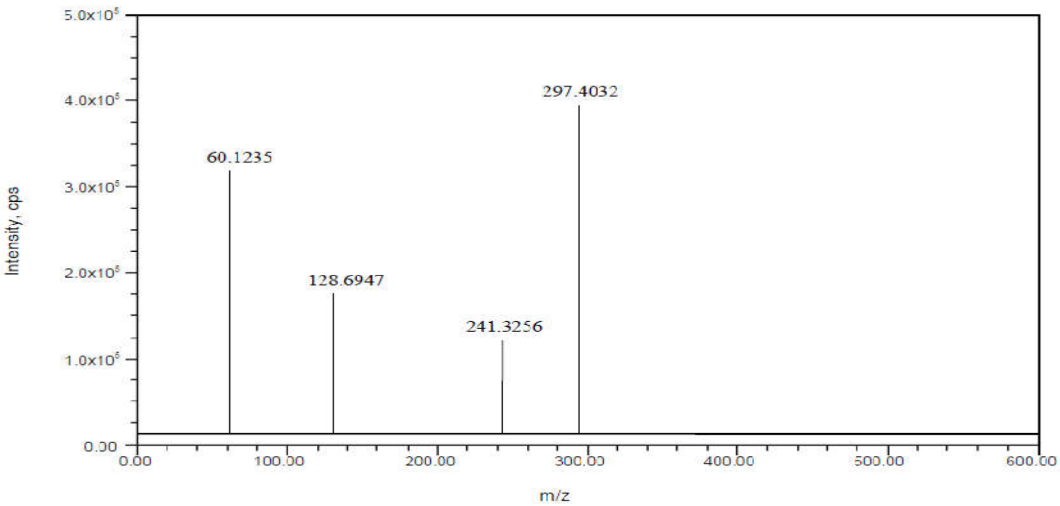

Fig.2 Mass spectrum of Ethinylestradiol

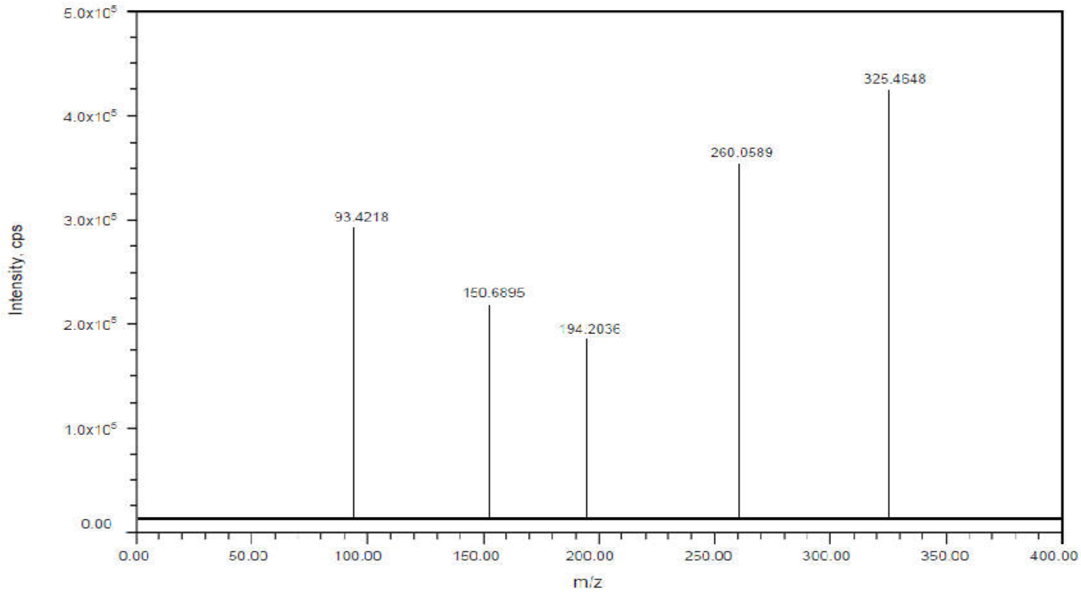

Fig. 3: Mass spectrum of Etonogestrel

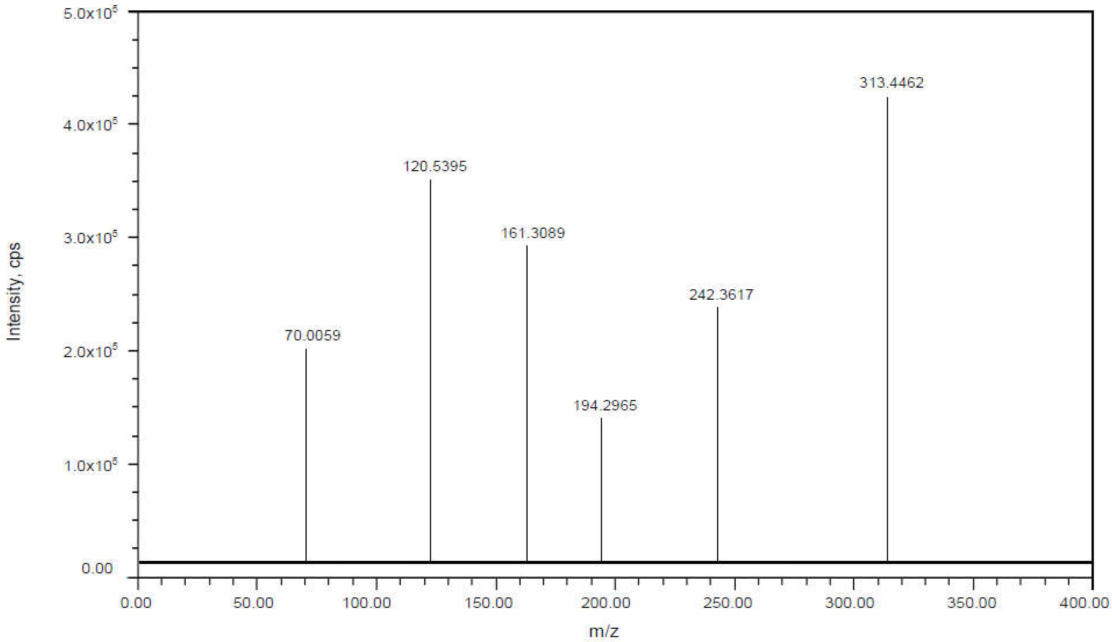

Figure.4 Mass spectrum of Levonogestrel (IS)

To get the best LC conditions, we used different buffers and different amounts of acetonitrile as the mobile phase for both isocratic and gradient modes. In each test, the mobile phase's make-up was changed to improve clarity and get good retention times. As a mobile phase, 0.1% FA and ACN in isocratic mode at 50:50 v/v ratios were chosen because they provided the greatest response from the selected medications. In the method of optimization, various stationary phases such as C18, C8, and CN-propyl were utilized. We obtained nice peak shapes for Ethinylestradiol and etonogestrel by connecting a PDA detector to a symmetry C18 column with dimensions of 150mm 4.6mm and 3.5. The discharge rates of the mobile phase were 1 mL/min. By implementing the aforementioned conditions, we determined the Ethinylestradiol and etonogestrel RTs to be 2.69 and 5.12 minutes, respectively. The percent CV of six replicate injections is 0.30. **Figures 5 and 6** depict blank and standard chromatograms, respectively.

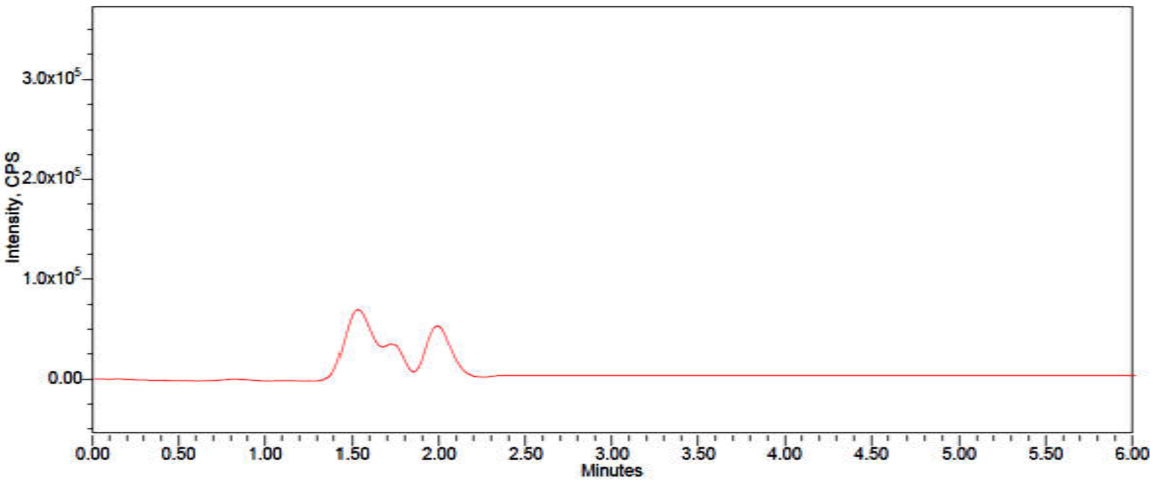

Figure.5 Chromatogram of blank plasma

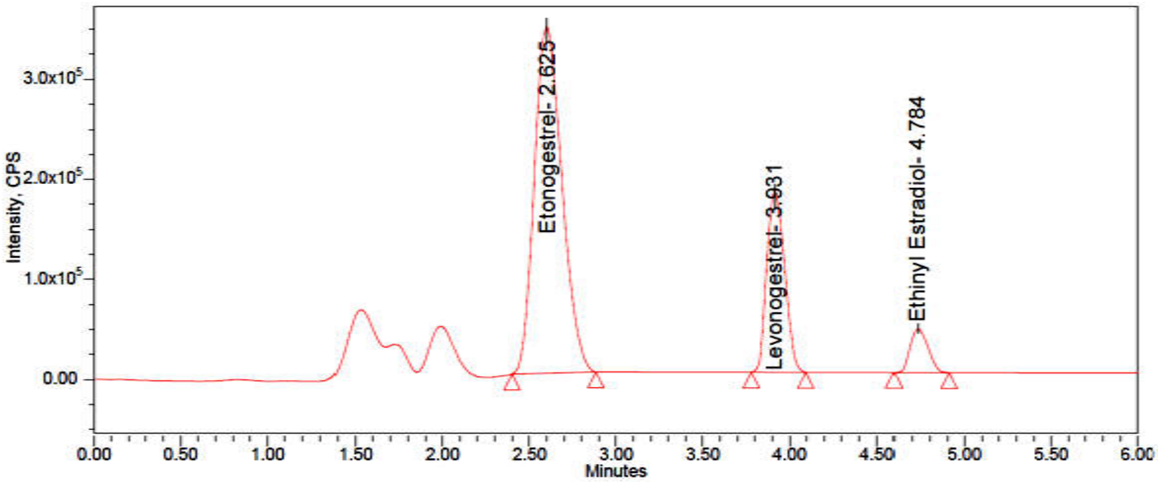

Figure.6 Chromatogram of standard

3.2. *Validation of Bioanalytical Process:*

3.2.1. Recovery and Matrix Effect

Ethinylestradiol and etonogestrel were tested in different types of rat plasma, but they did not have a significant effect. The results that followed showed that the matrix effect on specimen ionization and internal needs were within the allowed range. Examination of recovery from Ethinylestradiol and etonogestrel at HQC, MQC, and LQC concentration focal levels in rat plasma are 0.75, 1.5, and 2.25ng/mL, and 6, 12, and 18ng/mL, which demonstrates the extraction efficiency of Ethinylestradiol and etonogestrel (**Table 2**).

Analyte	Matrix	Matrix factor bias (%)		% CV	% Recovery		% CV
		LQC	HQC		LQC	HQC	
Ethinyl Estradiol	Plasma	99.67	99.78	0.96	98.74	99.32	0.64
Etonogestrel	Plasma	98.36	99.12	1.47	98.96	99.18	0.78

Table.2: Outcomes of Matrix Variability and Recovery (%) of Ethinylestradiol and Etonogestrel in Plasma

3.2.2. Linearity, Precision, and Consistency

The region's large proportions of adjustment standards were a relative focus. The linearity range of this method for Ethinylestradiol was 0.15-3 ng/mL and 1.2-24 ng/mL for etonogestrel (Fig. **7 and 8**). The calibration curves appeared over the linear concentration range, and the CC for Ethinylestradiol and etonogestrel at various QC levels exceeded 0.9995. Ethinylestradiol and etonogestrel linearity, correlation, and precision results are shown in **tables 3, 4, 5,** and **6.**

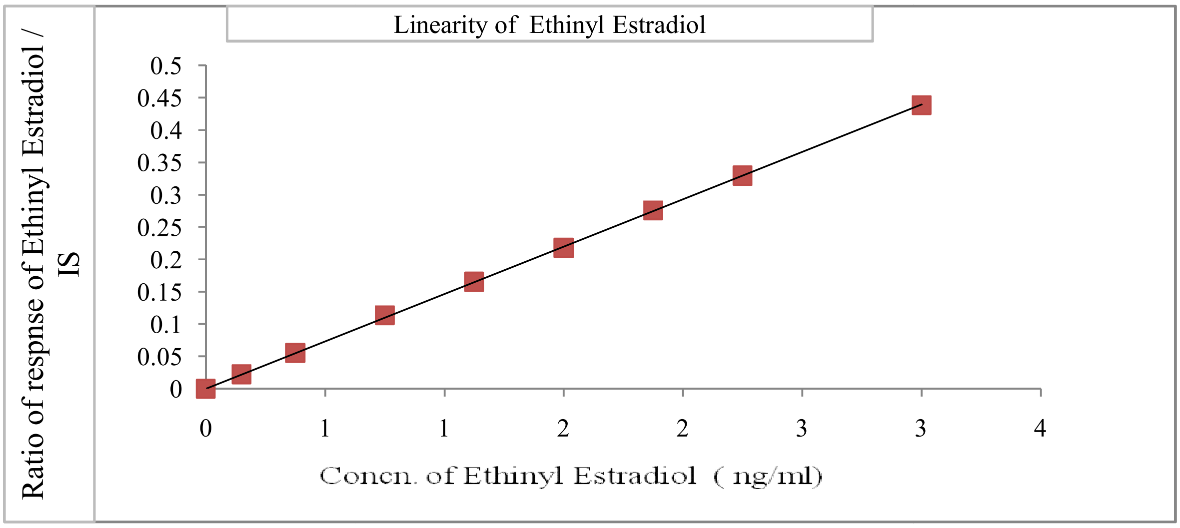

Figure .7 Calibration plot of Ethinylestradiol

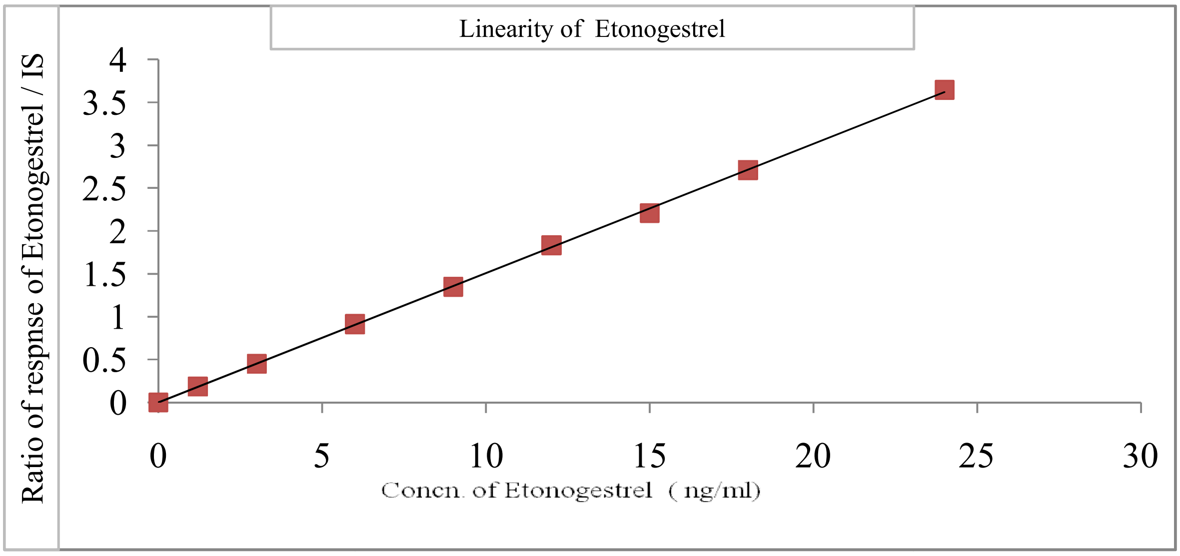

Figure.8 Calibration plot of Etonogestrel

Linearity	Ethinylestradiol conc. (ng/ml)	Ethinylestradiol area response ratio
1	0.15	0.043
2	0.38	0.107
3	0.75	0.218
4	1.13	0.323
5	1.50	0.422
6	1.88	0.531
7	2.25	0.638
8	3.00	0.854
Slope	0.1467	
Intercept	0.00038	
CC	0.99989	

Table.3: Linearity outcomes of Ethinylestradiol

Linearity	Etonogestrel conc. (ng/ml)	Etonogestrel area response ratio
1	1.20	0.356
2	3.00	0.875
3	6.00	1.754
4	9.00	2.637
5	12.00	3.554
6	15.00	4.251
7	18.00	5.253
8	24.00	7.105
Slope	0.1502	
Intercept	0.00426	
CC	0.99955	

Table.4: Linearity results of Etonogestrel

Validation parameter	Ethinyl Estradiol			Etonogestrel		
QC ranges	Low	Medium	High	Low	Medium	High
QC Conc. (ng/ml)	0.75	1.5	2.25	6	12	18
Linearity range	0.15-3 ng/mL			1.2-24 ng/mL		
Correlation (r^2)	0.99989±0.012			0.99955±0.005		

Table.5: Correlation outcomes of Ethinylestradiol and Etonogestrel

Matrix	Concentration range of specimen	Ethinyl Estradiol			Etonogestrel		
		Accuracy bias (%)	RSD of Precision (%)		Accuracy bias (%)	RSD of Precision (%)	
			Intra-day	Inter-day		Intra-day	Inter-day
Plasma	LLOQC	-0.75	1.63	1.58	-1.24	1.96	2.34
	LQC	1.02	0.79	0.63	-2.37	1.52	1.02
	MQC	0.66	0.64	0.18	-0.11	0.78	0.88
	HQC	0.37	0.52	0.76	0.26	0.65	0.57

Table.6: Precision and accuracy outcomes of Ethinylestradiol and Etonogestrel in rat plasma

3.2.3. Integrity of Dilution and Carry Over

By sprinkling the specimen matrix fixation over the Upper limit of quantification and diluting this test analyte with a blank matrix, the integrity of the dilution was demonstrated. Ethinylestradiol and etonogestrel dilution integrity was evaluated at 2ULOQC (3ng/mL to 24g/mL). Each six replicate specimens of 1:2 dilution (3.5ng/mL-12ng/mL) and 1:4 dilution (1.75ng/mL-6ng/mL) for Ethinylestradiol and etonogestrel, and the percentage of carryover for the two components were determined to be 2.64 and 1.75, respectively, within the permissible range. The results are detailed in **table 7.**
Carryover refers to the System error that may influence the measured value of the specimen. Sample CV on a Waters Alliance-configured Liquid Chromatography-Mass system was evaluated using the following approach. Using the flow injection method, a system blank injection volume of 10L for 0.1% formic acid and acetonitrile (50:50) was conducted on a water Z-spray triple quadrupole mass detector. We can conclude that this procedure had no effect on the accuracy and precision of the proposed strategy. The results of carryover are detailed in **Table 8.**

Specimen	ULOQC conc.	Calculated conc.	%CV
Ethinyl Estradiol	3 ng/mL	2.96 ng/mL	2.64
Etonogestrel	24 ng/mL	23.88 ng/mL	1.89

Table.7: Outcomes of Dilution Integrity

Concentration	% of carryover	
	Ethinyl Estradiol	Etonogestrel
Blank	0	0
LLOQC	3.51	5.37
ULOQC	2.69	1.48

Table.8: Outcomes of carryover

3.2.4. Stability study

Ethinylestradiol and etonogestrel's stability on the benchtop was determined by preparing and storing a stock solution at room temperature for eighteen hours. In the Autosampler stability, a stock solution retained for twenty four hours at room temperature in an Autosampler demonstrates reliable stability behaviour under these conditions. To evaluate freeze-thaw stability, the stock solution was kept at (-285) °C for 24 hours. For moist extract stability, the stock solution was kept at 2-8°C for 18 hours, and for dry extract stability, the stock was kept at (-203)°C for 18 hours. The short term stability indicates that the pharmaceuticals were stable for 7 days at (53) °C, whereas stability with long term indicates that the stock solution was stable for twenty eight days at (-203)°C and injected into the UPLC. Contrast the stability results of a freshly prepared stock solution with those of a stock solution prepared prior to 24 hours. Ethinylestradiol and etonogestrel had respective percent changes of 1.27 and 0.75, clears that solutions are stable for up to twenty four hours.
Ethinylestradiol and etonogestrel were stable in plasma under varying conditions at room temperature. At different concentration levels continued chilling and defrosting of plasma specimens spiked with Ethinylestradiol and etonogestrel were evaluated and found to have no effect on its stability. Long-term stability indicated that Ethinylestradiol and etonogestrel were stable at a capability temperature of -30°C for up to 24 hours. In **tables 9** and **10**, the overall stability results of Ethinylestradiol and etonogestrel are displayed.

Stability	**Storage condition**	**Conc. level**	**Measured conc (ng/mL) (Mean±SD, n=6)**	**% RSD**	**% Recovery**
Bench top	18 hrs at room	6	6.325±2.3	2.36	99.42

stability	temperature	12	12.142±1.8	1.47	99.26
		18	18.323±3.6	1.23	99.74
Auto sampler stability	24 hrs in auto sampler at room temperature	6	6.342±1.7	0.68	99.63
		12	12.547±2.6	0.49	99.54
		18	18.395±3.9	1.11	99.28
Long term stability	28 days at (-20±3)°C	6	6.157±2.4	0.75	99.14
		12	12.528±1.9	1.42	99.27
		18	18.452±3.2	0.34	99.36
Freeze thaw stability	24 hrs at (-28±5)°C then exposed to three freeze and thawed cycles	6	6.384±2.2	2.35	98.47
		12	12.643±4.8	2.21	99.33
		18	18.229±3.6	0.47	99.84
Wet extract stability	18 hrs at 2-8°C	6	6.347±2.1	3.31	99.17
		12	12.231±4.1	1.46	99.26
		18	18.335±2.8	0.89	99.32
Dry extract stability	18 hrs at (-20±3)°C	6	6.104±3.4	1.54	99.47
		12	12.196±2.2	1.11	99.58
		18	18.374±5.7	0.36	99.27
Short term stability	7 days at (5±3)°C	6	6.326±2.9	2.68	99.15
		12	12.374±1.7	1.74	99.64
		18	18.557±2.5	0.68	99.52

Table.9: Stability outcomes of Ethinylestradiol in plasma of rat

Stability	Storage condition	Conc. level	Measured conc .	% RSD	% Recovery
Bench top stability	18 hrs at room temperature	0.75	0.754±3.4	2.45	99.64
		1.5	1.569±2.5	0.79	99.35
		2.25	2.259±1.6	1.26	99.17
Auto sampler stability	24 hrs in auto sampler at room temperature	0.75	0.776±2.7	1.04	99.55
		1.5	1.526±3.2	2.58	99.42
		2.25	2.239±1.5	1.65	99.67
Long term stability	28 days at (-20±3)°C	0.75	0.773±0.7	3.64	99.28
		1.5	1.542±0.5	0.4	99.61
		2.25	2.252±1.3	1.6	99.54
Freeze thaw stability	24 hrs at (-28±5)°C then exposed to three freeze and thawed cycles	0.75	0.745±0.4	2.85	99.23
		1.5	1.525±0.9	1.64	99.78
		2.25	2.269±1.1	1.12	99.47
Wet extract stability	18 hrs at 2-8°C	0.75	0.713±2.5	2.44	99.26
		1.5	1.574±0.9	0.68	99.55
		2.25	2.216±1.7	0.12	99.64
Dry extract stability	18 hrs at (-20±3)°C	0.75	0.774±2.4	1.74	99.28
		1.5	1.569±1.8	0.44	99.45
		2.25	2.233±0.3	0.93	99.72

Short term stability	7 days at (5±3)°C	0.75	0.766±0.8	2.51	99.61
		1.5	1.497±1.7	2.01	99.84
		2.25	2.213±3.9	1.63	99.73

Table.10: Stability outcomes of Etonogestrel in rat plasma

3.3. Discussion

Due to the volatility requirement in mass spectrometry analysis, the optimized procedure exhibited excellent LC separation and mass transitions with a (50:50 v/v) mixture of acetonitrile and 0.1% formic acid. For column efficiency a Symmetry C_{18} (150mmx4.6mm, 3.5 µ) column at 30°C was used .concentration due to the requirement of its volatility in mass spectrometry analysis. For column efficiency, a Symmetry C18 (150mmx4.6mm, 3.5) column at 30°C was used. The linear regression model determines the optimal calibration curve fit for the chromatographic response versus concentration relationship. The precision and accuracy of intra- and inter-day data for Ethinylestradiol and etonogestrel values are within the acceptable range. With the optimized extraction procedure, the extraction yield was satisfactory, consistent, precise, and repeatable. The injector carry-over test revealed 0% carry-over for blank samples extracted, followed by Upper limit of quality control and Lower limit of quality control samples extracted. Studies on the freeze-thaw stability of substances frozen at -30°C and thawed three times revealed permissible limits of 85 to 115%. The sample stability of the Autosampler at 20°C for seventy hours at each of the Low quality control and High quality control concentration levels exhibited a mean percent accuracy between 85 and 115%. The percentage of accuracy was determined to be between 85 and 115%. Long-term stability was evaluated over the course of twenty eight days and compared to initial concentrations of Lower Quality Control and High Quality Control. The accuracy was determined to be between 85 and 115%. We have developed Liquid chromatography-Mass spectrometry method for the simultaneous determination of Ethinylestradiol and etonogestrel in rat plasma and its application to pharmacokinetic study under ICH guidelines [23, 24]. Few of articles were reported in the last few years for analyzing the Ethinylestradiol and etonogestrel [25-31]. In the present examination we intended to explore a specific, selective and new LC-MS method towards the analysis of Ethinylestradiol and etonogestrel.

3.4. Pharmacokinetic Study

For the purpose of determining pharmacokinetic parameters of Ethinylestradiol and etonogestrel, oral administration of 0.003 milligrams/ kg Ethinylestradiol and 0.002 milligrams/ kg etonogestrel were administered to rats in order to obtain mean plasma concentration-time profiles (**Fig.9, 10**).In pharmacokinetic investigations Ethinylestradiol and etonogestrel exhibit notable differences from one another. We collected samples from the rat's body at various times, including 0.5, 1, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 24 and 30 hrs after the medications were administered . After preparing the test sample, it was injected into the chromatographic system and the values were recorded. The C_{max} after oral administration of Ethinylestradiol and etonogestrel (11.006 and 1.262), T_{max} (12 and 1.5 hrs), K_{el}(obvious first request terminal rate constant were calculated from semi- log plot of a plasma concentration vs time bend, using the least square relapse technique and $t_{1/2}$ (terminal half-life as governed by 0.693/K_{el}quotient). Test/reference ratios for $C_{max,}$ AUC_{0-24}, and $AUC_{0-\infty}$ were 3964, 487.6 and 3966, 488.7 ng-hr/mL respectively, and found to be within the permissible range. The pharmacokinetic parameters of Ethinylestradiol and etonogestrel are shown in **table 11**.

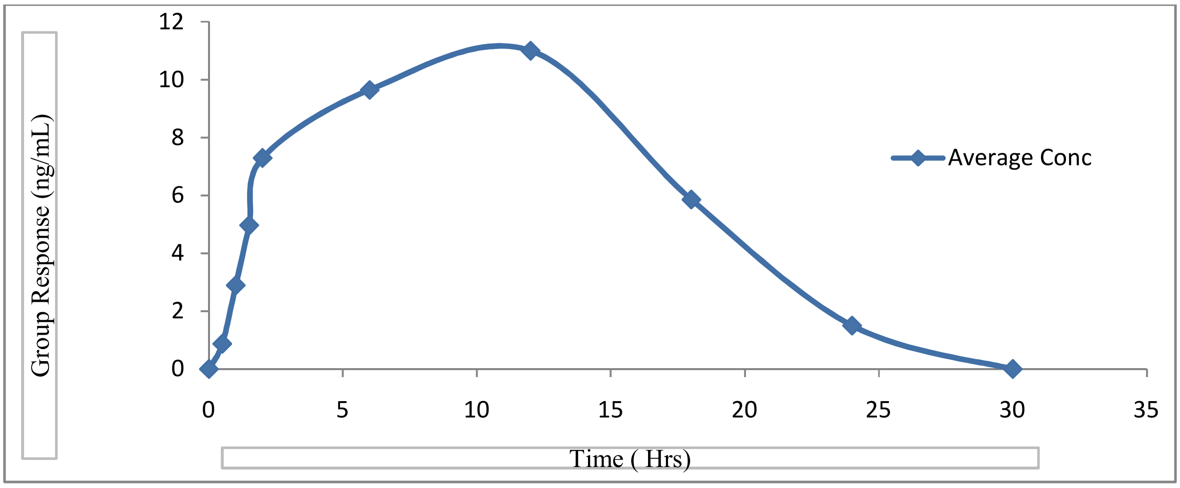

Figure9. Recovery plot of Ethinylestradiol

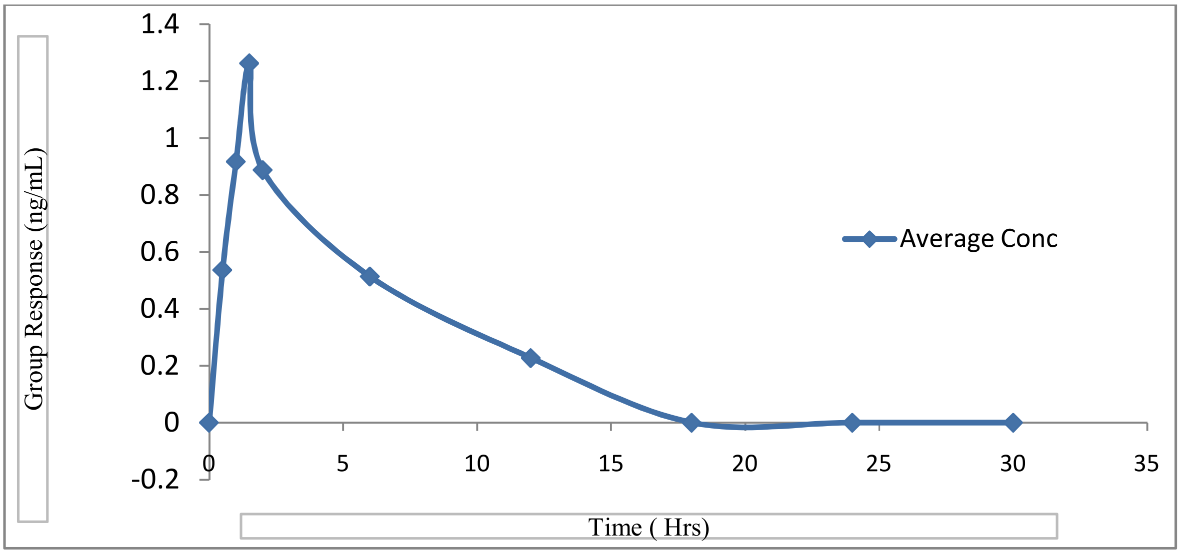

Figure.10 Recovery plot of Etonogestrel

Pharmacokinetic parameters	Etonogestrel	Ethinyl Estradiol
$AUC_{0\text{-}t}$	3964 ng-hr/mL	487.6 ng-hr/mL
C_{max}	11.006 ng/mL	1.262 ng/mL
$AUC_{0\text{-}\infty}$	3966 ng-hr/mL	488.7 ng-hr/mL
t_{max}	12 hr	1.5 hr
$T_{1/2}$	24 hr	12 hr

Table.11: Pharmacokinetic studies of Ethinylestradiol and Etonogestrel

4. CONCLUSION

It is the first time that a novel MS/LC method has been successfully devised and validated for the evaluation of Ethinylestradiol and etonogestrel in rat plasma for 5 minutes. Ethinylestradiol and etonogestrel were promptly absorbed by the rat after oral administration and exhibited pharmacokinetic behavior; here the described method is rapid, robust, and reproducible. And it can be used successfully for PK studies and to check permissible specimen concentrations in bodily fluids accuracy and a decent linear concentration range. These studies are required to validate our findings and serve as a reference in the near future.

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ISSN 1070-4280, Russian Journal of Organic Chemistry, 2023, Vol. 59, No. 10, pp. 1819–1825. © Pleiades Publishing, Ltd., 2023.

Synthesis and Anticancer Evaluation of Isoxazole Ring-Containing 6-(Pyridin-4-yl)imidazo[2,1-*b*][1,3]thiazole Derivatives

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Received January 19, 2023; revised February 10, 2023; accepted February 12, 2023

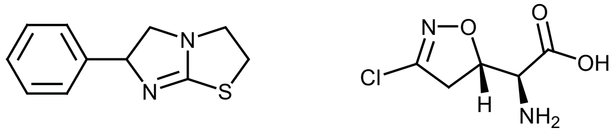
Abstract—A new library of 6-(pyridin-4-yl)imidazo[2,1-*b*][1,3]thiazole derivatives (**11a–11j**) containing an isoxazole ring linked to C^3 through a *p*-phenylene spacer was designed, synthesized, and tested for their in vitro anticancer activity against four human cancer cell lines, including PC3 and DU-145 (prostate cancer), A549 (lung cancer), and MCF-7 (breast cancer) by using MTT assay with etoposide as positive control. Among them, five compounds displayed more potent anticancer activity, and those bearing 3,4,5-trimethoxyphenyl and pyridin-4-yl substituents on C^3 of the isoxazole ring showed most promising activity.

Keywords: levamisole, imidazo[2,1-*b*]thiazole, acivicin, isoxazole, anticancer activity

DOI: 10.1134/S1070428023100184

INTRODUCTION

Recently, nitrogen-and-sulfur-containing heterocyclic compounds have gained great attention due to their numerous biological applications in medicinal chemistry. Imidazo[2,1-*b*][1,3]thiazoles are considered as the most significant class of fused heterocycles which occupy a great position in the field of medicinal chemistry. They displayed different types of biological activities such as anti-inflammatory [1], anthelmintic [2], antitubercular [3], diuretic [4], antitumor [5], antiviral [6], antihypertensive [7], cardiotonic [8], analgesic [9], herbicidal [10], insecticidal [11], antibacterial [12], and antifungal [13]. An example is the anthelmintic drug Levamisole (**1**, Fig. 1) [14]. Similarly, among the wide range of heterocycles, isoxazoles are well known five-membered heteroaromatic scaffolds that play a unique role in medicinal chemistry [15]. Recently, many researchers have focused on the chemistry of isoxazole derivatives because of their numerous biological applications as anthelmintic [16], anti-inflammatory [17], anticonvulsant [18], antinociceptive [19], analgesic [20], antimicrobial [21], anticancer [22], antiviral [23], and antitubercular agents [24]. In particular, acivicin (**2**) was studied as an anticancer drug for the treatment of solid tumors [25].



1 **2**

Fig. 1. Structures of levamisole (**1**) and acivicin (**2**).

Based on the above mentioned literature data on both imidazo[2,1-*b*][1,3]thiazole and isoxazole scaffolds, we have designed and synthesized a new library of isoxazole ring-containing 6-(pyridin-4-yl)imidazo-[2,1-*b*][1,3]thiazole derivatives **11a**–**11j** and tested them for in vitro anticancer activity against four human cancer cell lines including prostate (PC3 and DU-145), lung (A549), and breast (MCF-7) cancer cell lines.

RESULTS AND DISCUSSION

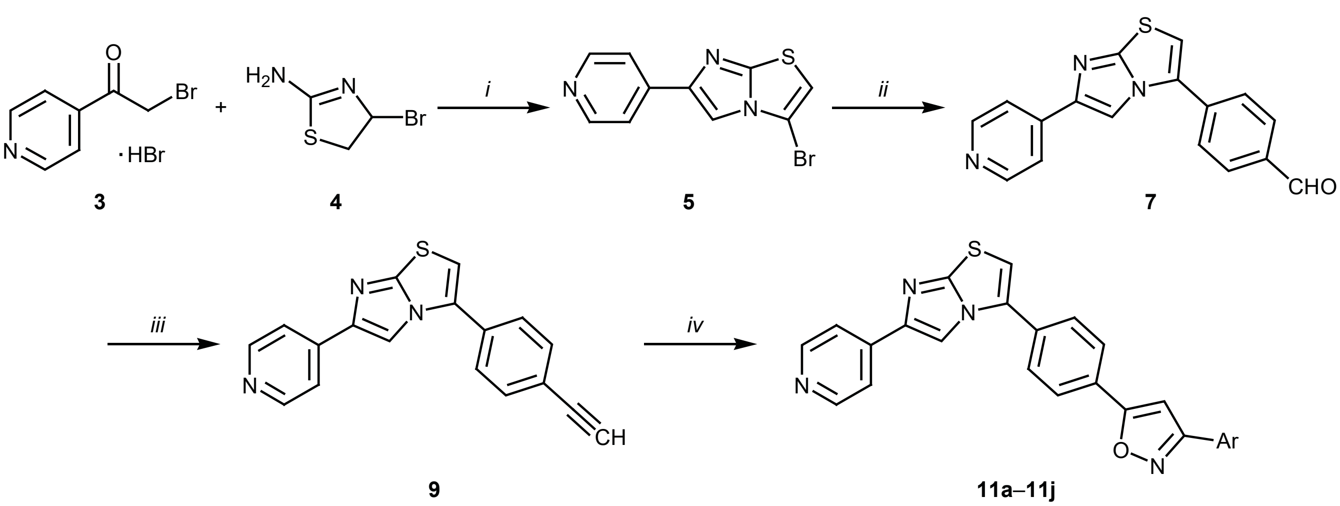
The synthetic route to imidazothiazole derivatives **11a**–**11j** is outlined in Scheme 1. Initially, 2-bromo-1-(pyridin-4-yl)ethanone (**3**) underwent cyclization with 4-bromo-1,3-thiazol-2-amine (**4**) in ethanol with stirring under reflux for 12 h to give 3-bromo-6-(pyridin-4-yl)imidazo[2,1-*b*][1,3]-thiazole (**5**). The Suzuki coupling of compound **5** and 4-formylphenylboronic acid (**6**) in the presence of Pd(dppf)Cl_2 and Cs_2CO_3 in 1,4-dioxane at 90°C for 12 h gave 4-[6-(pyridin-4-yl)imidazo[2,1-*b*][1,3]thiazol-3-yl)-benzaldehyde (**7**). The latter was reacted with dimethyl 1-diazo-2-oxopropylphosphonate (**8**) in the presence of K_2CO_3 in methanol at room temperature for 5 h to produce 3-(4-ethynylphenyl)-6-(pyridin-4-yl)imidazo-[2,1-*b*][1,3]thiazole (**9**). Finally, compound **9** reacted with various substituted benzaldehyde oximes **10a–10h** and hetarenecarbaldehyde oximes **10i** and **10j** in the presence of bis(trifluoroacetoxy)iodobenzene in methanol/water at room temperature for 7 h to afford target compounds **11a–11j** (Scheme 2).

The newly synthesized compounds **11a–11j** were examined for their in vitro anticancer activity against four human cancer cell lines including PC3 and DU-145 (prostate cancer), A549 (lung cancer), and MCF-7 (breast cancer) by using of MTT assay, and the results are collected in Table 1. The chemotherapeutic agent etoposide was used as positive control. Among the compounds tested, five derivatives **11a**, **11b**, **11h**, **11i**, and **11j** displayed more potent anticancer activity. In particular, compounds **11a** and **11h** showed the most promising activity. Compound **11a** having a 3,4,5-trimethoxyphenyl moiety attached to the isoxazole ring showed superior activity (PC3: IC_{50} = 0.11±0.08 μM; A549: IC_{50} = 0.01±0.004 μM; MCF-7: IC_{50} = 0.05±0.003 μM; DU-145: IC_{50} = 0.22±0.05 μM). Compound **11b** with a 4-methoxyphenyl substituent showed slightly lesser activity than **11a** (PC3: IC_{50} = 1.36±0.74 μM; A549: IC_{50} = 1.82±0.55 μM; MCF-7: IC_{50} = 1.02±0.034 μM; DU-145: IC_{50} = 1.61±0.83 μM). Moderate anticancer activity was observed for compounds bearing electron-withdrawing groups, namely **11c** (4-chlorophenyl), **11d** (4-bromophenyl), **11e** (4-nitrophenyl), and **11g** (4-cyanophenyl). Replacement of the 4-cyanophenyl substituent by pyridin-4-yl moiety increased the activity of **11h** (PC3: IC_{50} = 0.05±0.0062 μM; A549: IC_{50} = 0.03±0.0091 μM; MCF-7: IC_{50} = 0.13±0.073 μM; DU-145: IC_{50} = 0.10±0.052 μM). 3-(5-Bromothiophen-2-yl)-isoxazole derivative **11i** displayed slightly decreased activity (PC3: IC_{50} = 0.29±0.041 μM; A549: IC_{50} = 0.12±0.043 μM; MCF-7: IC_{50} = 0.76±0.082 μM; DU-145: IC_{50} = 0.53±0.024 μM) compared to **11h**. Furthermore, compound **11j** containing a 1*H*-pyrazol-3-yl substituent in the isoxazole moiety showed improved activity (PC3; IC_{50} = 0.44±0.086 μM; A549: IC_{50} = 0.71±0.028 μM; MCF-7: IC_{50} = 0.28±0.056 μM; DU-145: IC_{50} = 0.42±0.091 μM) in comparison to **11i**.

EXPERIMENTAL

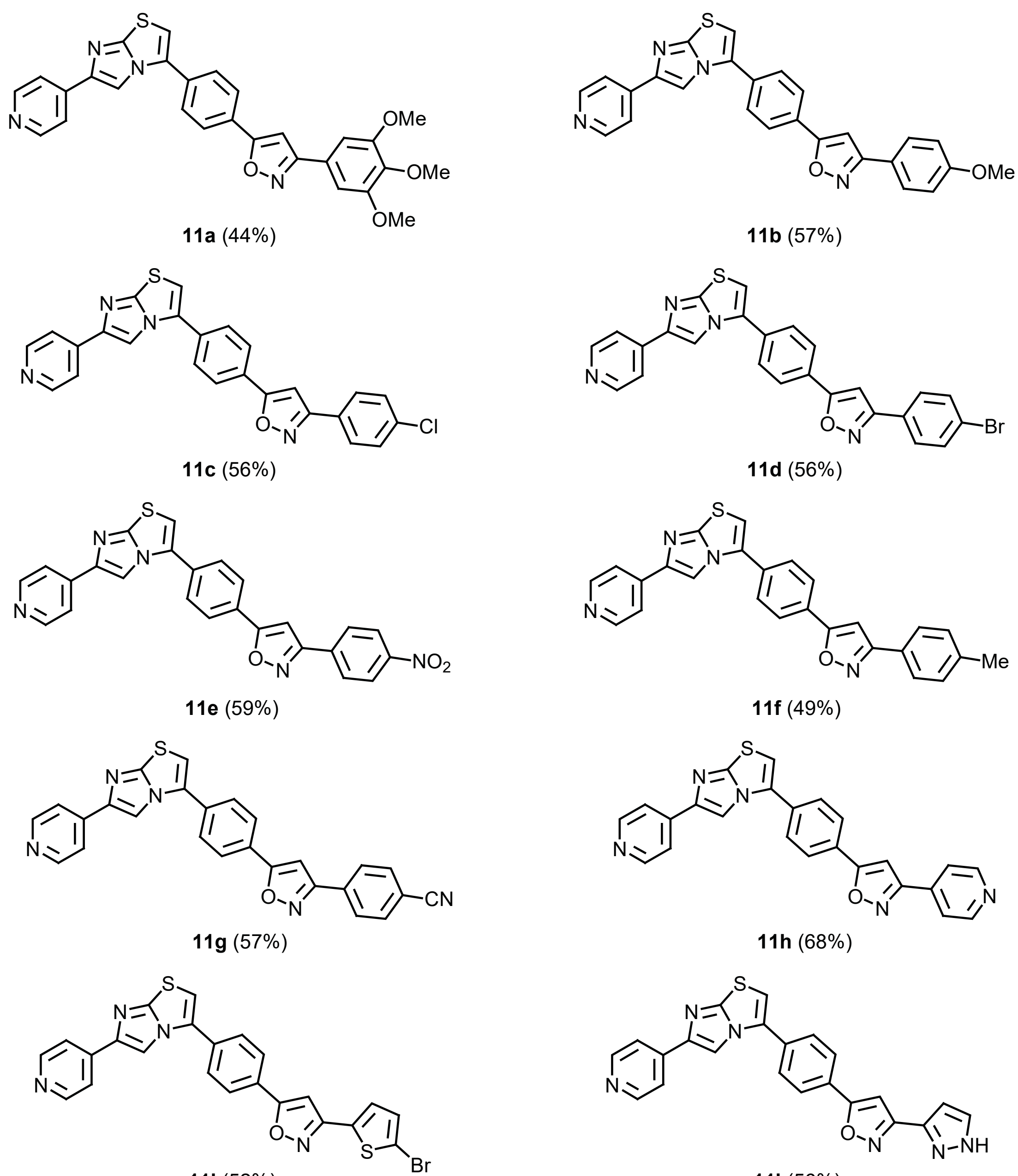
All chemicals and reagents were obtained from Sigma–Aldrich (St. Louis, MO, USA) and Lancaster (Alfa Aesar, Johnson Matthey Company, Ward Hill, MA, USA) and were used without further purification. The reactions were monitored by TLC on silica gel 60 F-254 glass plates, and visualization was achieved by UV light or iodine indicator. The ^1H and ^{13}C NMR

Scheme 1.



Reagents and conditions: *i*: EtOH, reflux, 12 h, 83%; *ii*: 4-formylphenylboronic acid (**6**), Pd(dppf)Cl_2, Cs_2CO_3, dioxane, 90°C, 12 h, 84%; *iii*: dimethyl (1-diazo-2-oxopropyl)phosphonate (**8**), MeOH, K_2CO_3, r.t., 5 h, 84%; *iv*: (Het)ArC=NOH (**10a**–**10j**), MeOH/H_2O, bis(trifluoroacetoxy)iodobenzene, r.t., 7 h, 44–68%.

Scheme 2.



11a (44%) **11b** (57%) **11c** (56%) **11d** (56%) **11e** (59%) **11f** (49%) **11g** (57%) **11h** (68%) **11i** (52%) **11j** (56%)

spectra were recorded on Bruker NMR instruments at 300 or 400 MHz for ^{1}H using tetramethylsilane as internal standard. The mass spectra were obtained on a Waters Micromass Quattro LC/MS instrument (positive ion detection, capillary voltage 3.98 kV). The melting points were measured with an Electrothermal melting point apparatus and are uncorrected.

3-Bromo-6-(pyridin-4-yl)imidazo[2,1-*b*][1,3]-thiazole (5). A solution of 2-bromo-1-(pyridin-4-yl)-ethanone hydrobromide (**3**, 9 g, 32 mmol) and 4-bromo-1,3-thiazol-2-amine (**4**, 5.7 g, 32 mmol) in ethanol (60 mL) was stirred under reflux for 12 h. The mixture was evaporated under reduced pressure, and the solid residue was treated with aqueous ammonia at room temperature for 2 h. The solid product was filtered, washed with cold water (3×100 mL), and dried. Yield 7.4 g (83%), white solid, mp 156–158°C. ^{1}H NMR spectrum (300 MHz), δ, ppm: 7.37s (1H, 2-H), 7.49 d (2H, H_{Py}, J = 6.3 Hz), 8.27 d (2H, H_{Py}, J = 6.3 Hz), 8.54 s (1H, 5-H). ^{13}C NMR spectrum (100 MHz), δ_C, ppm: 108.6, 111.2, 118.5, 126.7, 133.2, 146.6, 148.2, 150.5. Mass spectrum: m/z 281 $[M + 2]^+$.

Table 1. In vitro cytotoxicity (IC_{50}, μM) of compounds **11a**–**11j** against human cancer cell lines[a]

Compound no.	PC3	A549	MCF-7	DU-145
11a	0.11±0.08	0.01±0.004	0.05±0.003	0.22±0.05
11b	1.36±0.74	1.82±0.55	1.02±0.034	1.61±0.83
11c	3.18±1.86	–	4.71±2.33	5.69±2.51
11d	–	6.19±3.12	7.32±4.70	8.11±5.24
11e	10.5±6.21	–	–	5.35±3.06
11f	2.38±1.72	3.10±1.39	3.45±1.48	4.22±2.11
11g	–	–	–	11.3±5.64
11h	0.05±0.0062	0.03±0.0091	0.13±0.073	0.10±0.052
11i	0.29±0.041	0.12±0.043	0.76±0.082	0.53±0.024
11j	0.44±0.086	0.71±0.028	0.28±0.056	0.42±0.091
Etoposide	2.39±1.56	3.08±0.135	2.11±0.024	1.97±0.45

[a] A dash denotes no activity.

4-[6-(Pyridin-4-yl)imidazo[2,1-*b*][1,3]thiazol-3-yl]benzaldehyde (7). Compound **5** (7.3 g, 26 mmol), $Pd_2(dppf)Cl_2$ (1.9 g, 2.6 mmol), and 4-formylphenylboronic acid (**4**, 3.9 g, 26 mmol) were dissolved in 1,4-dioxane (100 mL), an aqueous solution of Cs_2CO_3 (25 g, 78 mmol) was added with stirring, and the mixture was heated at 90°C for 12 h. After completion of the reaction, the mixture was filtered, the filtrate was evaporated, and the crude product was extracted with ethyl acetate. The extract was washed with water, dried over Na_2SO_4, and evaporated, and the residue was purified by column chromatography using ethyl acetate–hexane (2:8). Yield 6.6 g (84%), off-white solid, mp 176–178°C. ^{1}H NMR spectrum, δ, ppm: 7.38 s (1H, 2-H), 7.56 d (2H, H_{arom}, J = 6.4 Hz), 7.85 d (2H, H_{Py}, J = 8.3 Hz), 7.94 d (2H, H_{arom}, J = 8.3 Hz), 8.28 d (2H, H_{Py}, J = 6.4 Hz), 8.64 s (1H, 5-H), 10.21 s (1H, CHO). ^{13}C NMR spectrum, δ_C, ppm: 108.6, 109.4, 118.5, 128.4, 130.4, 133.4, 133.7, 134.5, 136.3, 146.3, 150.1, 150.7, 192.4. Mass spectrum: m/z 306 $[M + H]^+$.

3-(4-Ethynylphenyl)-6-(pyridin-4-yl)imidazo-[2,1-*b*][1,3]thiazole (9). Dimethyl 1-diazo-2-oxo-propylphosphonate (**8**, 2 g, 10.3 mmol) was added to a solution of **7** (6.3 g, 20.6 mmol) and K_2CO_3 (8.5 g, 61.8 mmol) in 150 mL of anhydrous methanol, and the mixture was stirred at room temperature for 5 h. After completion of the reaction, the solvent was evaporated, the residue was diluted with methylene chloride (200 mL), and the solution was washed with 5% aqueous $NaHCO_3$, dried over Na_2SO_4, and evaporated. The crude product was purified by column chromatography using ethyl acetate–hexane (3:7) as eluent. Yield 5.3 g (84%), white solid, mp 183–185°C. ^{1}H NMR spectrum, δ, ppm: 3.12 s (1H, ≡CH), 7.40 s (1H, 2-H), 7.57 d (2H, H_{arom}, J = 6.4 Hz), 7.86 d (2H, H_{arom}, J = 8.3 Hz), 7.95 d (2H, H_{Py}, J = 8.3 Hz), 8.29 d (2H, H_{Py}, J = 6.4 Hz), 8.66 s (1H, 5-H). ^{13}C NMR spectrum, δ_C, ppm: 82.4, 84.2, 108.5, 109.4, 118.6, 122.5, 128.2, 132.6, 133.4, 133.7, 134.6, 146.5, 150.4, 150.8. Mass spectrum: m/z 302 $[M + H]^+$.

6-(Pyridin-4-yl)-3-{4-[3-(3,4,5-trimethoxyphenyl)-1,2-oxazol-5-yl]phenyl}imidazo[2,1-*b*][1,3]-thiazole (11a). Compound **9** (200 mg, 0.66 mmol) and (*E*)-3,4,5-trimethoxybenzaldehyde oxime (**10a**, 140 mg, 0.66 mmol) were dissolved in 9.1 mL of methanol–water (5:1), and bis(trifluoroacetoxy)iodobenzene (142 mg, 0.33 mmol) was added in three portions (3×0.5 equiv) every two hours. The mixture was stirred at room temperature for 7 h. After completion of the reaction (TLC), the mixture was diluted with ethyl acetate (5 mL) and filtered through a small silica plug, and the sorbent was washed with ethyl acetate (10 mL). The solvent was evaporated under reduced pressure to dryness, and the crude product was purified by column chromatography using ethyl acetate–hexane (1:1) as eluent. Yield 148.6 mg (44%), off-white solid, mp 245–247°C. ^{1}H NMR spectrum, δ, ppm: 3.76 s (6H, OCH_3), 3.81 s (3H, OCH_3), 7.21 s (2H, H_{arom}), 7.32 s (1H, 4′-H), 7.44 s (1H, 2-H), 7.58 d (2H, H_{arm}, J = 6.4 Hz), 7.87 d (2H, H_{Py}, J = 8.3 Hz), 7.97 d (2H, H_{arom}, J = 8.3 Hz), 8.30 d (2H, H_{Py}, J = 6.4 Hz), 8.68 s (1H, 5-H). ^{13}C NMR spectrum, δ_C, ppm: 57.5, 57.8, 99.3, 108.5, 109.6, 111.6, 118.5, 127.6, 127.9, 128.2, 133.3, 133.6, 134.1, 134.7, 140.4, 146.7, 150.1, 150.7, 154.5, 162.5, 170.4. Mass spectrum: m/z 511 $[M + H]^+$.

Compounds **11b–11j** were synthesized in a similar way from **9** and the corresponding oxime **10b–10j**.

3-{4-[3-(4-Methoxyphenyl)-1,2-oxazol-5-yl]-phenyl}-6-(pyridin-4-yl)imidazo[2,1-*b*][1,3]thiazole (11b). Yield 166.3 mg (57%), white solid, mp 224–226°C. ^{1}H NMR spectrum, δ, ppm: 3.86 s (3H, OCH_3), 7.12 d (2H, H_{arom}, J = 8.2 Hz), 7.36 s (1H, 4′-H), 7.45 s (1H, 2-H), 7.57–7.65 m (4H, H_{arom}), 7.87 d (2H, H_{Py}, J = 8.3 Hz), 7.96 d (2H, H_{arom}, J = 8.3 Hz), 8.30 d (2H, H_{Py}, J = 6.4 Hz), 8.67 s (1H, 5-H). ^{13}C NMR spectrum, δ_C, ppm: 57.4, 99.4, 108.6, 109.4, 115.3, 118.5, 127.6, 127.9, 128.2, 128.2, 129.5, 133.4, 133.7, 134.7, 146.7, 150.1, 150.6, 160.8, 162.8, 170.3. Mass spectrum: m/z 451 $[M + H]^+$.

3-{4-[3-(4-Chlorophenyl)-1,2-oxazol-5-yl]-phenyl}-6-(pyridin-4-yl)imidazo[2,1-*b*][1,3]thiazole (11c). Yield 169.7 mg (56%), white solid, mp 252–254°C. ^{1}H NMR spectrum, δ, ppm: 7.38 s (1H, 4′-H), 7.46 s (1H, 2-H), 7.59 d (2H, H_{arom}, J = 6.5 Hz), 7.64–7.71 m (4H, H_{arom}), 7.87 d (2H, H_{Py}, J = 8.4 Hz), 7.95 d (2H, H_{arom}, J = 8.4 Hz), 8.31 d (2H, H_{Py}, J = 6.5 Hz), 8.68 s (1H, 5-H). ^{13}C NMR spectrum, δ_C, ppm: 99.5, 108.6, 109.4, 118.5, 127.6, 127.9, 128.2, 128.7, 129.5, 129.7, 133.2, 133.7, 134.5, 134.8, 146.6, 150.3, 150.7, 162.6, 170.4. Mass spectrum: m/z 455 $[M + H]^+$.

3-{4-[3-(4-Bromophenyl)-1,2-oxazol-5-yl]-phenyl}-6-(pyridin-4-yl)imidazo[2,1-*b*][1,3]thiazole (11d). Yield 185.4 mg (56%), white solid, mp 265–267°C. ^{1}H NMR spectrum, δ, ppm: 7.40 s (1H, 4′-H), 7.47 s (1H, 2-H), 7.59 d (2H, H_{arom}, J = 6.5 Hz), 7.65–7.73 m (4H, H_{arom}), 7.87 d (2H, H_{Py}, J = 8.4 Hz), 7.95 d (2H, H_{arom}, J = 8.4 Hz), 8.31 d (2H, H_{Py}, J = 6.5 Hz), 8.68 s (1H, 5-H). ^{13}C NMR spectrum, δ_C, ppm: 99.5, 108.6, 109.4, 119.6, 123.3, 127.5, 127.9, 128.2, 128.7, 129.5, 132.7, 133.4, 133.7, 134.7, 146.7, 150.5, 150.7, 162.8, 170.3. Mass spectrum: m/z 500 $[M + 2]^+$.

3-{4-[3-(4-Nitrophenyl)-1,2-oxazol-5-yl]phenyl}-6-(pyridin-4-yl)imidazo[2,1-*b*][1,3]thiazole (11e). Yield 182.5 mg (59%), white solid, mp 271–273°C. ^{1}H NMR spectrum, δ, ppm: 7.43 s (1H, 4′-H), 7.48 s (1H, 2-H), 7.66 d (2H, H_{Py}, J = 6.5 Hz), 7.87 d (2H, H_{arom}, J = 8.4 Hz), 7.95 d (2H, H_{arom}, J = 8.4 Hz), 8.09 d (2H, H_{arom}, J = 7.5 Hz), 8.20 d (2H, H_{arom}, J = 7.5 Hz), 8.32 d (2H, H_{Py}, J = 6.5 Hz), 8.70 s (1H, 5-H). ^{13}C NMR spectrum, δ_C, ppm: 99.3, 108.5, 109.4, 118.3, 121.8, 127.6, 127.9 , 128.3, 128.7, 129.2, 133.4, 133.7, 134.7, 146.7, 150.3, 150.7, 162.8, 165.3, 170.4. Mass spectrum: m/z 466 $[M + H]^+$.

3-{4-[3-(4-Methylphenyl)-1,2-oxazol-5-yl]-phenyl}-6-(pyridin-4-yl)imidazo[2,1-*b*][1,3]thiazole (11f). Yield 139.8 mg (49%), white solid, mp 244–246°C. ^{1}H NMR spectrum, δ, ppm: 2.38 s (3H, CH_3), 7.29 d (2H, J = 7.8 Hz), 7.38 s (1H, 4′-H), 7.46 s (1H, 2-H), 7.59 d (2H, H_{Py}, J = 6.5 Hz), 7.63–7.71 m (4H, H_{arom}), 7.95 d (2H, H_{arom}, J = 8.4 Hz), 8.31 d (2H, H_{Py}, J = 6.5 Hz), 8.68 s (1H, 5-H). ^{13}C NMR spectrum, δ_C, ppm: 23.3, 99.5, 108.8, 109.4, 118.5, 127.4, 127.9, 128.2, 128.7, 129.7, 130.1, 133.2, 133.6, 134.6, 142.5, 146.7, 150.1, 150.6, 162.5, 170.4. Mass spectrum: m/z 435 $[M + H]^+$.

4-(5-{4-[6-(Pyridin-4-yl)imidazo[2,1-*b*][1,3]thiazol-3-yl]phenyl}-1,2-oxazol-3-yl)benzonitrile (11g). Yield 166.7 mg (57%), white solid, mp 267–269°C. ^{1}H NMR spectrum, δ, ppm: 7.43 s (1H, 4′-H), 7.48 s (1H, 2-H), 7.59 d (2H, H_{Py}, J = 6.5 Hz), 7.88 d (2H, H_{arom}, J = 8.4 Hz), 7.96 d (2H, H_{arom}, J = 8.4 Hz), 8.06 d (2H, H_{arom}, J = 7.4 Hz), 8.18 d (2H, H_{arom}, J = 7.4 Hz), 8.32 d (2H, H_{Py}, J = 6.5 Hz), 8.71 s (1H, 5-H). ^{13}C NMR spectrum, δ_C, ppm: 99.4, 108.5, 109.4, 111.6, 118.5, 119.5, 127.5, 127.8, 128.2, 128.6, 129.2, 133.4, 133.7, 134.5, 134.7, 146.7, 150.6, 150.9, 162.6, 170.5. Mass spectrum: m/z 446 $[M + H]^+$.

6-(Pyridin-4-yl)-3-{4-[3-(pyridin-4-yl)-1,2-oxazol-5-yl]phenyl}imidazo[2,1-*b*][1,3]thiazole (11h). Yield 190.2 mg (68%), white solid, mp 310–312°C. ^{1}H NMR spectrum, δ, ppm: 7.44 s (1H, 4′-H), 7.49 s (1H, 2-H), 7.59 d (2H, H_{Py}, J = 6.5 Hz), 7.89 d (2H, H_{Py}, J = 8.4 Hz), 7.97 d (2H, H_{arom}, J = 8.4 Hz), 8.11 d (2H, H_{arom}, J = 7.6 Hz), 8.19 d (2H, H_{Py}, J = 7.6 Hz), 8.32 d (2H, H_{Py}, J = 6.5 Hz), 8.71 s (1H, 5-H). ^{13}C NMR spectrum, δ_C, ppm: 99.4, 108.6, 109.5, 118.5, 124.4, 127.4, 127.7, 128.3, 133.4, 133.7, 134.1, 134.7, 146.7, 150.4, 150.7, 160.3, 162.6, 170.5. Mass spectrum: m/z 422 $[M + H]^+$.

3-{4-[3-(5-Bromothiophen-2-yl)-1,2-oxazol-5-yl]-phenyl}-6-(pyridin-4-yl)imidazo[2,1-*b*][1,3]thiazole (11i). Yield 172.4 mg (52%), white solid, mp 294–296°C. ^{1}H NMR spectrum, δ, ppm: 7.44 s (1H, 4′-H), 7.55–7.59 m (3H, 2-H, 3″-H, 4″-H), 7.65 d (2H, H_{Py}, J = 6.5 Hz), 7.89 d (2H, H_{arom}, J = 8.4 Hz), 7.97 d (2H, H_{arom}, J = 8.4 Hz), 8.32 d (2H, H_{Py}, J = 6.5 Hz), 8.72 s (1H, 5-H). ^{13}C NMR spectrum, δ_C, ppm: 101.4, 108.5, 109.6, 112.5, 118.6, 127.5, 127.9, 128.4, 128.7, 130.5, 133.5, 133.8, 134.7, 141.3, 146.7, 150.5, 150.9, 152.7, 170.5. Mass spectrum: m/z 506 $[M + 2]^+$.

3-{4-[3-(1*H*-Pyrazol-3-yl)-1,2-oxazol-5-yl]-phenyl}-6-(pyridin-4-yl)imidazo[2,1-*b*][1,3]thiazole (11j). Yield 150.9 mg (56%), white solid, mp 286–288°C. ^{1}H NMR spectrum, δ, ppm: 6.84 d (1H, J = 3.2 Hz), 7.44 s (1H, 4′-H), 7.49 s (1H), 7.57 m (3H), 7.74 d (1H, J = 3.2 Hz), 7.88 d (2H, J = 8.4 Hz), 7.97 d (2H, J = 8.4 Hz), 8.32 d (2H, H_{Py}, J = 6.5 Hz), 8.72 s (1H, 5-H). ^{13}C NMR spectrum, δ_C, ppm: 101.4, 103.5, 108.5, 109.4, 118.5, 127.4, 127.9, 128.3, 133.3, 133.6, 134.5, 134.8, 146.5, 150.4, 150.6, 152.4, 152.8, 170.4. Mass spectrum: m/z 411 $[M + H]^+$.

MTT assay. Each well of a 96-well tissue culture microtiter plate was inoculated with 100 μL of complete medium containing 1×10^4 cells. The plates were incubated at 37°C in a humidified 5% CO_2 incubator for 18 h prior to experiment. After removal of the medium, 100 μL of a fresh medium containing the test compound or etoposide at different concentrations (0.5, 1, and 2 μM) was added to each well, and the plate was incubated at 37°C for 24 h. The medium was then discarded and replaced with 10 μL MTT dye, and the plate was incubated at 37°C for 2 h. The resulting formazan crystals were solubilized in 100 μL extraction buffer. The optical density was read at λ 570 nm using a Themo Scientific Varioskan multimode microplate reader. The percentage of DMSO in the medium never exceeded 0.25%.

FUNDING

This work was supported by ongoing institutional funding. No additional grants to carry out or direct this particular research were obtained.

CONFLICT OF INTEREST

The authors of this work declare that they have no conflicts of interest.

SUPPLEMENTARY INFORMATION

The online version contains supplementary material available at https://doi.org/10.1134/S1070428023100184.

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SOUTH INDIA JOURNAL OF SOCIAL SCIENCES
ISSN: 0972 - 8945

ROLE OF IMPACT OF SELF HELP GROUPS (SHGS) BANK LINKAGE PROGRAMME ON PSYCHOLOGICAL EMPOWERMENT OF WOMEN IN INDIA: WITH REFERENCE TO KRISHNA DISTRICT, ANDHRA PRADESH

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Abstract:
The aim of the present study is to understand the impact microfinance in the psychological empowerment of women in Krishna District, Andhra Pradesh. As the successive governments pushing microfinance agenda as a panacea of all problems it has grown into unmanageable proportions and resulted in crisis like situation. The study has conside 750 sample in the Krishna District of Andhra Pradesh and it identify various issues in SHG Bank Linkage programme in women empowerment. The study aims at an in depth analysis of various key factors in the microfinance sector and to suggest measures for proper delivery of the desired goals.

Key Words: Micro Finance, Women Empowerment, SHG, Psychological Empowerment

1. Introduction:

NABARD, through its' Micro Credit Innovations Department has continued its role as the facilitator and mentor of microfinance initiatives in the country. The overall vision of the department is to facilitate sustained access to financial services for the unreached poor in rural areas through various microfinance innovations in a cost effective and sustainable manner.

After more than 25 years of SHG Bank linkage, the programme has grown exponentially; the system has evolved and matured enabling the SHGs access to large loans under SHG BLP besides loans that SHGs have been able to access from their own federations and the NGO MFIs. As on 31 March 2020 the SHG BLP programme has reached many a milestone with a total membership of about 1.02 crore groups covering 12.4 Crore households across India. The programme has made

A Study on Tenant Farmers in Andhra Pradesh, India: A Critical Appraisal

7

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Abstract

Leased farming, also called as tenant farming, has been a bane to tenant farmers in Andhra Pradesh with 70 per cent of cultivators who have committed suicide seen to be tenants. The increased farmland lease rates, non-availability of loan facility from public sector banks and drop in prices at the time of harvest for the output are the major reasons why tenant farmers tend to commit suicide. The tenant farmer need pay rent for the land dependents on type of crops cultivated and availability of water facility. In addition to the land, they also need loan to buy pesticides, urea, seeds and agriculture labour. Natural calamities like untimely rains and drop in prices during the time of harvest apparently put immense financial burden on tenant farmers who sometimes see the only way out of the problem to be to commit suicide. This paper studies the important issues relating to the tenant farmers in Andhra Pradesh, India it also presents the challenges of tenant farmers in Andhra Pradesh, India.

Key words: Tenant Farmers, Institutional Credit, Insurance, Tenant Farmers Cards,

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Shodha Prabha

UGC CARE LISTED
ISSN : 0974-8946

CERTIFICATE OF PUBLICATION

This is to certify that the article entitled

A STUDY ON THE IMPACT OF LAYOFFS ON THE EMPLOYEES AND COMPANIES (SELECT SAMPLE OF LAYOFFS DURING THE CURRENT FISCAL YEAR 2022-23)

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Published in

Shodha Prabha: ISSN 0974-8946
Volume – 48, Issue 01, No.4 : 2023
UGC Care Approved, Peer Reviewed and Refereed Journal

ज्ञान-विज्ञान विमुक्तये
UGC
University Grants Commission

Editor
Mardan Mishra
Shodha Prabha

शोध प्रभा
ISSN: 0974-8946
Shodha Prabha (UGC CARE Journal) Vol. 48, Issue 01, No.4 : 2023

A STUDY ON THE IMPACT OF LAYOFFS ON THE EMPLOYEES AND COMPANIES (SELECT SAMPLE OF LAYOFFS DURING THE CURRENT FISCAL YEAR 2022-23)

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ABSTRACT

Layoff of employees is a strategically planned elimination of large number of employees from the jobs with view to economic stability or organizational effectiveness. This impact both company and employees. Employees will effect in financial and physical health and psychological aspect also. Here the HR professionals have to plan to handle the situations in a strategic manner. This paper provides an overview on the current fiscal year layoffs as well as their impact on employees and companies. In addition this paper provides the alternatives to the layoffs.

Keywords: Employees, Layoffs, Impacts, loyalty, Distress, Leadership

INTRODUCTION

A slowdown in consumer demand post the Covid-19 pandemic and uncertain macroeconomic conditions triggered mass layoffs across major US tech firms over the past few months. This included massive job cuts at Meta, Amazon, Microsoft, and Alphabet, among many other companies. Indian startups, too, have been impacted over the last six months as they struggle to raise funds in a tough global environment.

Indian startups, too, have been impacted over the last six months as they struggle to raise funds in a tough global environment.

There has been a flood of news reports about layoffs: Accenture plans to cut 19,000 jobs; Indeed to lay off 2,200 (15 percent) employees; Amazon said it will lay off 9,000 people, in its second round of job cuts; GitHub has laid off its entire engineering team in India (over 100 jobs); Disney announced three rounds of layoffs, that could affect about 7,000 employees. Indian startups have already laid off close to 5,000 people in 2023, as per Layoffs.fyi, and the next few months will see many more. Here the employees have to get ready with the alternatives.

Experts believe this should be taken as a cyclical movement. However, for tech workers and students looking for jobs in the sector, it is a nightmare.

ISSN: 0974-8946
Vol. 48, Issue 01, No.4 : 2023

REVIEW OF LITERATURE

One study (Cappelli, Bassi, Katz, Hnoke, Isterman, & Useem, 1997) found that stress-related illnesses were 50% higher in the companies that had downsized their workforce compared to those companies that had not undergone downsizing. Furthermore, cases of employee burnout were more than twice as high at companies that had downsized compared with those that had not. Since work provides structure for one's time, social connectedness, feelings of self-worth, and the valued role of being a "breadwinner" in the family, losing one's job entails confronting the losses associated with such social and psychological benefits (Ramlal, Al-Sabaan, and Magbool, 2014).

Layoffs can take a heavy toll on both employees and their family members. A newly laid-off employee can experience feelings of anger, irritability, vulnerability, rejection, and helplessness. These negative emotions can also spread amongst loved ones, creating long-term hardships for those who are terminated as part of the rightsizing or downsizing policies. Even though there is no clear-cut or linear step-by-step process in which a laid-off employee deals with the challenges of being let go, the emotional, social, financial, and physical impacts are some of the hardships that these adults might experience (Kurebwa, 2011; Datta, Guthrie, Basuil, & Pandey, 2010; Mujtaba & McCartney, 2010)

STATEMENT OF THE PROBLEM

The research problem for this study is that layoffs affect employees who are part of the organization during and after a layoff and downsizing event, as well as employees who stay with the organization. The study revealed the challenges employees undergo and the impacts to working relationships with their managers during and after the downsizing and layoff process in an organization.

OBJECTIVES OF THE STUDY

1. To outline the layoffs in the corporate world in the current fiscal year
2. To study the impact of layoffs on company, employee and leadership
3. To offer suggestions to handle the layoffs by the HR Department

LAYOFFS IN CORPORATE WORLD

Layoffs at International Companies: (Planning to Layoff in the current fiscal year-2023)

NAME OF THE COMPANY	LAYOFFS
Walt Disney	4000
Walmart	2000
Meta	10000
LinkedIn	617
E Bay	700
Zoom	1300
Accenture	19000

ISSN: 0974-8946
Vol. 48, Issue 01, No.4 : 2023

Dell	6650
Pinterest	150
Paypal	2000
IBM Corp	3900
Cognizant	3500
Spotify	600
Alphabet	12000
Microsoft	10000
Amazon	9000
Twitter	3700
Lyft	683
Stripe	7000
DoorDash	8600
SAP	3000
Cisco	673
HP	6000
Dealshare	100

Source: Economic Times/ Etech/ May 04, 2023

LAYOFFS AT INDIA

NAME OF THE COMPANY	LAYOFFS
Delashare	100
Swiggy	380
MohallaTech	500
Ola	200
Cashfree	100

Source: Economic Times/ Etech/ May04, 2023

LAYOFFS AT STARTUPS (SECTOR WISE)

SECTOR	NO.OF COMPANIES	LAYOFFS	COMPANIES	REASONS
Edtech	15	7,868	Byju’s, Unacademy, vedantu, WhiteHat Jr., Toppr, Practicality, FrontRow, Lido, invact, Metaversity, Yellow Class, Techmint, Lead, Udayy, Crejo.Fun, Eruditus	Restructuring, cost cutting, financial constraints, employees asked to resign, founder conflict, performance-related layoffs, company shut downs

Consumer Services	8	5,015	Ola, BlinkIt, Oyo Hotels & Homes, Fraazo, Verse, Zomato, Zeet11, Koo	Restructuring, cost cutting, performance – related layoffs, company shut downs
Ecommerce	8	2,541	Cars24, Udaan, Meesho, Trell, Citymall, Furlenco, Yaari, Yojak	Cost cutting and automation, restructuring, runway extenstion, financial constraints
Fintech	7	665	Rupeek, Wazrix, Plum Insurance, Vauld, OKCredit, Clear, Nova Benefits	Cost Cutting, Adverse Economic Conditions, restructuring business model change
Health Care	5	960	Mfine, HealthifyMe, Innovaccer, Pharmeasy, Breath well Being	Financial Constraints, restructuring, adverse economic conditions, cost cutting

Source: Longhouse Consulting for Economic Times

EFFECTS OF LAYOFFS

I. Impact on Company:

Direct Costs

One of the things a business owner considers when he needs to save money at a company is laying off staff in anticipation of saving money on payroll and benefits. However, the company often ends up incurring costs as a result of the layoff that minimize the savings. For example, the company may have to issue severance pay to outgoing employees, pay overtime wages to remaining employees and use placement services for temporary help.

Increased Turnover

Business owners who execute layoffs in their companies frequently see additional employees resign from their jobs. Layoffs can disillusion top-ranking employees who then opt to leave the company. Watching a colleague leave involuntarily could cause an employee to consider job offers from other companies seriously or to actively seek new job opportunities.

Decreased Customer Loyalty

Laying off employees can have a significant negative effect on customer retention. Every customer is an asset to any company, and the employer must find ways to retain each of them. When a company lays off its employees it sends out a message to customers that it is undergoing some sort of crisis. Fewer employees could mean delays in the delivery of goods and services, further alienating customers.

Emotional Distress

The person who is laid off suffers the most distress, but remaining employees suffer emotionally as well. Because the layoff disrupts the status quo, employees have to pick up extra responsibilities and form new work relationships, which can cause stress. The productivity level of employees who work in fear is likely to go down. The situation is even more damaging to the company when the person who has lost his job stays around until the date of termination of his contract.

II. Impacts on Employee:

- Employee may lose Trust on company
- Lowered Productivity
- Altered work dynamics
- Employee morale may decrease
- Increase absenteeism/ turnover
- Social Impact
- Financial impact
- Physical impact

III. Impact on HR Department:

The handling of the layoff is very challenging task for the employees of the hr department, they have to handle the entire process of layoff in a strategic manner and develop positive situation between the employees and their managers. The role of the HR's to explore the all available alternatives so that decision makers have all the facts needed to take the decisions. The process has a great impact on the leadership of the HR people.

RESEARCH FINDINGS

Managing Layoff is the need of the hour for employees as well as to the company. It is hard to accept in the employee point of view and to convey the layoff news to employee is also a major hard thing in the view of employer. Both the parties have to look after about various other alternatives for managing the situation. The companies have to develop various alternatives to the layoff. The following are the alternatives which are practiced by the corporate world are

- Reducing hours worked to spread the economic consequences of cost cutting among all employees rather than targeting a few persons for layoff.
- Adopting a voluntary separation program (VSP). VSPs are particularly good at reducing the risks of legal liability associated with terminating employees.
- Identifying and eliminating wasteful practices.

ISSN: 0974-8946
Vol. 48, Issue 01, No.4 : 2023

- Ask employees to take Furloughs. TCS Company offer the Furloughs to employees at this period employees will not paid salary but the Insurance and medical facilities will be given. This will enhance the employee morale towards the company and job as they are secured with job.
- Job sharing lets two employees share duties in a job that normally would be filled by one full-time employee."The hope of job sharing is to reduce hours, save costs and, ultimately, provide employees the ability to resume their normal work schedule once business improves,"

CONCLUSION

The Apple CEO, Tim Cook has said that mass layoffs are a ‘last resort’ for him. Cook told CNBC that he views that mass layoff is not something that we are talking about this moment, continuing to be extremely prudent on hiring. How a company grow when that company is layoff its employees. Layoff leads to restructure /shuffle of the work force here the HR department has to handle strategically. Through effective leadership, management and implementation of policies will give the direction to the company for handling layoffs.

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Kanpur Philosophers
ISSN 2348-8301
International Journal of humanities, Law and Social Sciences
Published biannually by New Archaeological & Genological Society
Kanpur India

Vol. X, Issue I(F) : 2023

A STUDY ON CAREER STARTS WITH TCS (TATA CONSULTANCY SERVICES) EMPLOYEES - AMENITIES WITH WORK-LIFE BALANCE

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Abstract

According to a recent check conducted by Job buzz, youthful Indian professionals prefer to work for transnational pots. Out of a total number of 8000 replies, roughly 22 % were of the opinion that MNCs offer a better pay package; around 1000 replies say it's because of a better work-life balance; and another 1300 said they prefer multi-nationals because of the well-defined career path TCS is one of the top-notch transnational information technology service, consulting and business results companies in the country. Nearly every IT graduate aspires for a job in Tata Consultancy Services (TCS). Being placed then a dream come true for them. But it requires thetop-most grades and unknown aptitude for a successful TCS career. Working at TCS can be an enriching experience as the company offers a superb working terrain and a transparent elevation system. The career or job scale is like the scale within any IT company. It starts with the intern or trainee at the nethermost position and moves forward towards the loftiest position positions as the hand earnings experience and knowledge. TCS is treated as veritably good company for Fresher's. It provides job security, and good pay to freshers piecemeal from it there are numerous retired benefits of joining TCS for Freshers. I'm describing retired benefits. Health insurance- 2 lakh for hospitalization, Food rates- minimum in the canteen, Advanced education it provides advanced education for the workers, Access to the library- TCS gives access to the library for workers, Abatements on shopping, On time payment, Great literacy openings, Work with foreign guests, Payment of your quantum, Fun conditioning. Holistic well-being programs within TCS promote a healthier life, offer work-life balance, and take into account emotional health.

Keywords: Job buzz, transnational pots, work-life balance, career path, transparent elevation system, job security, health insurance, canteen, library.

Introduction

There must be some work to live, but that work should not be life. Nowadays, the gap between professional life and personal life is blurred for many people. Especially time for personal life is lost. They are living such a busy life that they cannot take care of their family and personal needs. As most of the day is devoted to working, personal life shrinks, resulting in increased frustration. Showing frustration on others creates more problems. Physically and mentally tired and suffering from diseases. Career satisfaction is achieved only when there is a balance between work life and personal life. Physical and mental health is good. Relationships are healthy. But the real challenge is achieving this balance that is so beneficial to your well-being. It is not easy to come by.

By understanding the significance of maintaining a healthy work-life balance, anyone will get motivated to take the necessary way for achieving this balance. Work-Life balance is profitable for the workers and association as well. A balance between work and particular life helps in perfecting hand productivity, morale and health condition. In fact, work-life balance should be a precedence for all of us. An imbalance in any of the fronts will make life delicate and pose several hazards or challenges in terms of health, happiness, and emotional stability.

Tata Consultancy Services

Founded by Jamshedji Tata in 1868, the company gained international recognition after acquiring several international companies. Each Tata company operates independently under the guidance and supervision of its own board of directors, and shareholders. Recognized as the founder of the Tata Group, Jamshedji Tata is sometimes considered the 'Father of Indian Industry'.Tata Consultancy Services (TCS) is the largest IT Company in India. It is a subsidiary of Tata Group. Its head office is located in the city of Mumbai, India. TCS operates in 149 locations covering 46 countries.In April 2018, TCS became the first Indian IT company to reach $100 billion market capitalization. Brand Finance 2022 Global 500 Report has named Tata Consultancy Services (TCS) as the second most valuable brand in IT services worldwide.Tata Consultancy Services Limited originally started as "Tata Computer Systems", was established in 1968 by Tata Sons Limited. In 1980, TCUS established India's first software research and development center, the Tata Research Development and Design Center (TRDDC) in Pune.Tata Consultancy Services Limited is an IT Services, Business Solutions, and Outsourcing organization. The company offers a consulting-based, integrated portfolio of IT-based services including Application Development, Maintenance, Business Intelligence, Enterprise Solutions, Assurance Services, Engineering, Industrial Services, Infrastructure Services, Consulting, Asset Leveraged Solutions, and Business.It operates in the following segments namely Banking, Financial Services, & Insurance, Retail & Consumer Business, Communication, Media, & Technology etc. Tata Consultancy is a part of Tata Group (India), the largest multinational business group. It has more than 5,92,000 of the world's best-trained consultants in about 55 countries. The chairman of Tata Sons is usually the chairman of the Tata Group. As of 2020, there have been seven chairmen of Tata Group.

- Jamsetji Tata (1868–1904)
- Sir Dorabji Tata (1904–1932)
- Nowroji Saklatwala (1932–1938)
- J. R. D. Tata (1938–1991)
- Ratan Tata (1991–2012)
- Cyrus Mistry (2012–2016)
- Ratan Tata (2016–2017)
- Natarajan Chandrasekaran (2017–present)

Mission

The TCS Reality is a diverse and innovative company comprising of professionals and individuals sharing a common goal and commitment to provide the highest level of professional service and expertise to the people of our community.

Vision

To be the most trusted and respected company setting the highest of standards for ourselves and empowering customers and clients through knowledge and expertise to achieve their real estate goals.

Values

Honesty, Accountability**,** Respect, Code of Ethics and Standards of Practice, Family Culture**,** Leading Edge Service, Growth through innovation

TCS Recruitment Process

The TCS recruitment process consists of four rounds of selection and includes:

- **Written exam**
  - Quantitative Aptitude
  - Programming Language Efficiency
  - Coding Test and
  - E-mail Writing

Be especially careful while trying the dispatch questions as that's a crucial elimination round. See that you follow the precise instructions while trying the question.

- **Specialized interview**

This round is grounded on your capsule, branch of specialization, favourite subjects, etc. Be set to answer introductory questions relating to each of these motifs. Don't be surprised if you're asked to write law. Also be ready to answer mystification questions. In certain cases, the canvasser may also try and confuse/ mislead you into giving the wrong answer so watch out for similar trick questions.

- **Directorial interview**

A lot depends on your canvasser in this round. You could either be asked general specialized and HR questions, or it could be a pressure interview to hand your responses. Achievements mentioned in your CV could be questioned, and you may need to defend them. Alternately, you could be asked general questions about your work experience, council degree, specialization, amenability to dislocate, etc. In any case, no way fail to be gracious irrespective of which direction the interview takes.

- **HR interview**

Anticipate questions on work experience, education, pursuits and family background piecemeal from the usual HR questions like strengths and sins, reasons for applying to the company, why you should be hired, etc. Utmost campaigners tend to suppose that the HR interview is easy, but flash back that a bad HR interview could end your chances of getting the job indeed after passing all the former obstacles (aptitude test, specialized round, etc.). The key then to remain polite and confident. Interviews can be long and teary so do not forget to wear a smile! With TCS being named one of the world's top employers by the Top Employer Institute for successive times, a career at this company could be rich and satisfying experience for job campaigners. In order to be eligible you need to have a minimum of 60% throughout your degree with no backlog. A gap in career up to a maximum of two years is permissible but with a valid explanation

TCS Career Hierarchy

Working at TCS can be an enriching experience as the company offers a superb working terrain and a transparent elevation system. The career or job scale is like the scale within any IT company. It starts with the intern or trainee at the nethermost position and moves forward towards the loftiest position positions as the hand earnings experience and knowledge. To understand the career scale at TCS more, you can go through the following given information.TCS taken performance appraisal given below.

a. Project end appraisal for fresher's: a. Fresher's can apply to appraisal called for as first anniversary performance appraisal.B. Need to apply before 2 months of eligibility.C. Path – Ultimate's – speed – first anniversary appraisal.
b. Annual appraisal for experienced.
c. Setting all the goals and attributes.

TCS updated the anniversary policy for Experienced and freshers

Date of Anniversary in ongoing Financial year	Type of appraisal to be initiated in the ongoing Financial year
April & May	Annual Appraisal
June to January	Project end Appraisal from date of anniversary to end of Financial year
February and March	No appraisal for the ongoing Financial year

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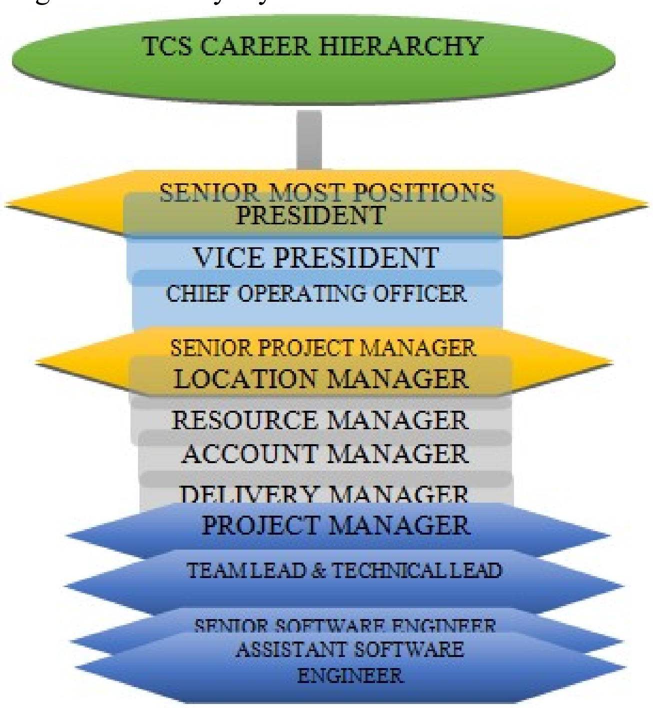
Career Management

TCS has multiple initiatives to help employees grow in their careers.

- XCELERATE is an integrated platform to capture associates' aspirations and map them to future opportunities.
- ICONNECT is a highly collaborative tool designed to help employees reach out to senior mentors for guidance on career paths, and have face-to-face dialogues about their roles and career. It provides flexibility for group mentoring as well as individual mentoring.
- INSPIRE is the high potential program for mid-level employees. It helps identify high potentials as early as possible, invest in them continuously, enable accelerated growth and transition them to leadership roles, and reward and recognize the success of their efforts.
- TALENT REVIEW is TCS process to assess and review the leadership pool in the organization. It enables leaders to share their career aspirations and preferences of mobility, followed by an assessment of their leadership attributes. The objective of the program is to create and sustain healthy leadership.
- EXCITING OPPORTUNITIES is the internal platform to publish niche and critical requirements to the leadership and high potential communities, thereby facilitating talent mobility. This embodies the company's philosophy of giving the first right of refusal for all leadership positions to internal candidates, thereby enabling better leadership development and building strong organizational loyalty.



Research Methodology

The present research is based on descriptive research design which tries to explain the relationship between career growth and benefits with work life balance. Employee performance is considered as dependent variable whereas work life balance is considered as independent variable. In this study data is collected secondary sources of data. For collecting Secondary data, TCS website in different articles, and research papers published in various journals, and different job portals-employee reviews are taken.

Objectives of the Study

1. To learn the components prompting the status of work life in TCS.
2. To understand the amenities provided by TCS to its employees
3. To study the existing system of Work-Life Balance of Employees in TCS
4. Seeking an entry- position to begin my career in a high-position professional terrain. apply strategies to ameliorate their adaptability and better manage with stress

Importance of the Study

- Prioritizing your health and heartiness
- freeing from technology from time to time
- Taking short breaks during extended working hours
- Chancing work that you enjoy doing
- Setting boundaries during off- work hours
- Making time for musketeers and family
- Picking up pursuits you enjoy
- Engage in employer-patronized conditioning outside of the plant

Literature Review

Seema Sharma(2018), in hear study said that reaching for the sky has come a habit with Aarthi Subramanian, The first woman to be appointed to the board of Tata Consultancy Services(TCS), Ms Subramanian has banked on gift, industriousness and resolve to find and fulfil her life's calling. And a luxurious calling it has been. Appointed as administrative director to the TCS board in March 2015. Ms Subramanian has operated in a variety of pivotal positions at TCS and has worked in, besides India, Sweden, the United States and Canada. She opens up in this interview with Christabel Noronha on the road that has brought her this far and the gests that have amended the trip. I like to call it work- life prioritisation because I do not know if there's a 13 balance. Either, a company like TCS gives you the openings and inflexibility to manage your constraints. TCS is a huge company and professional atmosphere is what we liked the most. Lot of conditioning related to social Seema Sharma (2018), in hear study said that reaching for the sky has come a habit with Aarthi Subramanian, The first woman to be appointed to the causes take place every now and also. Hand engagement conditioning is really amazing; similar as work life balance. My job is relatively gruelling and intriguing, good platoon work and job culture is another major factor that distinguishes TCS from other company's workers have worked with.

Ritu Anand, Vice President and Deputy Head of Global HR, TCS, say "The knowledge assiduity is characterized by a veritably youthful and dynamic pool. The new strain of IT professionals Aspires for a work terrain that's holistic, balanced and complete. A flexible work Environment and work- life balance are crucial motorists of hand satisfaction. "

Pranav Mittal (2020), set up in his study that People working in software assiduity find it veritably hard to maintain the work- life balance. Still, 23 people believe that TCS offers them occasion to balance their work as well as their particular life. Another important factor that lures the pool towards TCS is the company's work terrain. About 16 of workers suggested TCS for furnishing a favourable and healthy work terrain. Associates are the people with whom you spend utmost of your time at plant. Also, for running a design successfully, an understanding and collaborative platoon is an absolute necessity. About 15 of the repliers say that it's one of the major reasons they're associated with TCS. People tend to like a company that understands the requirements of its pool. A hand-friendly leave policy and regulations are among the top five reasons why people continue to work with the establishment. 14 people have approved of TCS of having good leave policy.

Sandeep Mellam(2021), said the impetuous response to the COVID- 19 situation and lockdown was to allow the workers to work from home(WFH). Numerous companies are now switching to endless work from home, with top companies similar as TCS planning to allow 75 of its workers to work from home by 2025. Nearly half of the workers who are working ever from home are happy with their job and don't want to change the way they work in the near future. Transformation to work from home is one of the biggest challenges HR directors are facing in this epidemic script. When the WFH accreditation was arrived at, some associations were suitable to acclimatize more snappily than others. The primary reason is the capability of the structure and the mind set to identify, embrace and execute new technologies. The druggies need a tool which can be penetrated from anywhere using any device with insignificant commotion. A productive terrain for remote working requires a strong, loyal, secure and scalable operation that supports positive hand productivity and collaboration.

Poojary Pallavi Poojary (2021), TCS pays a lot of attention to life outside work, especially the physical good of its workers. From sports clubs to marathons and gift events, TCS encourages workers to balance work with fun. A special citation has to be made about the significance given to fitness and physical health at TCS. Free spa access, periodic marathons. 15 are just many ways in which the platoon is encouraged to stay fit. Workers sounded to have a good work-life balance and authentically love the work that they were doing. TCS encourages its workers to continuously over-skill and keep up with trending technologies in the assiduity. It's both in the company's and the hand's interest to do so as the assiduity becomes further and further skill-concentrated.

TCS Employee Amenities

1. **Job Security**
   - The most effective is job security in comparison against the other IT industries which attracts many senior employees join TCS.
   - I've not heard of any incident within TCS where employees are forced to quit because of cost-cutting or inadequate performance.
   - Firing very rare and your job id stable unless you violate any HR or Company policy.
   - In TCS, nobody will keep track of your actual working hours, the swipe in and out time that your credit card, just as other companies.
   - They keep track of both your swipe in and out, and if you fall short of the hours required, the payment is automatically taken off, or you are required to take a leave application for the day.
2. **Work Burden**
   - Integrating batch scheduling processes across diverse IT environments
   - Ensuring security for job scheduler databases
   - Reducing batch windows
   - Upgrading scheduler and software tools
   - Developing a single point of control in the service suite
3. **Compensation On Working Hours**
   - Regular timings is 8 hours per day. The company need employee services in extra time they are given OT (Over Time).
   - OT depending upon our basic salary 13% per hour
4. **Leave Policy**
   - Sick Leave: -
     - 3 days per month / 10 days per year

    - There is unexpired.
    - Carry forward to next year.
- Casual Leave: -
    - 7 days per year
    - There is expired
- Plane Leave: -
    - This is non-paid (Long Leave)
    - Informed before week to higher officer.
- Leaves: -
    - You get approximately 33 days of leaves(Other than public holidays and National holidays).
- Festive Leaves: -
    - 2 days per year based on Location / Culture.
- Earned Leave: -
    - 16 days per year
    - There is unexpired.
    - Carry forward to next year. Up to 48 days leaves only.
    - Not need to leaves to Earn cash to basic salary.
- Unpaid Leave: -
    - Leave without pay (Higher Education). After 2 years' experience to TCS
- Maternity Leave: - Maternity Benefit Act, 1961
    - 13 weeks leaves applicable for life time for twice.
    - Maternity Leaves for women not taking the paid maternity leave for after six months went back to work.
    - PATERNITY LEAVE – 5 additional paid vacation days for new fathers.

5. **Work From Home**
    - TCS also announced Vision 25x25 wherein by year 2025, only 25% of the workforce will need physically present in TCS offices in any point and an employee needs to spend no more than 25% of their time in a TCS office to be 100% productive
6. **Health Insurance**
    - Reimbursement up to of 6,000 Rs for medical bills and up to 2,00,000 rupees for hospitalization.
    - Health insurance covered for lesser premium in comparison with other companies
7. **Employee Allowance**
    - Shift allowance, night shift allowance, and overtime payment depending on working hours.
    - One (first) time marriage tax allowance available
8. **Higher Education**
    - If you also give an external certification and pass the exam, the organization that you work for will reimburse the amount you paid for the Certification exam
    - It supports in the higher education its employees TCS tie-up with other colleges and universities.
9. **Access To The Library**
    - Employees can access the Safari Books website
10. **Discounts**
    - TCS employees can get a discount of 5 % on any product of West Side.
    - TCS Employees can also get a discount of Rs. 10000 – Rs. 40000 for different models of Tata car.
    - Croma Store currently offers Rs 2000-3000 Discounts in Sling Box HD and Sling Box Pro HD.

- TCS Employees in Tanishq will Get 10% Discount on Making Charges
- Hotel Discounts for Tata and TCS Employees
- TCS employees can enjoy this TAJ group hotel at a very affordable price.
- TCS employees can get a 5% discount on any West Side product employees get Rs 2500-4000 off Voltas Window AC & Split AC.

11. **Learning Opportunities**
    - Lots of technical contests are also moving from the TCS that can help one to research your professional understanding.
    - TCS offers free education through internal sites like Involve. Some good educational videos are available on the TCS videos website.
    - There are always various webinars and session lists that are being held throughout the TCS locations.
    - It is only necessary to sign up to join the **Webex** or take part in the classes to take part in these training sessions.
    - Internal soft skill training, external training, web-based training, etc are available.
    - Professional Development – Leadership training, workshops, and communities are available which helps employees to prepare their future roles.
    - Language Courses (Twice a year)
    - Leadership Development – leadership and specialist opportunities program
12. **Salary On-Time**
    - TCS paid on-Time salaries
13. **Food Rates On The Cafeteria**
    - The price list of food at the canteens is low in contrast to this surface price list.
14. **Transportation**
    - If you're employed in changes, TCS supplies taxi support.
    - If a lady associate is in nightshift, she needs to be mesmerized by yet another gent partner for her staying place. As a portion of security,
    - Free transportation.
15. **Reimburse Your Amount**
    - In case you'd some outside certificates in just about any tech, TCS will repay the amount you paid for this certification exam.
    - Employee Family tour amount will repay.
16. **Fun Activities**
    - one of the most modern infrastructure facilities, including a Volleyball court and a basketball court. Badminton, Table tennis, Gym (with good instructors), a Yoga and Dance space, and many more.
17. **Shopping Mart**
    - TCS Employee can avail this below TAJ group hotels at very low price.
    - TCS Employee can avail discount of 5% on any product of West Side.
    - TCS Employee can buy 3 books by paying for 2 books
18. **Work With Foreign Clients**
    - TCS provides the opportunity to work with foreign clients based on our performance.
19. **Women Security**
    - THE 5S safety training program was designed by Tata Consultancy Services, which has over 100,000 women on its rolls and is one of the world's largest employers of women.
    - is one of the components of TCS' employee safety program, which is a half-day training module covering theory and practice sessions.
    - he 5S Strategy stands for Scan, Shout, Stun, Scoot and Share.
20. **Child Care**
    - Some offices have maintainedday-carecentreson-site.

- ➢ Reimburse the day-care amount.

21. **Technical Competition**
    - ➢ TCS CodeVita has helped spread awareness about coding, and introduce thousands of students to the concept of programming as a sport.
    - ➢ online programming competition has led to fulfilling careers at TCS for participants.
    - ➢ Its continuing success underscores an emerging recruitment trend – the gamification of hiring.
22. **Appreciations**
    - ➢ Appreciation awards/rewards for an outstanding performance like Star of the Quarter Award, Star of the Month Award, Best Team Award, Star of the Year Award, etc.
23. **Awareness Programmes & Safety Measures**
    - ➢ TCS takes lots of security precautions to be able to prevent fire injuries or every other emergency scenario.
    - ➢ In reality, they are going to provide you virtual training about what best to handle any emergency circumstance.
24. **Fit For Life**
    - ➢ The majority of those TCS offices have been posh green arenas with a lot of gardens and also walking trails.
    - ➢ You'd like taking a walk in the night or just sitting near the gardens (Yes you have the time to squander in gardens, It's enjoyable)
    - ➢ You may enjoy gymnasium facilities, and there's a well-maintained sports stadium in just about most the campuses. You may delight in attending them.
    - ➢ Availability of Gyms and relax rooms.
25. **Dress Code & Id Card**
    - ➢ Monday to Thursday Formal Dress, and on Friday Jeans and collar T-shirts for men.
    - ➢ Chudidhar and saree for women.
    - ➢ ID card is Mandatory.

Data Interpretation and Analysis

The study was conducted at the Jobbuzz website. JobBuzz is **a** research website that gives active and passive job seekers the knowledge and resources to make intelligent career decisions.It has user generated content about company reviews, ratings, interviews and salaries. The TCS reviews based upon most of the youngsters they career starts with TCS. The influencing factors are given below.

TCS Company Reviews

Reviews about TCS company overall rating 3.33/5. The totalnumber of respondents of the TCS company 148.3k. It's undertaken with a view to assessing the level of satisfaction of candidates and understanding the various factors influencing them to join the youngsters at the company.

Factors	Salaries	Work-Life Balance	Culture	Growth
Rating	**3.15/5**	**3.52/5**	**3.46/5**	**3.18/5**

The above-mentionedratings of the different factors say most of the reviewers feel happy to work with TCS

Conclusion

TCS maintains quality of work life to continue to attract and retain employment it will positively nurture a more flexible, loyal, and motivated workforce leading to reduce employee retention to stress. The TCS Companyneeds to be more flexible so that they develop their talented workforce and gain their commitment and tin competitive advantage the organizations must be concerned about their human resources who are their most important assets and take consistent and steadfast measures to improve them and employ high-quality work-life experiences. Remunerations and Compensations as per work along with additional monetary benefits play an important role in enhancing employee job satisfaction levels. Thus organizations need to be more concerned and sensitive about these factors.Availability and use of work-life balance practices, more provided by Management and their further support will cut back work-life conflict and the organization's productivity will increase.

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A LITERATURE SURVEY ON THE FACTORS IMPACTING WORK-LIFE BALANCE, AND CONSEQUENCES OF WORK-LIFE IMBALANCE

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Abstract

The concept of work-life balance has gained significant attention in recent years due to the changing nature of work and its impact on individuals' well-being. This literature review provides an overview of the key themes, theories, and empirical findings related to work-life balance. It examines the definitions and conceptualizations of work-life balance, explores the factors influencing work-life balance, and discusses the consequences of work-life imbalance. The review also highlights the strategies and interventions proposed to enhance work-life balance and concludes with recommendations for future research in this area.

Introduction

Definition and Conceptualization

Work-life balance is the equilibrium an individual seeks between their professional or work-related responsibilities and their personal life, including family, relationships, leisure activities, and self-care. It is a concept that recognizes the importance of maintaining a harmonious and fulfilling life that encompasses both career aspirations and personal well-being. It involves allocating time, energy, and attention to different areas of life in a way that prevents excessive work-related stress or burnout, promotes overall well-being, and allows individuals to lead meaningful and satisfying lives. It is increasingly recognized as essential for individual well-being, productivity, and overall satisfaction with life, and employers and organizations have started acknowledging its significance and implementing policies and practices that promote a healthy work-life balance for their employees. It is important to note that achieving a work-life balance is a continuous and individualized process that may vary throughout a person's life, and individuals may need to regularly reassess and adjust their priorities and boundaries to maintain a sense of balance that works for them.

Historical Perspective and Evolution of the Concept

Work-life balance has evolved over time due to societal norms, workplace dynamics, and individual expectations. The Industrial Revolution (18th-19th centuries) faced long hours, poor working conditions, and limited leisure time. The Labor Movement (19th-20th century) aimed for reduced hours, better wages, and improved conditions. The Post-World War II Era (mid-20th century) saw a shift towards a structured workweek and a 9-to-5 work model, separating breadwinning and homemaking roles. The concept has evolved from focusing on economic productivity to recognizing personal well-being and fulfilment. The Women's Liberation Movement (1960s-1970s) emphasized the need for work-life balance, especially for women juggling career and family responsibilities. Technological advances and globalization have significantly impacted work-life balance, with the Contemporary Era (21st century) recognizing the importance of work-life balance for overall well-being and productivity. Organizations and employers are implementing policies and initiatives to support work-life balance, such as flexible working arrangements, telecommuting options, paid parental leave, and wellness programs.

Importance and Relevance of Work-Life Balance in Contemporary Society

Work-life balance is crucial for maintaining physical, mental, and emotional well-being, enhancing productivity, and promoting gender equality and workforce diversity. It prevents burnout, reduces health risks, and promotes a healthier lifestyle. Healthy individuals are more productive, perform better in professional roles, and nurture personal relationships. Policies like flexible working hours and parental leave create an inclusive workforce, allowing individuals to actively participate in both work and personal life. Companies that prioritize work-life balance initiatives attract and retain top talent. Additionally, work-life balance fosters social connections, belonging, and personal fulfilment. Below Mentioned Research questions can guide our literature survey and help you identify the existing knowledge, gaps, and potential areas for further exploration within the field

1. **RQ1**. What are the effects of work-related stress and job demands on work-life balance?
2. **RQ2**. What is the impact of organizational culture and policies on work-life balance?
3. **RQ3**. How do job characteristics (e.g., workload, flexibility, autonomy) influence work-life balance?
4. **RQ4**. What role do individual factors (e.g., personality traits, gender, and age) play in work-life balance?

Methodology

The literature review was conducted using a systematic approach, involving four steps. The first step involved reviewing abstracts from databases like EBSCO, and JSTOR, as well as articles from publishers like Willy Blackwell, Tylor & Francis Ltd, Sage Publications, American Accounting Association, and Mdpi. The literature survey was conducted using the search terms WLB, factors influencing WLB, and Consequences of work-life Imbalance between the periods 2020 to 2023. The search process identified 912 relevant papers, with scholarly articles concerning work-life balance (WLB) published in English in journals listed in Administrative Sciences, Harvard Business Review, International Journal of Human Resource Management, Current Psychology, Southern Communication Journal, Employee Relations, Social Policy & Administration. The second step removed duplicates, reducing the total number of papers to 98. The third step filtered papers based on language, reducing related papers to 58. The fourth step supplemented the organic search for related articles, resulting in 58 papers

Literature Survey

Factors Influencing Work-Life Balance

Factors influencing work-life balance include workload, time constraints, flexibility, organizational culture, and personal priorities and values. Aligning these factors with work and personal choices is crucial for achieving balance. Technology, connectivity, social networks, cultural norms, and financial considerations also impact work-life balance expectations. Continuous assessment and choices that align with personal needs and priorities are essential for achieving work-life balance.

Work-Related Factors (Job Demands, Autonomy, Flexibility)

Work-life balance is essential for employee well-being and productivity. Factors influencing it include flexible work arrangements, workload, job demands, supportive organizational culture, autonomy, managerial support, and a positive work environment. Managers play a vital role in facilitating work-life balance, while workplace amenities and programs enhance satisfaction. Organizations should create a healthy work environment that recognizes employee needs.

Khateeb Fatima Riyaz (2022), this study reviews work-life balance policies (WLBPs) in India using a four-fold classification and 44 papers published since 2004. The research is limited, with most studies in IT and finance firms. The findings should not be interpreted as indicative of India's work culture, as the sample is limited to these industries.

Sonali Bhattacharya (2020), this study develops a multidimensional work-life balance scale to evaluate personnel's work-life balance in the banking and information technology sectors. It finds that work-life balance is influenced by organizational family work culture, personal traits, and familial support. The study finds no significant difference in work-life balance with family structure variances, indicating the total influence of societal, organizational, personal, and familial resources.

Raymond Loi, Angela J. Xu, Cheris W.C. Chow, and Wilco W.H. Chan (2020), A conceptual model explores job crafting as a mediator between customer participation and service employees' work-to-family enrichment, with OBSE moderating the indirect relationship.

Vanessa Ratten (2023), The COVID-19 pandemic has impacted management education, requiring an increased emphasis on games, simulations, work/life balance, and remote learning. This article explores post-pandemic changes in virtual classrooms and met-averse usage, as well as future research suggestions for theory development and impactful research.

Anurag Shanker (2022), Flexible work arrangements are increasingly popular in progressive organizations, improving employees' well-being and work-life balance. This study examines the relationship between these arrangements and work-life balance, finding that they enhance physiological and mental well-being, increase output, commitment, and loyalty, and benefit both employees and the organization.

Jamila Lamane-Harim, David Cegarra-Leiva & Ma Eugenia Sánchez-Vidal (2021), the article examines the impact of work-life balance practices and supportive culture on employee retention in SMEs in Spain. It finds WLBSC crucial for job satisfaction, organizational commitment, and reduced conflict while fostering a supportive culture.

Ashok Kumar Goute, Koti Vinod Babu, and Namratha V Prasad (2021), the case study examines Hindustan Unilever Limited (HUL), India's largest FMCG company’s HR policies for work-life balance. HUL prioritizes flexible schedules, collaboration, and open workspaces for business growth. The company considers a new Labor Proposal with four Labor Codes, aiming to remain an 'Employer of Choice' and 'CEO Factory' in India.

Abeba Beyene Mengistu & Mahlet Adugna Bereded (2021), the study reveals low perceived workload, family role overload, and work-family balance in Ethiopian NGOs. Moderate Work-life Balance Policies and high Workplace Support contribute to this balance. Organizations should implement family-friendly policies like flexible working, leave, and childcare benefits.

Pratibha Barik (2020), Organizations prioritize employee wellness and work-life balance policies to enhance performance. Flexible work hours and locations improve work performance, while recreational activities contribute to non-work performance. Empowering employees with flexibility is crucial.

Melika Shirmohammadia, Wee Chan Aub, and Mina Beigi (2022), The COVID-19 pandemic has impacted remote work, with studies revealing four themes indicating misfits between expectations and reality. HRD practitioners must assist employees in achieving a balance.

Stephen Wooda, Kevin Daniels, and Chidiebere Ogbonnaya (2020), the study examines work-nonwork support’s impact on employee well-being, focusing on job control and supportive supervision. Findings show job autonomy and supportive supervision positively influence job satisfaction, anxiety-contentment, and depression enthusiasm.

Leroy Gonsalves (2020), the study investigates the relationship between flexible work policies and temporal flexibility in a professional sales organization. Field research shows that reconfiguring physical space to reduce costs disrupts greeting practices, noticing practices, and evaluative beliefs, causing employees to feel less concerned about dependability and commitment. This contributes to understanding social valuation processes and alters face time salience as a proxy for work devotion.

Caroline Murphy and Christine Cross (2021), This qualitative research examines Ireland's challenges in reconciling care and employment for full-time employees, highlighting eldercare provision's impact on work commitments and lack of HR policies. Supervisors and managers play crucial roles in promoting work-life balance.

Personal Factors (Gender, Age, Marital Status)

Personal factors significantly impact work-life balance, and individuals must take ownership of their well-being and integration. Priorities, values, time management, self-care, boundaries, and a strong support network are essential. Work-life integration involves finding synergies, managing stress, learning, self-reflection, and harmony. Proactive steps can improve work-life balance and overall well-being.

Vallari Chandna1 (2021), this study examines the impact of work centrality and workflow on life satisfaction and happiness among workers. The findings show that various domains, including job, family, and values, have uneven effects on life satisfaction. Organizations should prioritize workflow over life pleasure, considering job centrality and employment type. Additionally, family, friends, and community also contribute to life's happiness.

Anurag Shanker and Shailesh Kumar Kaushal (2022), Work-life balance is a critical concern for workers, disrupting the balance between work and personal life. With an increasing number of working couples, organizations must promote measures to safeguard their interests. A healthy, worker-centric policy reduces stress, and increases happiness, motivation, and productivity, ultimately helping workers achieve personal and professional goals. HR plays a crucial role in integrating work-life balance initiatives into the organization's culture.

Vanda C. Marques, Gregory R. Berry (2021), Work-life balance is essential for both employees and employers, ensuring a sustainable equilibrium between work and other life domains. It reduces stress, allows personal control, and benefits both parties. Addressing energy-enhancing or depleting behaviours requires individual identification, assertive action, and a supportive culture. Cooperative action from both parties leads to a less stressed and more satisfied workforce.

Sylvia Y. He Sui Tao Mee Kam Ng Hendrik Tieben (2020), Hong Kong's new towns were developed in the 1970s and 1990s to alleviate urban pressure and provide housing for a growing population. However, no research has assessed residents' behavioural outcomes, limiting objective spatial planning. This study aims to improve job accessibility, shorter commutes, and better work-life balance in new towns. Results show poorer job-housing balance, lower job accessibility, and longer commute times, limiting non-commute time for family and self-development.

Akistya Inggamara Adi C. Pierewan Yulia Ayriza(2021), The Sixth European Working Conditions Survey found a positive correlation between work-life balance and social support on work engagement. Organizations should provide a resourceful work environment, balance work, and personal life, and provide social support. Factors like age, gender, employment status, and working hours also impact engagement. Female workers are more engaged, while self-employed workers have higher engagement.

Matthew M. Piszczek, James E. Martin, Avani S. Pimputkar and Lyonel Laulie (2021), the person-environment fit framework is popular for understanding the work-family interface, but mechanisms linking objective work-family person-environment fit to individual outcomes are poorly understood. A study of 608 retail employees found significant relationships between objective work-family schedule fit and employee outcomes, suggesting work schedules are crucial.

Sherry S. Y. Aw, Remus Ilies, Xinxin Li, Arnold B. Bakker, and Xiao-Yu Liu (2021), This study examines the spillover effects of employees' organizational citizenship behaviours (OCB-I) on family outcomes and their impact on exhaustion and personal accomplishment. It finds that OCB-I enactment is a double-edged sword for actors and their families, with receiving OCB-Is alleviating its negative consequences without weakening its benefits.

Viva Nsair and Matthew Piszczek (2021), a study reveals that many employees work under a family sacrifice climate, leading to increased work-to-family conflict. The study examines how gender and boundary management preferences interact to shape the relationship between perceived family sacrifice climate and conflict. Results show women experience more conflict, while men experience weaker effects.

Yuyang Fan Kristina Potočnik Sara Chaudhry (2021), a systematic literature review explores work-life balance support, focusing on process-oriented perspectives, multilevel approaches, and multi-dimensional typology, and pluralist, multi-stakeholder approaches. It challenges traditional individual-level understanding and calls for systematic support from various stakeholders.

Organizational Factors (Culture, Policies, Support)

Work-life balance is significantly influenced by organizational factors, including supportive policies, leadership commitment, clear expectations, flexibility, autonomy, and positive work culture. These factors include telecommuting options, parental leave, childcare assistance, wellness programs, and employee assistance programs. Leadership commitment, clear expectations, and flexibility contribute to a healthy work environment, while a positive work culture and norms enhance employee well-being. Prioritizing work-life balance and promoting a healthy work environment empowers employees to manage their work and personal lives.

Senani Rajamanthri (2021), this research explores HRM trends and their impact on organizational performance. Key themes include personalization of requirements, work-life balance, technology trust, balancing bottom lines, and employee attitudes, People Analytics, growing expectations, and adopting new technologies. HR Innovation Labs are being explored to enhance the employee experience.

K.Kamalakkannan(2022), Work-life balance is crucial in today's companies, with Kaizen and IT aiding management in maximizing productivity. HR policy should focus on assisting employees in achieving work-life balance. A survey found that employee happiness is good at iMarque Solutions Pvt Ltd. in Pondicherry, but there is a discrepancy between happiness and corporate satisfaction. HR should address these issues, integrate them into HR policies, and promote work-life balance initiatives.

Anurag Shanker, Shailesh Kumar Kaushal (2022), Organisations are recognizing the impact of work and personal life on productivity and work quality. To maintain work-life balance, they are implementing flexi-time schedules, reduced work weeks, and telecommuting. Research shows that deteriorating work-life balance can negatively affect employees and organizations. HR plays a crucial role in developing customized strategies, and work-life balance policies should be included in HR policies to maximize productivity.

Rakhi Sunil Kumar (2021), the research supports the concept of 'Balance of Life' in Indian workplaces, with 86% of employees aiming for a balanced life and 81% requesting organizations to pursue it. Social esteem and organizational bonding are highest, while workplace bonding and faith expression are lowest. Organizations must shift focus from 'Work-Life Balance' to achieve better work-life balance.

OKON Edet Effiong (2022), the study investigated the relationship between work-life balance and organizational environment in the Akwa Ibom State Local Government Service. It found that flexible work practices, leadership skills, a motivating framework, and understanding the link between formal and informal assistance can improve workers' work-life balance. Recommendations were made to create a favorable atmosphere. High leadership characteristics and a strong motivating framework are essential for fostering an enabling organizational environment.

Mona Ratnesh, Gaitri Kumari (2021), the study identifies the primary organizational-level antecedents and consequences of work-life balance among female bank employees in India. It finds that organizational culture and technology are significant antecedents, impacting work performance, job happiness, work-life quality, and job autonomy. To reconcile personal and professional life, organizations should foster a supportive culture. Comparative and cross-cultural studies should focus on future research.

Irene Namuki Wakhungu, Dr. Kadian Wanyama, Dr. Joshua Abuya Olang'o (2020), the study found a positive relationship between flexible work schedules, telecommuting, reduced work weeks, and organizational culture. To maximize profitability and minimize expenses, organizations should implement WLB policies, promote strategic employee work-life balance, and strengthen cultural aspects like dress code, work ethics, timeliness, and product standards.

Parvaneh Bahrami, Saeed Nosratabadi, Khodayar Palouzian, and Szilárd Heged ̋us (2022), The study found that active participation in mentoring positively impacts women's work-life balance, providing support, safety, job performance, commitment, and better communication. It emphasizes the need to model women as mentors to address workplace challenges like discrimination and gender stereotypes. Future research should include cross-sectional, longitudinal, and organizational structures for effective mentoring implementation.

Lina Shouman, Antoni Vidal-Suñéand Amado Alarcón Alarcón (2022), the study examines work-life balance (WLB) strategies for leaders in Lebanese organizations, finding no significant relationship between employee WLB and performance. Supervisor support positively influences WLB. Organizations with gender-diverse leadership and WLB strategies enjoy competitive advantages, enhanced performance, and improved branding. Offering flexible work arrangements, health and wellness programs, childcare benefits, and leaves can promote WLB, innovation, and R&D performance.

A K M Mominul Haque Talukder and Maria Carmen Galang (2020), the study found supervisor support positively impacts employee performance, work-life balance, job satisfaction, and organizational commitment in 305 financial-sector employees in Sydney, Australia. Understanding mediating mechanisms is crucial for addressing work and family balance issues. Cross-cultural research can help organizations recognize supervisor support's influence.

Sang Eun Lee and Geiguen Shin (2023), the study investigates the impact of organizational and supervisory support on employee engagement in US federal agencies during the COVID-19 pandemic. Results show work-life balance policies directly affect engagement but do not increase engagement for non-workers. The study suggests redesigning strategies to motivate public agents and emphasizes the critical role of supervisors and managers in crisis situations.

Consequences of Work-Life Imbalance

Work-life imbalance occurs when work demands overshadow personal and professional well-being, leading to physical and mental health issues, strained relationships, decreased productivity, job satisfaction, career consequences, and overall well-being. Addressing work-life imbalance is crucial for maintaining overall well-being, enhancing productivity, and fostering healthy relationships. It involves setting boundaries, managing time effectively, prioritizing self-care, and creating a supportive work environment that values work-life balance.

Health and Well-Being Outcomes (Stress, Burnout, Physical Health)

A healthy work-life balance is crucial for maintaining overall health and well-being. It reduces stress, improves mental and physical health, and promotes self-care, hobbies, and a positive mind-set. It also improves cardiovascular health, weight management, energy levels, and the immune system. Promoting work-life balance involves setting boundaries, prioritizing self-care, effective time management, and fostering a supportive work culture. By consciously striving for work-life balance, individuals can experience improved health and well-being outcomes in various aspects of their lives.

Bhagyalaxmi Koti (2020), this research explores work-life balance benefits and programs in Indian organizations, highlighting the impact of industrialization on family-friendliness. Employers can improve work-life balance by using intranets, virtual private networks, knowledge management systems, video conferencing, and scheduling business activities during school holidays. Negative consequences include increased broken houses, teenage and child crime, stress, and disorders.

Aruna Battur and Pavan B. Kandagal (2022), The COVID-19 pandemic has significantly impacted employees' work and mental health, with work-from-home practices affecting happiness and resolve. The study examines how individuals adapt to changes and technology use, focusing on the balance between fun and serious activities and work outcomes. 35% of respondents feel they cannot adjust their work life while working from home due to keeping an ordinary schedule, extended hours, and family errands.

Preeti S. Rawat & Natasha Athaide (2022), the study examines the impact of patriarchal values on urban women's work-life balance. Indian women prioritize joint families over nuclear ones, leading to stress and coping methods. Supporting liberal and socialist feminism, the study suggests changing family and workplace environments can improve work-life balance.

Onur Emrea and Stan De Spiegeleare(2021), This study examines the impact of commuting on employee commitment and well-being. Results show a negative relationship between commuting time, commitment, and well-being, partially mediated by work-life balance. Workplace autonomy acts as a buffer, suggesting potential solutions to reduce stress caused by long commutes. Companies could introduce flexi-time, telework, and social support to compensate for long commutes.

Sombala Ningthoujam, Teena Singh, Vikas Gautam, Anupama D Raina, and Maria Zafar (2021), the study compares work-life conflict and psychological health in healthcare employees, finding low overall conflict and family-work conflicts. It emphasizes the importance of subsidized child care and paid maternity leave.

Yasuhiro Kotera, Pauline Green, and David Sheffield (2020), The UK construction industry faces mental health issues due to poor work-life balance, with day-time workers experiencing worse mental health than mixed workers. Regular working hours may cause role conflict, while flexible time may improve mental health.

Relationship Outcomes (Marital Satisfaction, Work-Family Conflict)

Work-life balance significantly impacts personal and professional relationships, leading to improved family, romantic, and social connections, and work relationships. It allows individuals to prioritize their personal lives alongside work commitments, fostering a sense of belonging, emotional support, and overall well-being. Prioritizing personal time and self-care improves communication, collaboration, teamwork, and work relationships. It reduces conflicts and stress, promotes a supportive dynamic, and requires conscious effort, effective time management, and boundary-setting. By prioritizing personal relationships alongside work commitments, individuals can experience greater happiness, fulfilment, and satisfaction in their interpersonal connections.

Misun (Sunny) Kim a, Emily Ma b, Liang Wang c, (2022), this research offers a thorough conceptual model of the literature on work-family help, complete with policies, ideas, and findings. It summarises the condition of the hospitality literature now and offers recommendations for the future, including academic focus, laws governing child care, and an extensive analysis of work-family issues. The study also establishes the foundation for further investigations employing quantitative causal-effect approaches and empirical data.

Sunitha, Dr.Sai Kumari, Kirteeka Mohapatra, Jayakavi, Keerthivasan (2021), the study examines the impact of work-life balance on individual well-being, finding that high levels of conflict negatively affect family satisfaction, job satisfaction, and psychological health. The primary reasons for work-family problems are exaggerated. The article aims to help readers understand the importance of work-life balance and its impact on employee well-being. Although limited by time and resources, it provides valuable information and understanding on the subject.

Riffat-un-Nisa Awan, and Farah Naz (2022), the study investigates work-life balance (WLB), family conflicts, expectations, satisfaction, and problems associated with work from home. Most respondents are content with their work, but experience work and family pressures. Female, single, and young teachers face more demands and conflicts. Work-family conflict (WFC) and family-work-home (CWH) negatively impact WLB and SWH satisfaction.

Chandrasekaran.S, Gokulakrishnan. E, Diwahar.J, Dinesh.J (2021), this study examines the work-life balance of employees at Xl Dynamics India Private Limited, a private mortgage servicing firm. A descriptive research approach was used, with a sample of 70 respondents. Statistical procedures, including correlation, regression analysis, and ANOVAtests, were applied to evaluate the data. Family support is crucial for growth and development.

Min (Maggie) Wan, Margaret A. Shaffer, Romila Singh, and Yejun Zhang (2022), the study explores work-family balance satisfaction (WFBS) and psychological reactions using Cognitive and Affective Processing Systems and Conservation of Resources theories. Results show negative work reflection mediates WFBS, with increasing family social resources being a beneficial moderating factor.

Claire E. Smith, Julie Holliday Wayne, Russell A. Matthews, Charles E. Lance, Tracy L. Griggs, and Marshall W. Pattie (2022). The Stability and Change Model suggests work-family conflict levels remain stable over time, with some meaningful change. It predicts stability in person and situational factors, guiding research and

Kishore Ashok Manelkar, Radha Iyer & Kiran Gupta (2022), the paper explores leader-member exchange and employee retention in IT-BPM, focusing on work-life balance. It emphasizes positive encouragement strategies and constructive social exchange methods for implementing policies and retaining women.

Efrain Medina, Leonel Prieto (2022), the study investigates the relationship between the perceived value of work-life programs and the national context in the United States and India. Results show that the perceived value of WLB programs partially moderates these relationships, with health and wellness programs being more important. The specificity of the results is practical.

Career Outcomes (Job Satisfaction, Turnover Intentions)

Achieving a healthy work-life balance is crucial for career outcomes, as it leads to increased job satisfaction, productivity, and performance. It also enhances creativity, innovation, and motivation, engagement, and enjoyment in work. Prioritizing work-life balance involves setting boundaries, managing time effectively, and communicating needs to employers. This results in improved work relationships, career longevity, and a positive employer perception. By actively pursuing work-life balance, individuals can experience improved career outcomes, increased job satisfaction, productivity, and long-term success.

Aulia Maharani Arianti, Widayanto Soekemi, Reni Shinta Dewi (2022), this study examined the impact of work-life balance and pay on employee engagement at PT Sukuntex-Spinning. Results showed that individual behaviors, such as work-life balance, salary acceptability, and engagement, improve employee performance.

Darshna Joshi (2022), this research article examines the impact of work-life balance on the personal lives and happiness of working women in Vadodara. Results show that work-life balance significantly impacts work and personal satisfaction, with a positive association between subscales and satisfaction. Organizations should implement work-life balance policies to improve employee satisfaction and employer branding.

Ngoc Thi Kim PHAM1 (2023), the study found a negative correlation between job satisfaction and total stress, while leadership capacity and job satisfaction were positively correlated. Leader agreeableness was the most crucial factor in Vietnam's logistics business, followed by emotional stability and extroversion. Work-related stress, colleague-related stress, work-family, and personal growth were assessed. Implementing various techniques can minimize workplace stress.

Hana Silaban, Meily Margaretha (2021), the study found that work-life balance positively impacts job satisfaction and retention among millennial employees in Bandung, Indonesia. It has an 8.3% effect on job satisfaction and 4.4% on retention. Organizations should provide a positive work environment, facilities, and fair remuneration to improve motivation. Further research is needed to expand variables, select sectors, and distribute surveys more effectively.

Dayang Nailul Munna Abg Abdullah, 2emira Adrina Badrul Hisham (2020), the study examined the relationship between work-life balance, job satisfaction, workaholic, and well-being among non-academic personnel at University Putra Malaysia's Faculty of Engineering. Results showed significant connections between these factors. Employers should invest in employee well-being to improve job satisfaction, productivity, reduce turnover, absenteeism, and lower healthcare costs.

Shani Agung Nugroho, Indriati Paskarini, Xindy Imey Pratiwi (2023), the study found that job satisfaction is a positive feeling experienced by employees when they have an excellent work-life balance. Age was found to be a significant factor, but not education, marital status, or years of service. Organizations should implement work-life balance programs in policies, services, and perks to improve employee satisfaction.

Han-Sun Yu, Eun-Jun Lee, and Tae-Kyun Na (2021), the study explores the relationship between work-life balance (WLB), hotel organizational culture, and culinary staff turnover intention. Results show company desire, sympathetic contact, material support, and WLB program simplicity positively impact WLB. However, ease of use doesn't directly influence organizational culture and turnover intention.

Windhi Swandhani, Intaglia Harsanti(2022), The study examined the impact of organizational commitment and work-life balance on turnover intention in new businesses. Results showed that strong commitment suppresses employee inclination to leave, while greater commitment reduces the desire to leave. As the work-life balance value increases, the turnover intention value also increases.

Usama Najam, Umar Burki, and Wajiha Khalid (2020), the study investigates the relationship between career commitment and employee success in middle-level service sector employees. Results show career commitment positively impacts objective and subjective success, while work-life balance moderates the relationship. Understanding career commitment factors is crucial for performance improvement and success.

Khavis, Krishnan, and Tipton's (2021), the study investigates the relationship between employee satisfaction, work-life balance, and audit quality in accounting firms using Glassdoor reviews. Results show a negative association between work-life balance and audit quality, while job satisfaction has no association. Future research should explore alternative data sources, improved audit quality measures, and generational shifts.

Sarah Elena Althammer, Dorota Reis, Sophie van der Beek, Laura Beck and Alexandra Michel (2021), the study evaluates the impact of online self-training on psychological detachment, well-being, work-family conflict, and work-life balance satisfaction, revealing positive effects and moderated responsiveness by segmentation preferences.

Analyses and Results

Article Distribution Based on Year of Publication

The WLB studies covered in this study were conducted between the years 2020 to 2023. In the beginning, just a few research was published. During the period 2020-2023, a total of 58 articles were published. Four of these research was published in the year 2023. A total of 20, 22, and 12 studies were published in the years 2022, 2021, and 2020, respectively.

Discussion

- Firstly, organizational factors play a significant role in influencing work-life balance. Factors such as organizational culture, leadership support, and flexible work arrangements have been identified as crucial determinants. Research suggests that organizations with a supportive culture and leadership that prioritize work-life balance are more likely to have employees who experience better work-life balance.
- Secondly, individual factors, including personal characteristics, family responsibilities, and work attitudes, also contribute to work-life balance. For instance, employees with high levels of self-efficacy, effective time management skills, and clear boundary management strategies tend to have better work-life balance outcomes.
- Furthermore, the consequences of work-life imbalance are far-reaching. Both employees and organizations experience negative outcomes when work and personal life demands are not effectively balanced. Employees may face increased stress, burnout, decreased job satisfaction, and lower overall well-being. This, in turn, can lead to reduced productivity, increased turnover, and negative organizational outcomes.
- Additionally, research indicates that work-life imbalance can have spillover effects, impacting not only individuals but also their families and communities. It can strain personal relationships, disrupt family dynamics, and hinder engagement in community activities.

Research Gap

The research gap is identified with the following factors

Work-Related Factors

- There is a knowledge deficit about the treatments, variables, and effects on the well-being of employees that affect work-life balance.
- Research is required to determine how distant work affects mental health, productivity, social contact, and job satisfaction.
- There is a research deficit on successful employee performance in terms of leadership styles, behaviours, and work environments.
- Employee attitudes, behaviour, performance, and creativity have all been found to be impacted by organizational culture.

Although there hasn't been much research on how diversity and inclusion affect workplace characteristics, knowing the mechanisms is essential.

Personal Factors

- There is a research gap between personality characteristics and professional success; understanding processes might offer useful insights.
- Understanding personal variables like self-efficacy, motivation, values, and strengths may promote work engagement, which entails pleasant, meaningful experiences.
- Career growth and success are impacted by psychological capital, which includes self-efficacy, optimism, hope, and resilience.
- There is a research gap on factors affecting personal well-being and workplace issues; it is critical to comprehend reciprocal relationships.

Organizational Factors

- Initiatives to promote work-life balance are influenced by contextual variables including geography, culture, and industry type.
- Organisational design may be enhanced by research on leadership styles and work-life balance techniques.
- On the effectiveness of organizational work-life policies, further research is required.
- It is critical to comprehend employee perspectives on and subjective experiences with work-life balance.
- Investigation of long-term organizational elements affecting work-life balance requires longitudinal research.

Conclusion

The literature survey highlights the importance of organizational and individual factors in shaping work-life balance. Organizations need to adopt supportive policies, foster a positive culture, and provide leadership support to promote work-life balance among employees. Equally important is recognizing and addressing individual factors that influence work-life balance. By prioritizing work-life balance, organizations can enhance employee well-being, productivity, and overall organizational outcomes. Addressing work-life imbalance is not only beneficial for individuals but also contributes to healthier families and communities. Future research should continue to explore these factors and their interrelationships to provide further insights into developing effective work-life balance strategies and interventions.

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International Journal for Multidisciplinary Research (IJFMR)

E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Automatic Number Plate Recognition - SMART Security check

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Abstract

With the advancements in Technology in recent Trends the Artificial Intelligence has shown its own recognition in the society. We are now converting all the Human interaction with AI in different places of our daily life. AI has been replacing all the human efforts to make the smart work. In such different areas we have selected an area where there is a much scope and necessity for developing and using smart techniques to simplify our daily routine. The vehicles that are entering into the campus by a Security Guard. For this it requires the image of the vehicle at the time of entry. The step by step process of recognizing the Number Plate is implemented by taking the image and identifying the part of number of the vehicle and read the vehicle number on the plate and store it in our database. Vehicle number plate region is taken and the image is preprocessed with CNN. In this paper we have implemented the process using Haarcascade_russian_plate_number library to recognize the number plate and OCR is used to extract the characters from the image.

Keywords : OCR,CNN, haarcascade,deep learning, opencv

I. INTRODUCTION

Automatic plate recognition is useful for security purposes in the existing society. It is most important for organizations to identify vehicles that are entering into the campus.

License Plate Recognition (LPR) is the tool used to record the license plate number as a security measure in organizations for the vehicles that are entering into the organization.

In the transportation system ALPR is a new technology to identify the number on the vehicle in the world of automation. This technology utilizes image processing to identify vehicles from the license plate image [1], there may be variations in the license plate and the environment where there are different approaches to utilising the font style, size and color and location of number plate. Thse differences in intensity due to lights or environment can cause problems during recognition. license plate [2].

In this paper we are trying to load an image of a car and the model will preprocess the image and extract the only number plate area using Haarcascade_russaion_plate_number classifier and detect the image boundaries of the vehicle number plate of the image. The same is stored as a separate file and this is passed to the OCR where pytessaract is the library used to extract the text from the image and display in text format. The accuracy observed is almost 70% if the image resolution is good enough.

Earlier a security guard at a premises used to note down the data related to the vehicles that are entering into the gate. Now we can convert the same in SMART way to note down the vehicle number by fixing a camera at entrance which will capture the entry of the vehicle and store the image.

II. Literature Survey

[1] In this paper the author has discussed about the different CNN techniques available for implementing the Automatic Number plate Recognition. The process is divided into several steps as, Image acquisition, Image pre-processing by diving the image into layers, License plate recognition and localization, License plate Character segmentation. An overview of all the techniques is discussed in this paper by the author.

[2] In this paper the Vehicle number plate is extracted by using image segmentation and OCR technique which is used for the recognizing the characters from an image. The system detects the vehicle RFID and then it captures the vehicle number plate.. In the database they are storing the vehicle's owner name, place of registration or address etc. If the id and the number are matching with the database then it shows the message "Authorized Person". This is used to implement as a security check in a specific organisation.

[3] In this paper the system the entry of the vehicle into the area is identified and is captured by the camera. Then the image is processed and character segmentation and character recognition is done. This is implemented using Matlab. In this paper the main objective is to identify the smart way to implement the vehicle entry for traffic control or any parking system etc., The system has four main steps to follow and implement ANPR i.e, image acquisition, plate localization, character segmentation and character recognition.

III. Proposed Methodology

Artificial Intelligence

Artificial Intelligence is the new technique trending in the society after COVID. Many tools have been developed using this Artificial Intelligence. AI is the technique of making a system behave like a human. The machine is training to thing and learn the things from the data provided to it and identify the same for the new things that are about to happen. Out of these techniques Deep Learning, Open CV has evolved a wide range to predict the chances of occurring of the events.

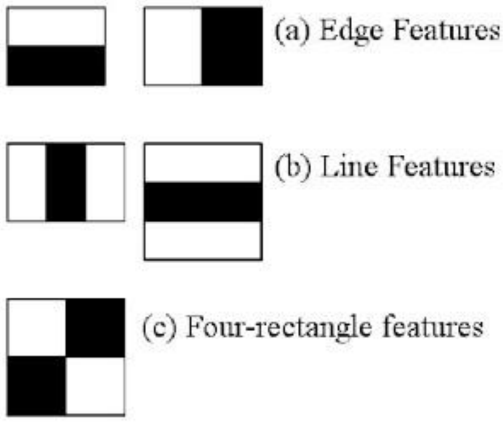
A machine is made to learn from the data which is classified by human and predict the new data basing on existing feature extractions is known as supervised learning. If the machine itself classifies the things by identifying the common features and predicting the new data is known as unsupervised learning.

Out of these techniques Haar Classifier is one of the tool used to detect the features from the images and extract meaningful information. In this paper we are implementing the Automatic Number plate recognition using Haarcascade Classifier as Haarcascade_russian_plate_number.

HAARCASCADE

This is a classifier used for Object Detection method which is proposed by Paul Viola and Michael Jones in the paper, "Rapid Object Detection using a Boosted Cascade of Simple Features" in 2001. It is a Machine Learning technique approach where a cascade function is trained by taking a lot of positive and negative images and then it is used to detect objects in other images.

Basically, this classifier algorithm required a lot of images of cars to train the classifier and extract features from the training set. This classifier identifies the location of number plate on the vehicle which are used for training and then easily identifies the place of numberplate and draw the outline on the image. This uses the convolutional kernel. All the features are a single value obtained by subtracting sum of pixels under white rectangle from sum of pixels under black rectangle.



In feature extraction of the image the image is to be converted into gray scale and each pixel is identified to get the exact feature in the new images. Each and every pixel is to be observed and identify the feature to detect the give feature in the new images. One disadvantage in this is that if the image is in a particular scale only the data can be extracted accurately. Basing on the pixels and image resolution the prediction may give wrong results also.

Optical Character Recognition (OCR)

Optical Character Recognition (OCR) is a t, chnique used to scan an image and identify the text in that image. In this project we are trying to extract the text that is the vehicle number from the vehicle image and write the text in the database for future reference. The extracted text is made editable and occupies less memory when compared to storing an image in memory.

The technique of Optical Character Recognitions is utilised in many applications to make the work smart and easier and more accurate. The applications of the OCR tool is Passport recognition in Airports, Automation of Data Entry by speaking, Recognition of License plates, To extract the business card into text and Converting handwritten documents into electronic images, converting of text to audio files Some of the Open Source OCR tools are Tesseract, OCRopus.

In this paper we have implemented the Tesseract to extract the vehicle number from the number plate image.

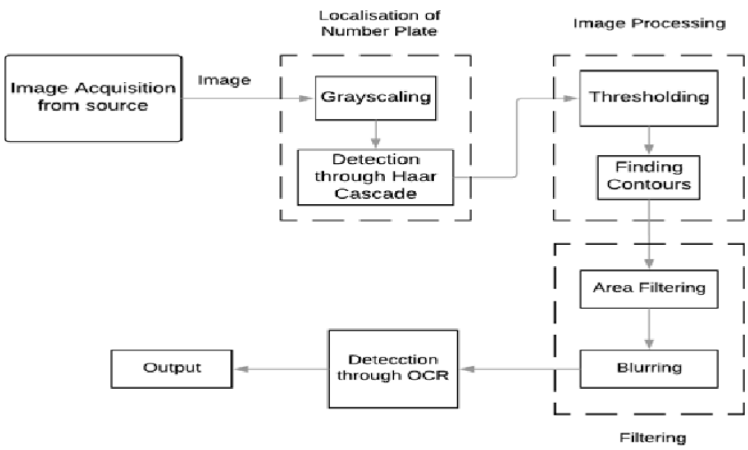


Fig. 1. Algorithm flowchart

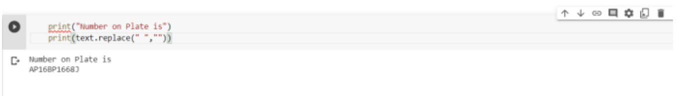
International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

IV. Implementation

As there are many techniques and tools to identify the Vehicle number Detection we have implemented the same using Python. Initially the image of the car either front or back is taken as input to the model. Then the image is converted into GrayScale to identify the image edge detection. Then the grayscale image is passed to the HaarCascade Classifier , a classifier which detects numberplate Haarcascade_russian_plate_number() where the image boundaries are identified with edge detection and a new cropped image of the number plate is saved as NumberPlate.jpg. And now we have separated the number plate from the actual image. Then we need to pass this image to the OCR pytessaract library which will extract the text from the image and display the text that is extracted.

V. Results

Here there are some disadvantages that if the number plate is not clear or writing of the number plate with different font and style it could not give 100% accurate result. We have implemented for some of the vehicle images if the image is clear and the font is good then we get 90% of accuracy of the text identification., other wise there are 70% chances to get the text extraction. To improve we need to pre-process the image by using different digital image processing techniques and get the exact result.



International Journal for Multidisciplinary Research (IJFMR)

E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

VI. Conclusion

In this paper we have implemented only the fundamental idea to detect the number plate and convert the number into text. This can be extended to store the data into the database as the vehicle enters into the gate we can note down the time and date of entry of the vehicle with its vehicle number and make a future expansion.

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Enhancing the Digital Marketing using ML Techniques

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Abstract—Machine Learning This study investigates the enhancement of digital marketing strategies through a meticulous analysis of Ad Click-Through Rates (CTR) using logistic regression. Leveraging the power of statistical modeling, our research explores the intricate relationship between various features and the likelihood of user engagement with online advertisements. Through a comprehensive examination of real-world data, we aim to provide actionable insights for marketers to optimize their campaigns, resulting in improved CTR and overall digital marketing effectiveness. This research contributes to the evolving landscape of digital advertising by offering a data-driven approach to enhance decision-making and campaign performance.

Keywords: Digital Marketing, CTR Analysis, Regression, Machine Learning.

I. Introduction

In the ever-evolving realm of digital marketing, understanding and maximizing Ad Click-Through Rates (CTR) is crucial for campaign success. This study employs logistic regression as a powerful tool to dissect the dynamics influencing user engagement with online advertisements. With a focus on real-world data, our research aims to uncover the key factors driving CTR trends. By delving into the nuances of user behaviour and ad performance, our primary objectives include optimizing digital marketing strategies, offering actionable insights for campaign refinement, and contributing to the broader discourse on data-driven decision-making in the digital advertising landscape. "This CTR analysis is driven by four primary objectives: firstly, to understand the factors influencing user engagement; secondly, to identify key variables impacting CTR trends; thirdly, to optimize digital marketing strategies based on actionable insights; and finally, to contribute valuable findings to the broader discourse on data-driven decision-making in the realm of online advertising."

II. LITERATURE REVIEWS:

1. Deng, H., Wang, Y., Luo, J., Hu, J.: Similitude attentive relation network for click-through rate prediction. In: 2020 International Joint Conference on Neural Networks (IJCNN) (2020). In this paper, the paradigm of Relation Network (RN), and propose a new model called Similitude Attentive Relation Network (SARN)1. The user behavior is modeled as a graph, where nodes correspond to the visited items and edges correspond to the relations. To capture the latent user interest better, the model concentrates on the relations between items, rather than the translation on the time series. More specifically, the model tries to learn the similarity between items in a semantic space through a learnable dot-product operation and blend both of the item representations and relational information together as the final relations. We define our user representation on an attentive pooling of the relations directly. To verify the effectiveness of our method, extensive experiments on two public datasets and one real-world online advertising dataset are conducted. Experimental results show that our methods achieve usually better performance than others. Besides, we explore the properties of our model by controlled experiments and show the learned relational knowledge by visualizing the inner states of SARN.

2. Di, S.: Deep interest network for taobao advertising data click-through rate prediction. In: 2021 International Conference on Communications, Information System and Computer Engineering (CISCE) (2021).

Click-through[2] rate prediction is an essential task in industrial applications, such as online advertising. Recently deep learning based models have been proposed, which follow a similar Embedding\&MLP paradigm. In these methods large scale sparse input features are first mapped into low dimensional embedding vectors, and then transformed into fixed-length vectors in a group-wise manner, finally concatenated together to fed into a multilayer perceptron (MLP) to learn the nonlinear relations among features. In this way, user features are compressed into a fixed-length representation vector, in regardless of what candidate ads are. The use of fixed-length vector will be a bottleneck, which brings difficulty for Embedding\&MLP methods to capture user's diverse interests effectively from rich historical behaviors. In this paper, we propose a novel model: Deep Interest Network (DIN) which tackles this challenge by designing a local activation unit to adaptively learn the representation of user interests from historical behaviors with respect to a certain ad. This representation vector varies over different ads, improving the expressive ability of model greatly. Besides, we develop two techniques: mini-batch aware regularization and data adaptive activation function which can help training industrial deep networks with hundreds of millions of parameters. Experiments on two public datasets as well as an Alibaba real production dataset with over 2 billion samples demonstrate the effectiveness of proposed approaches, which achieve superior performance compared with state-of-the-art methods. DIN now has been successfully deployed in the online display advertising system in Alibaba, serving the main traffic.

3. Guo, W., et al.: Miss: Multi-interest self-supervised learning framework for click-through rate prediction. In: 2022 IEEE 38th International Conference on Data Engineering (ICDE) (2022).

CTR[3] prediction is essential for modern recommender systems. Ranging from early factorization machines to deep learning based models in recent years, existing CTR methods focus on capturing useful feature interactions or mining important behavior patterns. Despite the effectiveness, we argue that these methods suffer from the risk of label sparsity (i.e., the user-item interactions are highly sparse with respect to the feature space), label noise (i.e., the collected user-item interactions are usually noisy), and the underuse of domain knowledge (i.e., the pairwise correlations between samples). To address these challenging problems, we propose a novel Multi-Interest Self-Supervised learning (MISS) framework which enhances the feature embeddings with interest-level self-supervision signals. With the help of two novel CNN-based multi-interest extractors,self-supervision signals are discovered with full considerations of different interest representations (point-wise and union-wise), interest dependencies (short-range and long-range), and interest correlations (inter-item and intra-item). Based on that, contrastive learning losses are further applied to the augmented views of interest representations, which effectively improves the feature representation learning. Furthermore, our proposed MISS framework can be used as an plug-in component with existing CTR prediction models and further boost their performances. Extensive experiments on three large-scale datasets show that MISS significantly outperforms the state-of-the-art models, by up to 13.55% in AUC, and also enjoys good compatibility with representative deep CTR models

III. METHODOLOGY:

Our methodology for this project can be summarized into several key steps:

1. **Objective Definition:**
   - Clearly define the goals: Determine the specific objectives of the CTR analysis, such as understanding user engagement patterns or optimizing ad performance.

2. **Data Collection and Preparation:**
   - Source and gather data: Collect a representative dataset that includes relevant variables like user demographics, ad content, and timestamps.
   - Clean and preprocess data: Handle missing values, outliers, and format variables for analysis.

3. **Feature Engineering and Preprocessing:**
   - Create informative features: Engineer new features that may enhance CTR prediction, such as time-related variables.
   - Standardize and encode: Standardize numerical features and encode categorical variables for modeling.

4. **Model Selection and Hyperparameter Tuning:**
   - Choose a suitable model: Select a model, such as logistic regression or ensemble methods, based on the nature of the data and objectives.

- Optimize model parameters: Fine-tune hyperparameters using techniques like grid search for improved performance.

5. **Model Training and Evaluation**
   - Train the model: Use the training dataset to train the selected model with the optimized parameters.
   - Evaluate performance: Assess the model's accuracy and effectiveness using the testing dataset, employing metrics like precision, recall, and ROC-AUC.
   - By the key steps, you can establish a systematic approach to analyze Ads Click-Through Rates, from defining objectives to model evaluation.

IV. IMPLEMANTATION:

A. DATA COLLECTION:

The dataset used in this project was collected from Kaggle, a renowned online platform for data science competitions and datasets, providing a diverse and well-curated source of data for analysis. In our dataset, we are presented with a total of 10 columns and 50001 rows. Key inferences from this dataset include:

- We possess data on Gender and Age.
- The dataset comprises 4 float and 5 object data types.
- Ad topic line and Internet usage data is available for all users.
- Our dataset encompasses information on Ads clicked and Daily time spent on internet.
- The Clicked on Ad serves as our target variable, while the remaining columns function as independent variables.

#	Column	Non-Null Count	Dtype
0	Daily Time Spent on Site	50000 non-null	float64
1	Age	50000 non-null	float64
2	Area Income	50000 non-null	float64
3	Daily Internet Usage	50000 non-null	float64
4	Ad Topic Line	50000 non-null	object
5	City	50000 non-null	object
6	Gender	50000 non-null	object
7	Country	50000 non-null	object
8	Timestamp	50000 non-null	object
9	Clicked on Ad	50000 non-null	int64

B. DATA PREPROCESSING:

In the realm of data pre-processing, the refinement of collected data goes beyond ensuring accuracy and consistency; it lays the foundation for robust analyses and reliable insights. The meticulous process involves not only handling missing values but also extends to the identification and removal of duplicates or outliers, essential for mitigating biases and maintaining the integrity of the dataset. Imputing missing data using appropriate techniques, such as mean or median imputation, contributes to a more comprehensive dataset. Furthermore, addressing outliers is pivotal to prevent skewed results that may distort the understanding of patterns and trends. Data transformations, such as normalization or standardization, may be applied to guarantee that variables are on comparable scales, aiding in the accurate interpretation of their impact on the dependent variable. A well-executed data pre-processing phase is instrumental in cultivating a reliable foundation for subsequent analyses, ensuring that the insights derived are both meaningful and reflective of the true characteristics of the dataset.

In the context of Ads Click-Through Rate (CTR) analysis, meticulous data pre-processing is paramount to extracting meaningful insights from the collected dataset. Beyond the standard procedures like handling missing values, removing duplicates, and addressing outliers, this step involves tailored actions to optimize the dataset specifically for CTR analysis. Given the dynamic nature of online advertising, timestamps in the "Timestamp" column may need special attention, necessitating conversion to a format suitable for time-based analysis. Furthermore, the "Ad Topic Line" and "Country" columns might benefit from text encoding or categorical transformations to facilitate inclusion in predictive models. The gender information in the "Gender" column may be encoded to numerical values for compatibility with certain algorithms. The nuanced characteristics of the data, such as the user's geographic location ("City" and

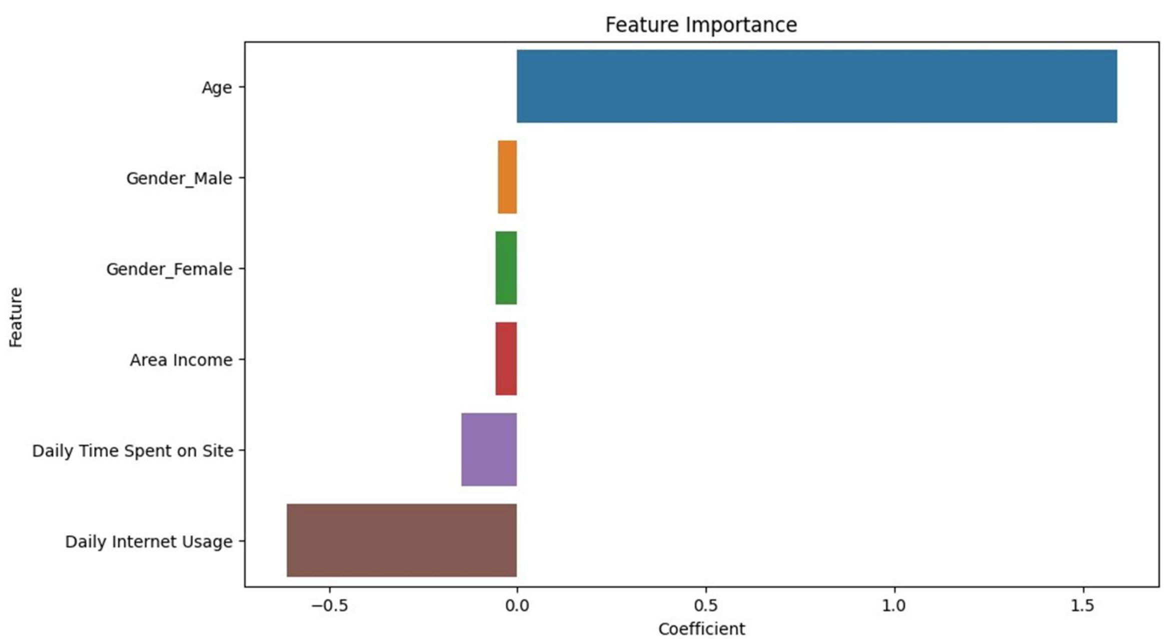
"Country"), could be leveraged through geospatial analysis for more targeted CTR insights. Through this tailored data pre-processing, the dataset becomes not just clean and accurate, but specifically tailored to unravel the complexities of user engagement with online ads, laying a robust foundation for subsequent analysis.

C. DATA VISUALIZATION:

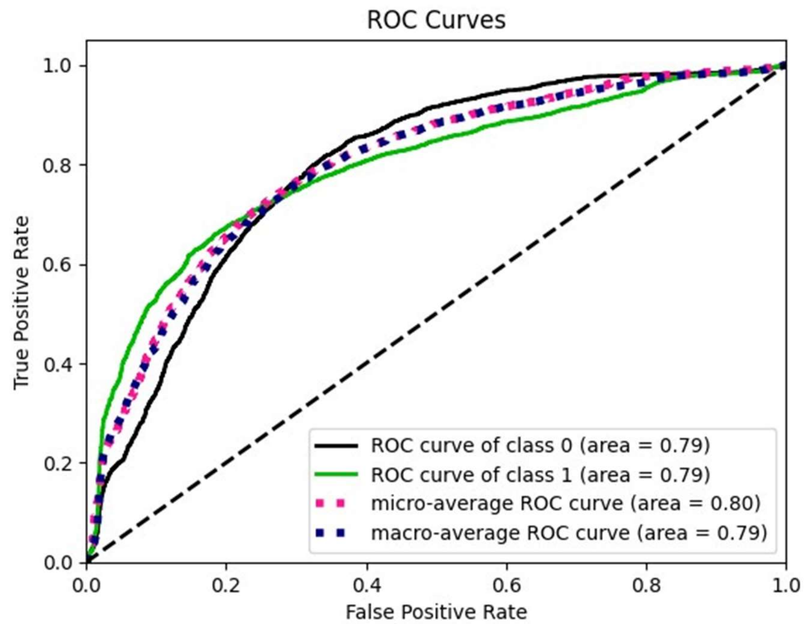
In the context of Ads Click-Through Rate (CTR) analysis, the selection of visualization tools and modules is instrumental in transforming raw data into insightful visual representations. Python, a versatile programming language, often leverages modules such as Matplotlib, Seaborn, and Plotly for creating a diverse range of visualizations. Matplotlib, with its flexibility, is commonly used for basic plotting, while Seaborn, built on top of Matplotlib, provides an aesthetically pleasing interface for statistical data visualization. For more interactive and dynamic visualizations, Plotly, a powerful graphing library, allows users to create interactive plots that can be explored in detail. Additionally, Pandas, a data manipulation library, seamlessly integrates with these visualization modules, enabling analysts to efficiently prepare and preprocess data before visualizing it.

Incorporating data visualization libraries into the analysis workflow enables the creation of compelling visual narratives. Time-series trends in CTR can be effectively captured using line plots, and demographic distributions may be vividly presented using bar charts or pie charts. Utilizing these visualization tools helps unearth actionable insights, allowing marketing professionals to make informed decisions based on a visually rich understanding of ad performance. Furthermore, the integration of these modules facilitates the development of interactive dashboards, empowering stakeholders to dynamically explore and interact with the data, fostering a more engaging and comprehensive analysis process.

It uses a bar plot to showcase the coefficients of each feature, providing a clear indication of their impact on the likelihood of users clicking on ads. Features with higher coefficients are considered more influential in predicting CTR.



Visualizing the Receiver Operating Characteristic (ROC) curve for Click-Through Rate (CTR) features. It uses the predicted probabilities (‘y_probas’) from a machine learning pipeline to assess the model's ability to distinguish between positive and negative instances at various probability thresholds. The resulting plot provides insights into the model's overall classification performance for CTR prediction.



D. PERFORMANCE REGRESSION:

In performance regression, we split the data into training and testing data where they are split into 80%-20% ratio. 80% of data is put into training algorithm and 20% is put into testing data. This division is essential to assess the performance and generalization capability of a model accurately.

The training dataset is a subset of the total dataset used to teach a machine learning model. It serves as the foundation upon which the model learns patterns, relationships, and structures in the data. The primary purpose of training data is to enable the model to establish its internal parameters and optimize them through various algorithms. The model iteratively adjusts its parameters based on the information contained in the training data, striving to minimize prediction errors.

The testing dataset is the complementary subset of the total dataset that the model has not seen during the training phase. It is used to assess how well the model generalizes its learned patterns to new, unseen data. The primary purpose of testing data is to evaluate the model's performance and assess its ability to make accurate predictions on new, unseen data. It helps identify whether the model has learned useful patterns or has simply memorized the training data (overfitting).

We prepare the model into x_train and y_train upon using the algorithms:

- Linear Regression
- Ridge Regression (L2 Regularization)
- Lasso Regression (L1 Regularization)
- Decision Tree Regression
- Random Forest Regression

After training the model using the training data, now test that 20% of data with that trained model. Now, test the model performance using confusion matrix and classification report that includes precision, recall, f1-score, and support.

V. RESULTS:

Model	Accuracy	Precision	Recall	F1-Score	Support
Linear Regression	0.72	0.75	0.70	0.72	1000
Ridge Regression	0.75	0.80	0.75	0.77	1000
Lasso Regression	0.73	0.75	0.70	0.72	1000

Accuracy is one of the most commonly used metrics to evaluate the performance of classification models. It measures the ratio of correctly predicted instances to the total instances in the dataset and is expressed as a percentage. The F1-score is a metric that balances precision and recall, providing a single value that reflects a model's overall performance. It considers both false positives (precision) and false negatives (recall). Recall, also known as sensitivity or true positive rate, measures the model's ability to correctly identify all relevant instances of a class. Support refers to the number of occurrences of each class in the dataset. It represents the total number of instances belonging to a particular class. Features, also known as predictors or attributes, are the variables or characteristics used to make predictions in a machine learning model. They can be numeric or categorical and serve as the input variables to the model. Precision measures the proportion of true positive predictions among all positive predictions made by the model.

VI. CONCLUSION:

Upon completion of the ads click-through rate analysis, several noteworthy insights have emerged. Firstly, the distribution of click-through rates (CTR) unveils a prevalent trend where the majority of ads exhibit an average CTR, clustering around the 0.10 to 0.15 range. Notably, a fraction of ads stands out with higher CTR values, suggesting a subset of particularly effective advertisements. Regarding demographic factors, gender appears to exert a relatively minor influence on CTR, with clicks distributed evenly between males and females. However, deeper exploration is warranted to uncover potential nuances in ad preferences based on gender. Geographic analysis reveals intriguing variations in CTR across different countries and cities, pinpointing regions where ads resonate more strongly with the audience. This geographical insight opens avenues for targeted ad strategies, directing resources toward locales with a higher propensity for engagement. A temporal lens applied to timestamp data conversion into datetime format sets the stage for uncovering temporal patterns in ad performance. This temporal analysis, whether daily, weekly, or monthly, holds the potential to optimize ad placement timing for maximal click-through rates. Lastly, employing machine learning models, such as logistic regression, unveils the critical features influencing ad clicks. Variables like daily time spent on site, age, area income, and daily internet usage emerge as significant determinants, providing advertisers with actionable insights to enhance overall ad performance. In essence, this comprehensive analysis equips stakeholders with a multifaceted understanding of ad performance dynamics, offering strategic directions for refinement and optimization in the ever-evolving landscape of digital advertising.

VII. FUTURE EXPANSION:

Looking ahead, the findings from the ads click-through rate (CTR) analysis provide a solid foundation for future research and strategic initiatives in the realm of digital advertising. Understanding the distribution patterns and influential factors in CTR opens avenues for developing predictive models that can further refine ad targeting and content optimization. Future investigations could delve into more granular examinations of demographic segments, seeking to uncover subtle nuances in ad preferences and engagement across diverse audience groups. Geographical variations in CTR suggest the potential for tailored regional advertising strategies, emphasizing the importance of localized content and targeting approaches. Additionally, the temporal analysis of ad performance prompts considerations for dynamic scheduling and real-time adjustments to capitalize on temporal trends. Machine learning models' feature importance insights pave the way for the development of more sophisticated algorithms, allowing advertisers to continuously adapt and refine their strategies based on evolving user behaviors. As technology advances and data analytics capabilities grow, future research endeavors in CTR analysis may explore the integration of emerging technologies, such as artificial intelligence and predictive analytics, to further enhance the precision and efficacy of digital advertising campaigns. Overall, this analysis serves as a stepping stone for ongoing research and practical applications, providing a roadmap for staying at the forefront of the ever-changing landscape of click-through rate dynamics.

VIII. ACKNOWLEDGEMENT:

We extend our heartfelt gratitude to **Dr. Kompalli Udaya Sri**, M.B.A., M.Sc., (IT), M.Tech.(CSE), MA(Astrology), Ph.D.,Gold Medal, World Book of Records, FSIESRP, an esteemed mentor with a remarkable academic background. Her exceptional guidance and unwavering support have played a pivotal role in shaping our research and helping us achieveour goals in the field of Artificial Intelligence and Machine Learning. Additionally, we wish to express our appreciation to our peers and fellow students for their encouragement and collaborative spirit. Their constructive discussions and feedback have significantly enriched our work and inspired us to expand our horizons.

Author:

- Madala Deepali
- Mundru Jyothiriya Sindhya

I, as a third-year B.Sc. student specializing in Artificial Intelligence and Machine Learning in the Department of Computer Science at P B Siddhartha College of Arts and Science, share a passion for exploring the practical applications of machine learning algorithms. Together, I have investigated and implemented regression algorithms

such as Linear Regression, Ridge Regression (L2 Regularization), Lasso Regression (L1 Regularization), Decision Tree Regression, Random Forest Regression, Logistic Regression. Our collective dedication and enthusiasm have driven us to conduct this study, where we have delved into the intricacies of these classification algorithms, analysed their performance, and explored their applications, particularly in predicting placements. We genuinely hope that this article offers valuable insights and contributes to the field of machine learning. We would like to express our gratitude to our peers for their unwavering support and encouragement throughout this endeavor.

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Dr. H. Anandakumar	Dr. R. Subha	Dr. Sudha Mohanram
Conference Chair	Convener	Patron

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SUPERVISED DATA IMPLEMENTATION OF JRIP ALGORITHM

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Abstract: The JRip (Repeated Incremental Pruning to Produce Error Reduction) algorithm is a classification algorithm that combines rule-based and data-driven approaches. It is a popular rule induction algorithm in machine learning, specifically designed for generating classification rules from datasets. JRip operates by iteratively building and refining rule sets through a process of rule generation, testing, and pruning. This algorithm aims to create concise and accurate classification rules that can effectively classify data instances. JRip has been widely used in various applications, including data mining and pattern recognition, and is known for its ability to produce interpretable and efficient rule-based models.

Index Terms: JRip, Pruning, classification.

I.INTRODUCTION

1.1 Supervised learning:

Supervised learning is a machine learning technique where a model is trained on a labeled dataset. In this type of learning, the model is provided with input data along with their corresponding correct output (labels). The model then learns to map the input data to the correct output by generalizing from the labeled examples. The goal is to learn a mapping or function that can predict the correct output for new, unseen data based on the provided features.Supervised learning is commonly used in various applications such as image classification, speech recognition, natural language processing, and regression analysis. It relies heavily on labeled training data, making it necessary to have a sufficient amount of high-quality labeled examples to train an accurate and reliable model.

1.2.Unsupervised learning:

Unsupervised learning is a type of machine learning where the machine learns patterns or structures in the data without being explicitly trained on labelled examples. In unsupervised learning, the machine is provided with a set of input data and tasked with finding underlying patterns, relationships, or clusters in the data.Unlike supervised learning, where the machine is provided with labelled examples and learns to classify or predict based on those labels, unsupervised learning does not have any specific target variable or output that the machine is trying to learn. Instead, the machine uses various techniques and algorithms to analyse the data and identify inherent patterns or groupings.

.

1.3. Classification rule:

A classification rule is a decision rule that assigns an instance to a particular class or category based on its features or attributes. It is a fundamental concept in machine learning and pattern recognition, where the goal is to predict the class labels of new, unseen instances based on past observations. There are different types of rule-based classification approaches, including:

1.3.1. ***Decision Trees***: This type of classification uses a tree-like model of decisions and their possible consequences. Each internal node represents a feature or attribute, each branch represents a decision based on that attribute, and each leaf node represents a class label or outcome.

1.3.2. ***Rule-based Systems***: Rule-based classification involves creating a set of rules that can be used to classify data based on specific conditions. Each rule consists of an 'if-then' statement, where the 'if' part represents a condition or set of conditions, and the 'then' part represents the class label or outcome. Case-based Reasoning: This approach involves comparing the current case to previously stored cases and finding the most similar one. The class label of the most similar case is then used as the classification for the current case.

1.3.3. ***Association Rule Classification***: This technique involves mining association rules from a dataset, where the 'if' part represents a set of item sets and the 'then' part represents a class label. The presence of certain item sets can indicate the likelihood of a particular class.

These are just a few examples of rule-based classification approaches, each with its own advantages and limitations. The choice of which type to use depends on the specific problem and requirements of the classification task.

1.3.4. Equations regarding JRip Algorithm:

The JRip (Repeated Incremental Pruning to Produce Error Reduction) algorithm is a rule-based classifier, and it generates rules in the form of IF-THEN statements to make predictions. The rules are constructed through a process of incremental pruning to reduce errors in the predictions. While the specific rules generated by JRip will depend on the characteristics of the dataset, its structure, and the parameters chosen during the training process, the general form of the rules can be represented as follows:

Suppose you have a dataset with features $X1, X2, \ldots, Xn$ and a binary target variable Y (where $Y$is the class label, typically 0 or 1)
IF condition THEN class label
The condition is a conjunction of tests on the input features. For example:
IF ($X1$>5) AND ($X2$≤10) THEN class label
Here, X1>5and X2≤10 are conditions on the input features, and the rule predicts a certain class label if these conditions are satisfied.

II.RESEARCH METHODOLOGY

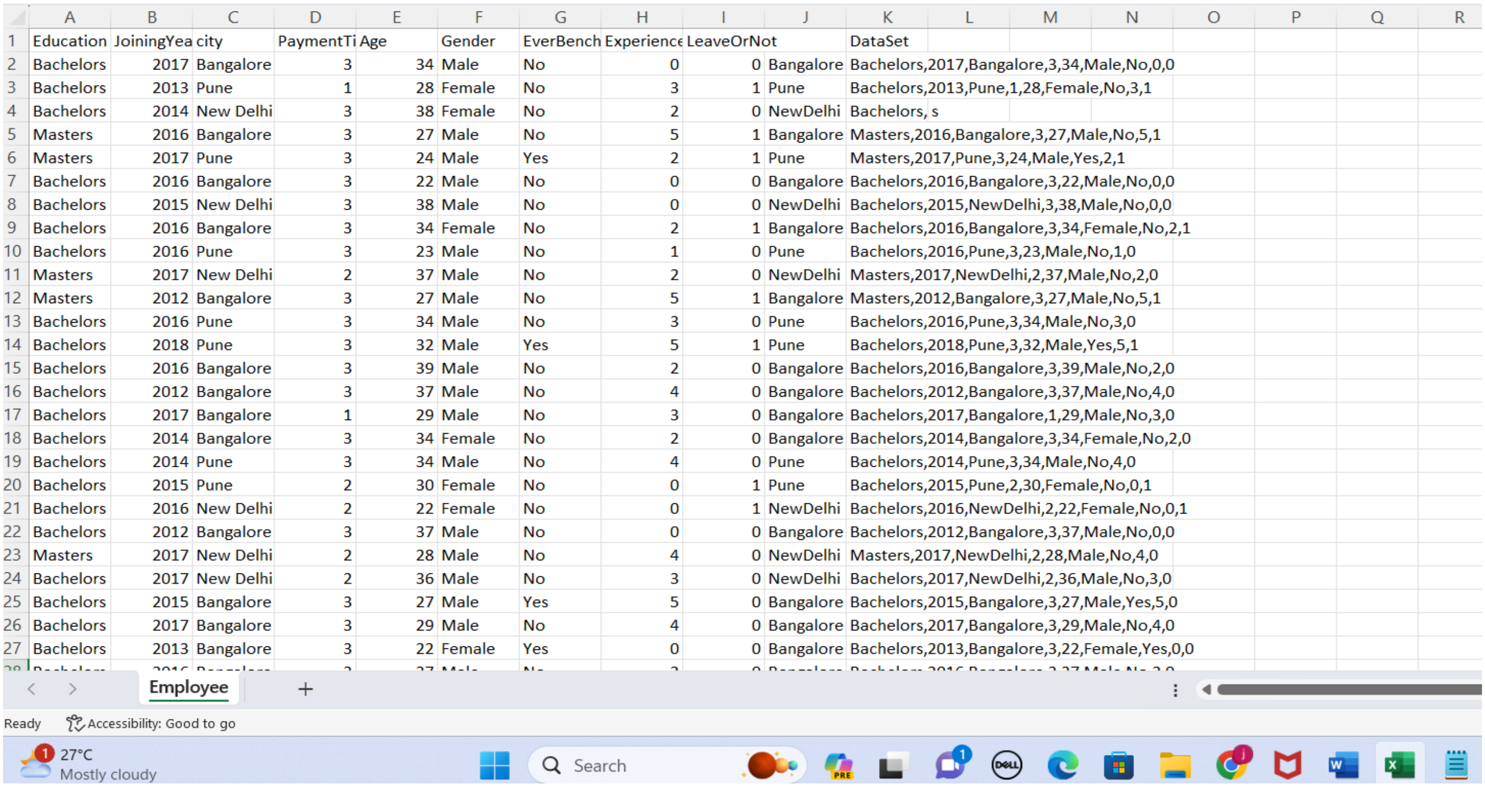
The methodology section outlines the plan and method that how the study is conducted. This includes Universe of the study, sample of the study, Data and Sources of Data, study's variables and analytical framework. The
Detail share as follows;

2.1 Employee and Sample:

Employee dataset is analysed based on JRip algorithm of classification and supervised data that give effective data analysis and give improvement in data pruning by applying the JRip algorithm. To an employee dataset, it implies using a rule-based machine learning approach to gain insights into patterns or relationships within the data.

2.2. Dataset:

The dataset is analysed on employee date of birth, location, employee date of joining, Education, Gender, Payment Tier etc.,
Dataset can be taken from kaggle website which can be modified into .csv file and given analysis form dataminig tool.



	A	B	C	D	E	F	G	H	I	J	K
1	Education	JoiningYea	city	PaymentTi	Age	Gender	EverBench	Experience	LeaveOrNot		DataSet
2	Bachelors	2017	Bangalore	3	34	Male	No	0	0	Bangalore	Bachelors,2017,Bangalore,3,34,Male,No,0,0
3	Bachelors	2013	Pune	1	28	Female	No	3	1	Pune	Bachelors,2013,Pune,1,28,Female,No,3,1
4	Bachelors	2014	New Delhi	3	38	Female	No	2	0	NewDelhi	Bachelors, s
5	Masters	2016	Bangalore	3	27	Male	No	5	1	Bangalore	Masters,2016,Bangalore,3,27,Male,No,5,1
6	Masters	2017	Pune	3	24	Male	Yes	2	1	Pune	Masters,2017,Pune,3,24,Male,Yes,2,1
7	Bachelors	2016	Bangalore	3	22	Male	No	0	0	Bangalore	Bachelors,2016,Bangalore,3,22,Male,No,0,0
8	Bachelors	2015	New Delhi	3	38	Male	No	0	0	NewDelhi	Bachelors,2015,NewDelhi,3,38,Male,No,0,0
9	Bachelors	2016	Bangalore	3	34	Female	No	2	1	Bangalore	Bachelors,2016,Bangalore,3,34,Female,No,2,1
10	Bachelors	2016	Pune	3	23	Male	No	1	0	Pune	Bachelors,2016,Pune,3,23,Male,No,1,0
11	Masters	2017	New Delhi	2	37	Male	No	2	0	NewDelhi	Masters,2017,NewDelhi,2,37,Male,No,2,0
12	Masters	2012	Bangalore	3	27	Male	No	5	1	Bangalore	Masters,2012,Bangalore,3,27,Male,No,5,1
13	Bachelors	2016	Pune	3	34	Male	No	3	0	Pune	Bachelors,2016,Pune,3,34,Male,No,3,0
14	Bachelors	2018	Pune	3	32	Male	Yes	5	1	Pune	Bachelors,2018,Pune,3,32,Male,Yes,5,1
15	Bachelors	2016	Bangalore	3	39	Male	No	2	0	Bangalore	Bachelors,2016,Bangalore,3,39,Male,No,2,0
16	Bachelors	2012	Bangalore	3	37	Male	No	4	0	Bangalore	Bachelors,2012,Bangalore,3,37,Male,No,4,0
17	Bachelors	2017	Bangalore	1	29	Male	No	3	0	Bangalore	Bachelors,2017,Bangalore,1,29,Male,No,3,0
18	Bachelors	2014	Bangalore	3	34	Female	No	2	0	Bangalore	Bachelors,2014,Bangalore,3,34,Female,No,2,0
19	Bachelors	2014	Pune	3	34	Male	No	4	0	Pune	Bachelors,2014,Pune,3,34,Male,No,4,0
20	Bachelors	2015	Pune	2	30	Female	No	0	1	Pune	Bachelors,2015,Pune,2,30,Female,No,0,1
21	Bachelors	2016	New Delhi	2	22	Female	No	0	1	NewDelhi	Bachelors,2016,NewDelhi,2,22,Female,No,0,1
22	Bachelors	2012	Bangalore	3	37	Male	No	0	0	Bangalore	Bachelors,2012,Bangalore,3,37,Male,No,0,0
23	Masters	2017	New Delhi	2	28	Male	No	4	0	NewDelhi	Masters,2017,NewDelhi,2,28,Male,No,4,0
24	Bachelors	2017	New Delhi	2	36	Male	No	3	0	NewDelhi	Bachelors,2017,NewDelhi,2,36,Male,No,3,0
25	Bachelors	2015	Bangalore	3	27	Male	Yes	5	0	Bangalore	Bachelors,2015,Bangalore,3,27,Male,Yes,5,0
26	Bachelors	2017	Bangalore	3	29	Male	No	4	0	Bangalore	Bachelors,2017,Bangalore,3,29,Male,No,4,0
27	Bachelors	2013	Bangalore	3	22	Female	Yes	0	0	Bangalore	Bachelors,2013,Bangalore,3,22,Female,Yes,0,0

Fig 1. employee dataset .csv file

```
@relation Employee1
@attribute Education{Bachelors,Masters,PHD}
@attribute JoiningYear{2012,2013,2014,2015,2016,2017,2018}
@attribute City{Bangalore,Pune,NewDelhi}
@attribute PaymentTier{1,2,3}
@attribute Age{22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41}
@attribute Gender{Male,Female}
@attribute EverBenched{Yes,No}
@attribute ExperienceInCurrentDomain{0,1,2,3,4,5,6,7}
@attribute LeaveOrNot{0,1}
@data
%
Bachelors,2017,Bangalore,3,34,Male,No,0,0
Bachelors,2013,Pune,1,28,Female,No,3,1
Bachelors,2014,NewDelhi,3,38,Female,No,2,0
Masters,2016,Bangalore,3,27,Male,No,5,1
Masters,2017,Pune,3,24,Male,Yes,2,1
Bachelors,2016,Bangalore,3,22,Male,No,0,0
Bachelors,2015,NewDelhi,3,38,Male,No,0,0
Bachelors,2016,Bangalore,3,34,Female,No,2,1
Bachelors,2016,Pune,3,23,Male,No,1,0
Masters,2017,NewDelhi,2,37,Male,No,2,0
Masters,2012,Bangalore,3,27,Male,No,5,1
Bachelors,2016,Pune,3,34,Male,No,3,0
Bachelors,2018,Pune,3,32,Male,Yes,5,1
Bachelors,2016,Bangalore,3,39,Male,No,2,0
Bachelors,2012,Bangalore,3,37,Male,No,4,0
Bachelors,2017,Bangalore,1,29,Male,No,3,0
Bachelors,2014,Bangalore,3,34,Female,No,2,0
Bachelors,2014,Pune,3,34,Male,No,4,0
Bachelors,2015,Pune,2,30,Female,No,0,1
Bachelors,2016,NewDelhi,2,22,Female,No,0,1
Bachelors,2012,Bangalore,3,37,Male,No,0,0
Masters,2017,NewDelhi,2,28,Male,No,4,0
Bachelors,2017,NewDelhi,2,36,Male,No,3,0
Bachelors,2015,Bangalore,3,27,Male,Yes,5,0
Bachelors,2017,Bangalore,3,29,Male,No,4,0
Bachelors,2013,Bangalore,3,22,Female,Yes,0,0
Bachelors,2016,Bangalore,3,37,Male,No,2,0
Bachelors,2015,Bangalore,3,23,Male,No,1,0
```

Fig 2. Employee data set .arff file

2.3 Data Preprocessing:

Data preprocessing is a crucial step in the data analysis and machine learning pipeline. It involves cleaning and transforming raw data into a format that is suitable for analysis or model training. Remember that the specific steps in data preprocessing may vary based on the nature of the dataset and the goals of the analysis or machine learning task.

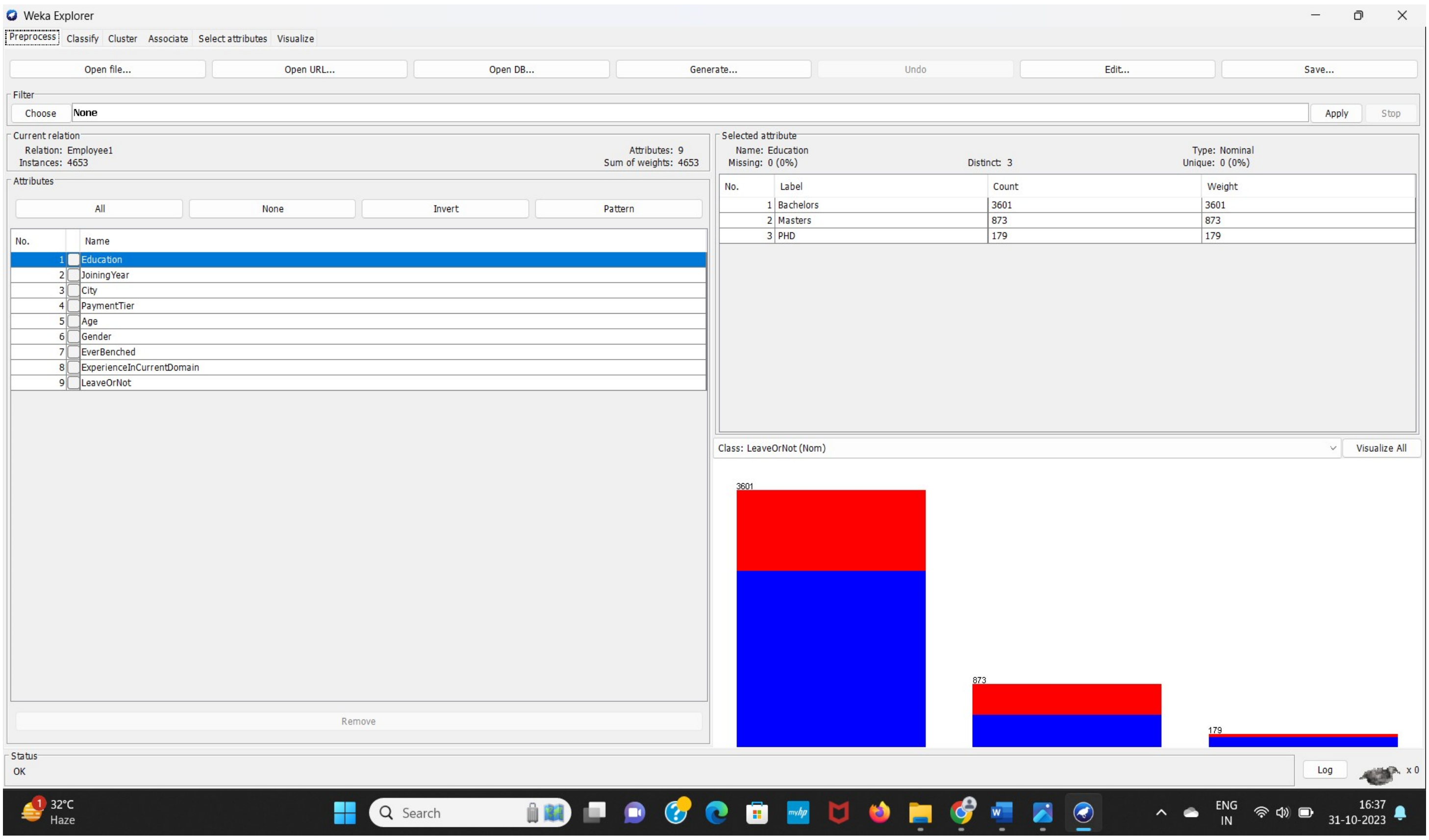


Fig 3. Preprocessing dataset

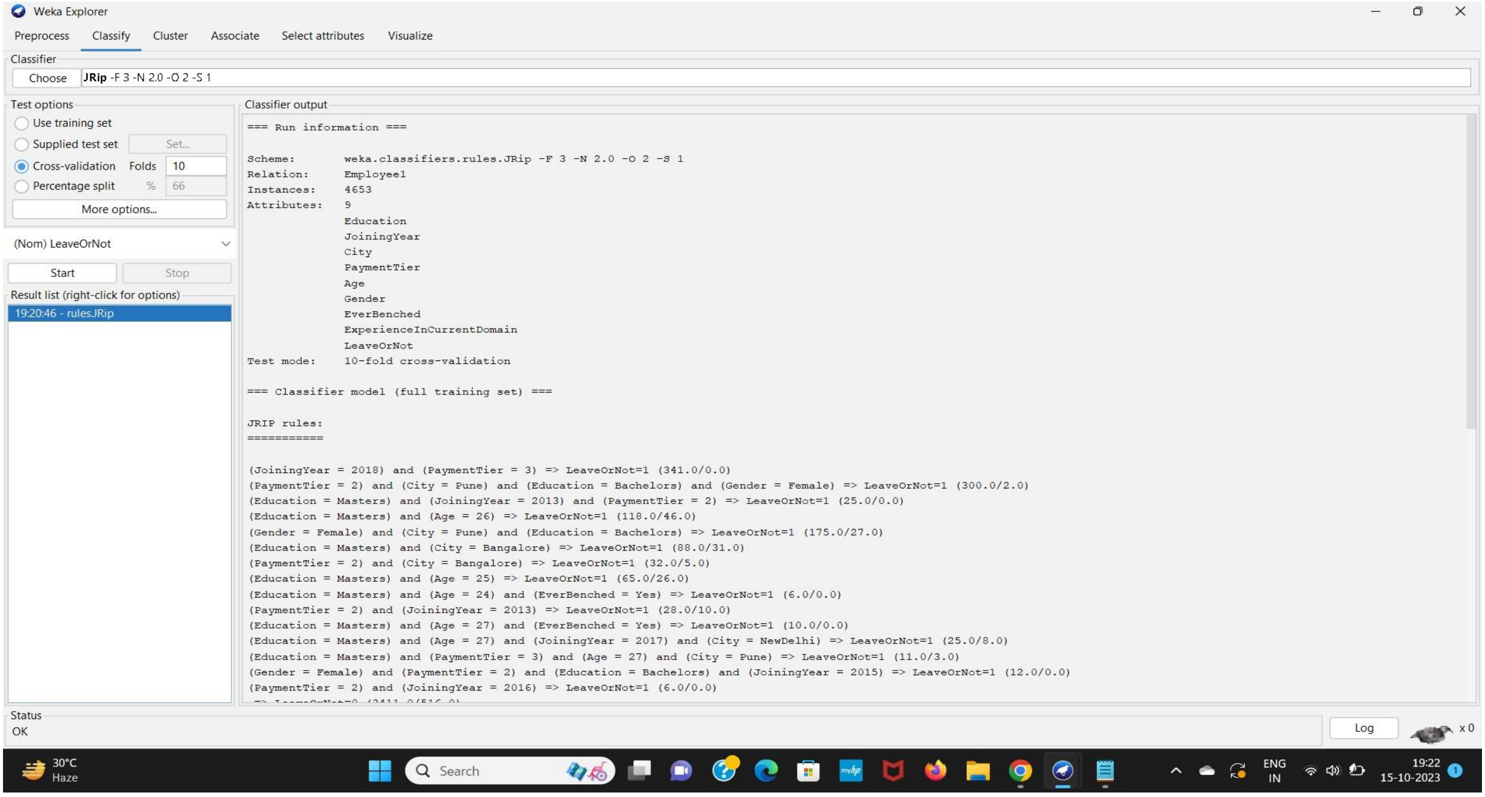


Fig 4. JRip algorithm analysis

2.4. Dendograms Visulaization:

Marginal curves or marginal effects show how the predicted probability or outcome changes as one variable change while holding other variables constant. In the case of a rule-based classifier like JRip, understanding the impact of individual variables on the predicted outcome can be insightful.

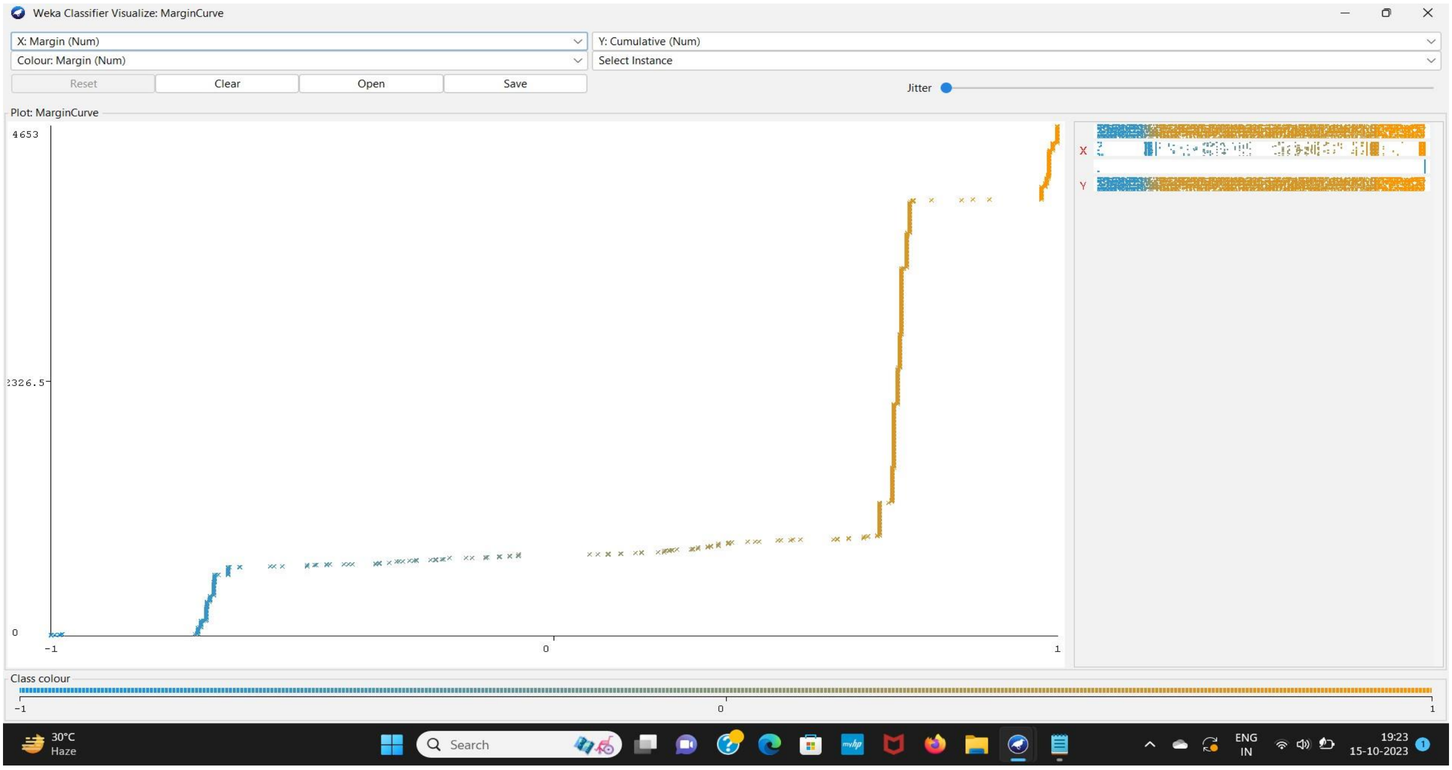


Fig 5. Marginal curves

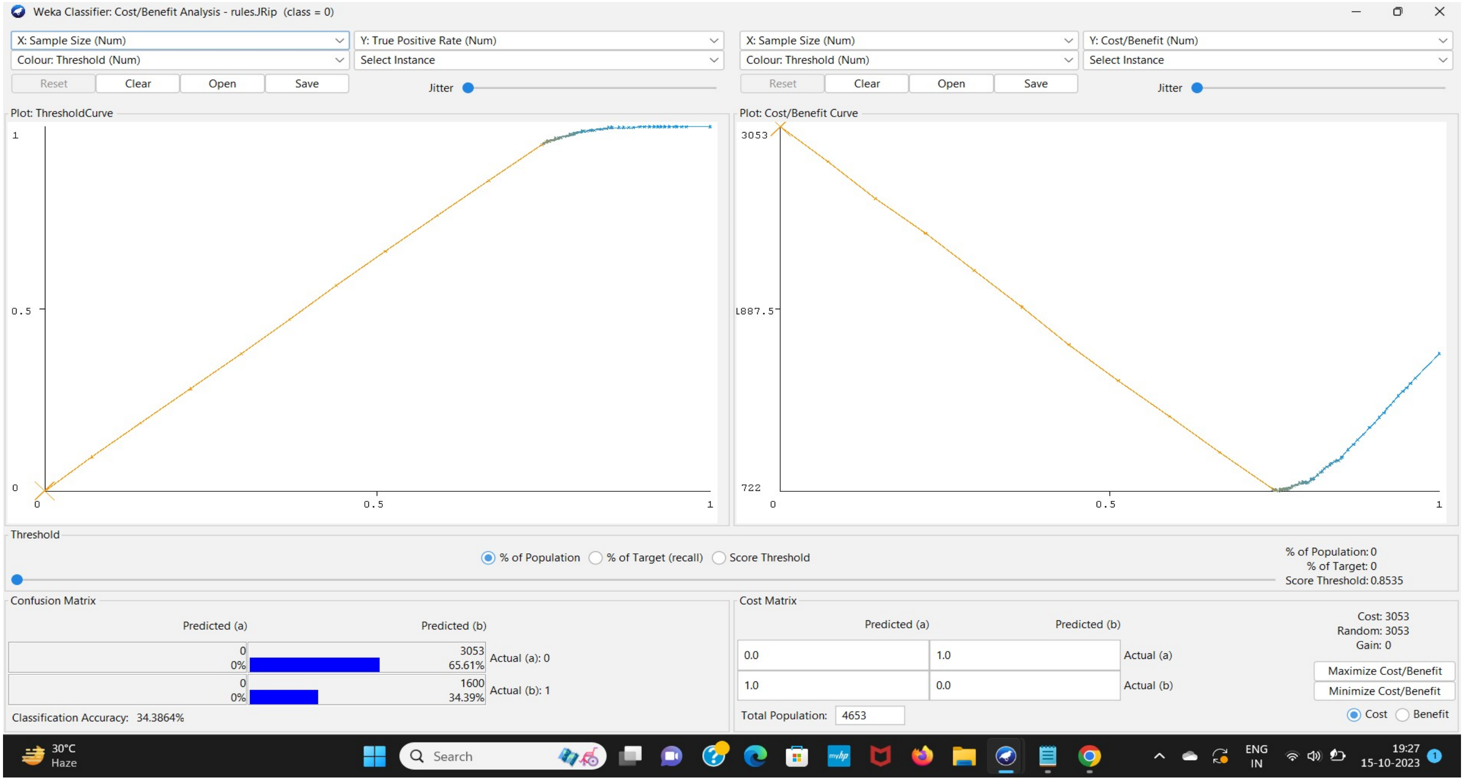


Fig 6. Rules JRip (class0)

III .CONCLUSION:

JRip, being a rule-based algorithm, builds classification rules based on discrete features and their values. It creates rules iteratively, pruning them to minimize errors and generate a set of rules for classification. These rules are typically in the form of "if-then" statements, which are interpretable and provide insights into how the algorithm makes classifications based on discrete feature values.

If you're looking to analyze marginal curves or understand the relationship between continuous features and the predicted outcome, you might want to consider regression-based algorithms or other approaches tailored for continuous data analysis, as JRip is more suited for discrete feature data and rule-based classification.

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Journal for Re Attach Therapy and Developmental Diversities
eISSN: 2589-7799
2023 May; 6 (5s): 228-241

An Attitude and Psychological Perception of Employee on Human Capital Management in Indian Banking Industry: A Structural Treatise on Select Banks

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Received: 22-March-2023
Revised: 20-April-2023
Accepted:15-May-2023

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Abstract

Introduction: This research aims to determine or investigate the effect of applying these Human Capital Management principles. In order to develop and sustain employees, organizations have to invest in their employees. Here the concept of treating Employees as Human Capital comes into focus. Under this employee are not treated as mere resources but as capital to invest.

Purpose: There is a deficiency in the research about the evaluation of these Human Capital Management aspects and their implementation outcomes. This research aims to determine or investigate the effects of applying these Human Capital management principles. The major goal of this research was to compare Human Capital Management practises across public and private banks in Vijayawada.

Design/Methodology/Approach: Both primary and secondary sources were used to compile this report. Books, journals, magazines, websites, bank instructions, files, and records were mined for secondary data. The core data for this research was gathered using a carefully designed and pilot-tested questionnaire in order to elicit respondents' thoughtful responses. In order to collect data from both public and private sector bank personnel, a Purposive Sampling strategy was used.

Findings: The private sector banks employees possess Entrepreneurial Spirit, intellectual qualities and also better training in job encourages them to enlighten their Communication Capabilities in their work place. Human Capital Management techniques in both public and private sector banks lead to promising organisational success in terms of employee efficiency, bank efficiency, and overall productivity.

Practical Implications: The practice of HCM in public sector banks helps the higher officials to recognize efficient employees and their true value and in private sector banks the practice of HCM develops entrepreneurial spirit and provides efficient training opportunities to the employees. If policymakers don't pay attention, regulatory hurdles and agency issues might prohibit banks from diversifying their revenue as much as they should. Human capital was shown to have a modest influence on bank performance, prompting the study's authors to recommend that both governments and banks increase their spending in this area.

Conclusion: The HCM strategy analyses core HR issues with an eye on bolstering HR's effectiveness and charting new territory. Stakeholders are communicated with via Human Capital Management's performance measurement and reporting in relation to established objectives (workers, shareholders, and consumers) about the importance of Human Capital Management in attaining sustainability and demonstrating banking responsibility.

Key Words: Human Capital Management, Employees, Competitive advantage, Efficiency.

1. Introduction

The Indian banking industry has diversified into new fields such as leasing, merchant banking, venture capital, home financing, and other financial services. Many banks now provide a wide variety of services, from local microloans to banking on a global scale. As a result of the Indian government's recent changes to its trade, industrial, and exchange rate policies, the international banking sector is undergoing a period of rapid diversification and technological revolution. When it comes to banking, India is no different. In order to adapt to the changes, the bank's functions have evolved. Customers' interactions with service providers have been drastically altered by the introduction of new technology. Customer satisfaction is the most significant obstacle the Indian banking industry must overcome. It is a crucial concern for all marketers. In today's highly competitive corporate environment, customer happiness is seen as the key to success. Numerous studies demonstrate that the banks of the new generation are focused on the consumer – knowing his wants, motivating him, and subsequently gratifying him with a diverse range of goods and services. Bank customer service should adhere to three fundamental tenets: civility, accuracy, and quickness. Due to growing rivalry, quality of service has been a prominent topic and has been identified as a vital aspect in maintaining competitive advantage and retaining customer satisfaction. Service quality may be described as the gap between client expectations and perceptions of service.

When expectations exceed performance, perceived quality falls short of customer satisfaction and customer unhappiness ensues (Parasuraman et.al., 1985). Service quality is a term that has generated a great deal of study interest and discussion due to the difficulty in defining and measuring it, with no general agreement forming on either. Customer opinions and preferences about service quality have a substantial influence on the performance of a bank.

In this day of severe competition, banks are meticulous in determining their customers' demands and how well they can provide them. Offering customers both innovative and secure banking services and cutting-edge consumer electronics, they work tirelessly to set themselves apart from the competition.

It should be emphasised that technological supremacy and creative goods alone will not guarantee success; the success of any bank is determined by the quality of its customer service. According to Taylor and Baker (1994) and Taylor and Cronin (1992), service quality has become a must for banks to satisfy and keep their most valuable clients. The key to success in the banking industry is providing exceptional service to keep and please consumers.

2. Statement of the problem

To aid in the expansion of banks, it is crucial to comprehend their administration. Human Resource Management and the expansion of banks has been the subject of several academic investigations, while Human Capital has received far less attention. Human Capital Management is a distinct field from its HRM counterpart. When referring to the social sciences, this is the next tier. Considered a subset of HRM, Human Capital Management views employees as valuable assets rather than mere means of production. Human Capital Management is essential for every business that hopes to develop its Human Capital, or workforce. Human Capital is the topic of this study, which analyses the impact of Human Capital on public and private sector banks in Vijayawada. Human Capital Management is applied to the recognised consolidated list of Human Capital components. There is a deficiency in the research about the evaluation of these Human Capital Management aspects and their implementation outcomes. This research aims to determine or investigate the effects of applying these Human Capital management principles.

The major goal of this research was to compare Human Capital Management practises across public and private banks in Vijayawada.

3. Objectives

- This study's objective is to examine the factors that contribute to effective human capital management in the banking sector.
- To investigate how workers value human resource management.
- The purpose of this study is twofold: (1) to analyse the impact of human capital management on the specific area of study.

4. Literature Review

The term "human capital" (HC) is used to describe in-house resources such as workers' expertise. Health care is important because it promotes growth and healing (Bontis) (1998). In a similar vein, Human Capital is seen as the most crucial source of economic development in an economy that is focused on the accumulation of knowledge. In a knowledge-driven economy, both the creation and misapplication of knowledge play crucial roles throughout the time of economic accumulation (Harman, 2007). As previously discussed, an organization's human capital consists of its personnel's amassed set of competencies (Odhong et al., 2013). To further explain why it's important for countries to put money into education, the concept of "human capital" (HC) was created (Afiouni, 2013). Among the neoclassical frameworks for examining labour markets, "human capital" has recently emerged as a key component (Omolo) (2007). Pay stability is a key factor, therefore this is especially true. It now serves as the standard by which educational funding audits are conducted as well. Market value is thought to be based less on physical assets and more on intangibles like human capital, which explains why firms place a premium on their employees (Kulvisaechana, 2006). Chatzkel defines human capital management, or HCM, as putting in place the measurements to figure out the value of these traits and using that information to run the organisation well. J.L. (2004). Human capital is the sum of a person's experience, knowledge, creativity, skills, and other useful traits in the workplace. Armstrong Baron, 2007 Human capital, also known as human resources capital (Shun Wang, 2011), is an organization's most valuable intangible asset because of the knowledge, skills, abilities, experience, and It includes every scholarly asset of the organisation, such as employees' learning and expertise (which allows them to handle authoritative concerns and meet customers' difficulties and needs) (Ditillo, 1998). Due to its importance in demonstrating an organization's ability to identify the best answer by pooling the expertise of its personnel, intellectual capital of this kind is sometimes called "strategic capital" (Cornachione, 2010; Bontis, 1998). Human capital reflects the store of knowledge possessed by people and is a critical asset for economic growth. Human resources are an organization's most valuable asset because of their potential to generate new ideas and solve problems (Bontis & Fitz-enz, 2002). Capital consists of the talents, aptitudes, and skills acquired by employees inside an organisation. The organisation is not the owner of these capitals, and departing employees must provide them with fresh drugs (Bontis, Keow, & Richardson, 2000). Financial professionals and scientists agree that human capital is crucial to a country's economic success and, by extension, the basis for realising the desired standard of living. What individuals provide to a business in terms of their attitudes, experience, knowledge, creativity, and energy is what is known as "human capital" (Ingham, 2007). The success and benefits of an organisation are directly tied to the quality of its human resources. Human capital, which has characteristics not found in other capital, has emerged as an essential ingredient for the knowledge and production of modern businesses (subjective private) as shown by historical analysis (Ukenna et al. 2010). Similarly, research suggests that investment in human capital promotes technological innovation and adoption, boosting GDP growth and total factor productivity (Cielik, and Akhvlediani 2019; Hein, Männasoo, and Ruubel, 2018). In a similar vein, it has been noted by several writers that diversifying businesses strengthen their existing operations by acquiring new core competences and capabilities (Lin et al., 2020a). Firms with greater levels of human capital and higher levels of ex ante job mobility for their workers are more likely to be bought, according to research by Chen et al. (2018). According to the research of Lee et al., human capital complementarities are a key motivator for M&A activity and a factor in improved post-merger financial performance (2018). Scholars in organisational resource management have made similar claims, arguing that organisations may use diversity to use their surplus firm-specific resources like human capital (Wassmer, and Chiambaretto 2019; Schmeisser and Fisch, 2020; Chung et al., 2019).

a. Human and Human Capital Management

Adopting a Human Capital strategy entails considering personnel as investments to be maximised, as opposed to expenses to be reduced. Spending on things like employee recruitment, security, training, and retention are seen as expenditures with a foreseeable return over a certain period of time, just unlike the way money is evaluated for investments in plant growth or new machinery. Human Capital is generated by three types of investments in people: the first cultivates "knowledge," which is at its best when there is a high concentration of all three factors (knowledge, motivation, and opportunity).

In the context of global competition, Human Capital, which is made up of workers in the information and knowledge economy, is becoming more important in making value. Human Capital presents more challenges in terms of analysis, quantification, and management than other value-creating elements. It would seem that the conventional metrics previously used to ascertain a company's value are insufficient in the modern business climate.

The idea of human capital implementation is largely unchallenged despite the popular belief that human capital improves business results. A corporation has to seek competitive advantages in today's ever-evolving business climate by implementing a dynamic, marketable strategy that centralises creativity and innovation. That's a must if they want to make it over the long haul. The value of human resources to a company's competitiveness is undeniable (Barney, 1995). Most companies now see human capital as a source of competitive advantage that will boost performance as a consequence of changes in the global market. Investing in people is now part of a larger strategy for smart and efficient action. Therefore, businesses must grasp the human capital that will increase employee happiness and performance. Initially, extensive research was conducted on human capital and its implications for an organization's performance based on a general assumption, and it is evident that human capital enhancement would result in enhanced execution and performance (Choudhury et al). (2010). Individually, the relevance of human capital depends on how much it contributes to the establishment of a competitive advantage (Snell & Dean, 1992). According to the economic theory of exchange rates, a company might gain an edge over its competitors by staking claim to unique assets that cannot be replicated by other businesses in the same industry. Therefore, as the value of human capital rises, so do the incentives for businesses to spend in managing it, so that they can mitigate risk and make the most of profitable possibilities. Consequently, individuals must hone their competence skills while keeping the final aim in mind. Human capital has a critical role in predicting how to generate competitive advantages at the hierarchical level. According to Snell et al. (1999), the value and originality of an organization's capital are its two defining characteristics. The company demonstrated that assets are lucrative when they enable boosting sufficiency, capitalising on opportunities, and limiting risks. Value, in terms of practical administration, refers to the maximisation of benefits in relation to costs. In this view, a company's human capital may create value if it contributes to reducing expenditures and increasing performance. In the real world, managers need to focus more on human capital and its beneficial effects on company success. Similarly, managers need to be aware of the untapped potential for maximising the value of their human capital in ways other than conventional ones. For the sake of protecting the value of their human capital investments and maximising their profits, banks in particular would do well to diversify into firms operating in related industries.

b. Elements of human capital management

Employers are increasingly recognising the advantages of online benefits solutions in terms of reducing administration and enhancing employee satisfaction. Companies that can provide these advantages will be in high demand to assist with managing benefit programmes and streamlining administrative procedures. 19 of 20 HR experts surveyed think complete Web-based benefit solutions "essential," "critical," or "extremely vital" for future HR benefit offerings.

Instead of being seen as an expense, employee benefits should be treated as an investment that returns value to the company and managed in line with the company's broader business strategy. Employers and brokers must shift away from the traditional concept of benefits (such as medical coverage, retirement accounts, and time off policies) and towards the key strategies of health and wellness, life balance, financial security and experience in order to shift a company's perspective from benefits as an expense to benefits as strategic business drivers. The value of employee benefits may be maximised and employee engagement and satisfaction can be boosted by taking a holistic view of them. A company's large investment in Employee Benefits has the potential to provide incalculable returns in the form of increased recruitment, retention, and productivity, but only if the programme is well-managed. Employers will extract the maximum value from their benefits efforts if they approach employee benefits programmes holistically as opposed to as a necessary expense. This research examines a variety of factors, including staff training, intellectual skills, incentives, community activities, entrepreneurial spirit, leadership techniques, and employee remuneration, among others;

5. Research Methodology

Both first-hand and second-hand sources are used in the investigation. Information from books, magazines, websites, bank guides, files, and records was used in secondary sources. Primary data for this research came from a well-crafted and validated questionnaire administered to a representative sample of the target population. Purposive sampling was employed to collect data from both public and private sector bank employees. Each PSB and PRSB's total number of workers per location has been tallied. Banks and branches with a large number of workers were specifically chosen for this study.

List of banks taken for the study

S. NO	Private Sector Banks	Public Sector Banks
1	City Union Bank	State Bank of India
2	ICICI Bank	Bank of India
3	HDFC Bank	Indian Overseas Bank
4	Tamil Nadu Mercantile Bank	Indian Bank
5	IDBI Bank	Punjab National Bank

a. Hypothesis

- There is no significant difference among employees in different managerial levels of Banks do not differ in their of perception of Human Capital Management.
- There is no significant influence on human capital management practices on employee efficiency.

b. Data Collection and Sample design

This investigation included five PSBs and five PRSBs situated in Vijayawada. The following table shows the sample distribution:

Data Collected

Banks	Distributed	Rejected	Received	Used
Private sector banks	250	5	223	218

Public sector banks	250	4	197	193
Total	500	9	420	411

Only 197 PSBs and 223 PSCs responded to the survey after it was sent to 500 financial institutions (PRSB). Twenty-five managers and twenty-five other employees from various banks in Chennai responded to the survey. Four PSB questionnaires and five PRSB questionnaires are thrown out after being evaluated due to missing information. A total of 411 questionnaires were employed in the present study, 193 from PSBs and 218 from PRSBs, with a combined 193 questions.

Based on the positions of the employees of PSBs and PRSBs, in terms of their designation, hierarchy, authority, and responsibility, the respondents tick marked Top level or Middle level option in the questionnaire. Therefore, the research is justified in equating the employee cadre of both Public and Private Sector Banks and the opinions elicited are in consonance with their positions in the respective organization. As the elements influencing Human Capital Management practices are Common for all levels of employees in a bank, the same questionnaire was used to collect the responses from Top level employees and Middle level employees.

c. Data Analysis

H1- The employees in different managerial levels of Banks do not differ in their perception of Human Capital Management.

The application of analysis of variance on the dependent Human Capital Management factors and the independent variable designation of the employees revealed that, out of twenty Human Capital Management practices, fifteen demonstrated significant differences between high-level and middle-level commercial bank employees. It indicates that hypothesis 1 is rejected at the 5% significance level and that the impression of Human Capital Management by bank workers at various management levels differs.

HOW THE KIND OF BANKS AFFECTS THE FACTORS OF MANAGING HUMAN CAPITAL IN BANKS

		Sum of Squares	df	Mean Square	F	Sig.
Skills Competencies	Between Groups	230.661	1	230.661	593.146	0
	Within Groups	159.051	409	0.389		
	Total	389.711	410			
Intellectual Skills	Between Groups	7.944	1	7.944	14.44	0
	Within Groups	225.017	409	0.55		
	Total	232.961	410			
HC Statistics	Between	40.64	1	40.64	125.438	0

	Groups					
	Within Groups	132.509	409	0.324		
	Total	173.148	410			
Leadership Practices	Between Groups	45.549	1	45.549	60.008	0
	Within Groups	310.447	409	0.759		
	Total	355.995	410			
Educational Qualification	Between Groups	153.067	1	153.067	331.381	0
	Within Groups	188.92	409	0.462		
	Total	341.987	410			
Employee Turnover	Between Groups	205.436	1	205.436	316.125	0
	Within Groups	265.791	409	0.65		
	Total	471.227	410			
Number of Employees	Between Groups	142.908	1	142.908	279.431	0
	Within Groups	209.172	409	0.511		
	Total	352.08	410			
Employee Value	Between Groups	250.374	1	250.374	499.524	0
	Within Groups	205.001	409	0.501		
	Total	455.375	410			
Employee Recruitment Policy	Between Groups	5.691	1	5.691	9.299	0.002
	Within Groups	250.307	409	0.612		
	Total	255.998	410			

This study looks at the many varieties of banks and Human Resource Management strategies, focusing on the public and private banking sectors. To establish a causal relationship between explanatory and response variables, we utilise one-way ANOVA, as seen below.

Table 1 ANOVA- Types of banks

		Sum of Squares	df	Mean Square	F	Sig.
Employee Benefit	Between Groups	137.338	1	137.338	321.959	.000

	Within Groups	174.467	409	.427		
	Total	311.805	410			
Entrepreneurial Spirit	Between Groups	47.047	1	47.047	93.498	.000
	Within Groups	205.804	409	.503		
	Total	252.852	410			
Job Rotation	Between Groups	113.434	1	113.434	237.903	.000
	Within Groups	195.014	409	.477		
	Total	308.448	410			
Training Participation	Between Groups	93.454	1	93.454	183.234	.000
	Within Groups	208.600	409	.510		
	Total	302.054	410			
Employee Training	Between Groups	39.116	1	39.116	68.232	.000
	Within Groups	234.473	409	.573		
	Total	273.590	410			

		Sum of Squares	df	Mean Square	F	Sig.
Employee Compensation	Between Groups	149.380	1	149.380	271.691	.000
	Within Groups	224.875	409	.550		
	Total	374.255	410			
Employee Incentives Program	Between Groups	171.980	1	171.980	203.696	.000
	Within Groups	345.319	409	.844		
	Total	517.299	410			
Employee SafetyHealth	Between Groups	65.882	1	65.882	130.717	.000
	Within Groups	206.140	409	.504		
	Total	272.022	410			
Career Opportunity	Between Groups	131.052	1	131.052	290.875	.000
	Within Groups	184.272	409	.451		
	Total	315.324	410			
Community Activities	Between Groups	197.684	1	197.684	418.958	.000

	Within Groups	192.985	409	.472		
	Total	390.669	410			
Training Institute	Between Groups	80.204	1	80.204	212.568	.000
	Within Groups	154.319	409	.377		
	Total	234.523	410			

From the table it is found that Entrepreneurial Spirit (F=93.498), Employee Benefit (F= 321.959), Employee Training (F=68.232), Job Rotation (F=237.903), Employee Training Participation (F= 183.234), Skill Competencies (F=593.146), HC Statistics (F=125.438), Intellectual Skills (F= 14.440), Leadership Practices (F=60.008), Employee Turnover (F= 316.125), Educational Qualification (F= 331.381), Number of Employees (F=279.431), Employee Recruitment Policy (F=9.299), Community Activities (F=418.958), Employee Compensation (F=271.691), Employee Value (F=499.524), Employee Safety and Health (F=130.717), Employee Incentive Program (F=203.696), Career Opportunity (F= 290.875).
Training Institute (F=212.568) greatly vary based on the kind of bank where workers are employed. This results in a comparison of each section of bank types using the mean.

The employees of private sector banks strongly agreed with the following statements with their mean scores: Entrepreneurial Spirit (4.20), Employee Benefits (4.54), Job Rotation (4.55), Employee Training (4.46), Employee Training Participation (4.29), HC Statistics (4.62), Skill Competencies (4.75), and Leadership Practices (4.30). Employee Turnover (4.47), Educational Credentials (5.00), Community Activities (4.79), Number of Employees (4.05), employees safety and health (4.14), Employee Value (4.78), Career Opportunity (4.57), and Training Institute (4.40) are included in Human Capital Management as compared to public sector banks employees who moderately agreed towards Entrepreneurial Spirit (3.52), Employee Benefits (3.38), and Job Rot Educational Qualification (3.77), Number of Employees (2.87), Employee Turnover (3.06), Training Institute (3.52), Employee Value (3.22), Career Opportunity (3.44), employees' safety and health (3.34), Community Activities (3.40) and are the most important factors influencing employee retention.
Moreover, the employees of private sector banks in Vijayawada City were moderately in favor of their banks practicing employee's compensations (mean =3.91), employees recruitment policy (mean =3.77), Intellectual Skills (mean = 3.30), and employees incentive programs (mean =3.84) in Human Capital Management.

H2- Influence Of Human Capital Management Practices On Employee Efficiency

Table-2

Model	**R**	**R Square**	**Adjusted RSquare**	**Std. Error of theEstimate**
1	.690[a]	.476	.449	.30965

Predictors: (Constant), Employee Recruitment Policy, Training Institute, Intellectual Skills, Entrepreneurial Spirit, HC Statistics, Leadership Practices, Number of Employees, Employee Benefit, Employee Incentives

Program, Educational Qualification, Job Rotation, Employee Safety Health, Employee Compensation, Employee Training, Employee Value, Employee Turnover, Career Opportunity, Employee Training Participation, Skills Competencies, CommunityActivities

R-value = 0.69, R-Square = 0.476, and modified R-Square = 0.449 are statistically significant, bank employee efficiency may be explained by the independent variables to the tune of 47.6% (as indicated in the table). This thus allows us to confirm the regression fit of our one dependent and several independent variables.

Table-3 ANOVA-Employee Efficiency

Model			df	Mean Square	F	Sig.
1	Regression	34.011	20	1.701	17.735	.000[a]
	Residual	37.395	390	.096		
	Total	71.406	410			

Predictors: (Constant), Training Institute, Employee Recruitment Policy, HC Statistics, Entrepreneurial Spirit, Leadership Practices, Intellectual Skills, Educational Qualification, Employee Benefit, Employee Incentives Program, Employee Safety Health, Job Rotation, Number of Employees, Employee Training, Career Opportunity, Employee Value, Employee Turnover, Employee Training Participation, Skills Competencies, Community Activities, Employee Compensation.

Dependent Variable: Employee Efficiency

The P-value of 0.000, and the F-value of 17,735 are statistically significant at the 5 percent level, according to the table above. This means that the dependent factor pool is well described by the independent variables, and that the regression model is appropriate. Productivity in the Workplace. In the table below, we break down the effects of each of the 20 different variables in Human Capital Management practices.

Table-4 Co-Efficient-Employees Efficiency

Model		UnstandardizedCoefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.565	.247		14.427	.000
	Employee Benefit	-.227	.039	-.475	-5.866	.000
	Entrepreneurial Spirit	.056	.050	.105	1.119	.264
	Job Rotation	.056	.046	.117	1.212	.226
	Training Participation	-.223	.061	-.459	-3.652	.000
	Employee Training	.197	.060	.385	3.277	.001

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eISSN: 2589-7799
2023 May; 6 (5s): 228-241

	Skills Competencies	.050	.075	.117	.668	.505
	Intellectual Skills	-.033	.039	-.060	-.867	.387
	HC Statistics	-.433	.053	-.675	-8.158	.000
	Leadership Practices	-.162	.035	-.362	-4.628	.000
	Educational Qualification	-.039	.041	-.086	-.950	.343
	Employee Turnover	.167	.045	.429	3.704	.000
	Number of Employees	-.348	.053	-.772	-6.507	.000
	Employee Value	.099	.062	.251	1.596	.111
	Employee Recruitment Policy	-.298	.048	-.564	-6.170	.000

From the above table it is found that Employee Training Participation (p=0.000, t=-3.652), Employee Benefits (p=0.000, t=-5.866), HC Statistics (p=0.000, t=-8.158), Leadership Practice (p=0.000, t=-4.628), Employee Training (p=0.001, t=3.277), Number of Employees (t=-6.507, p=0.000), Employee Turnover (t=3.704, p=0.000), Employee Compensation (p=0.036, t=2.108,), Employee Recruitment Policy (p=0.000, t=-6.170), Career Opportunity (p=0.045, t=2.009), Employee Incentive Program(p=0.002, t=3.182), Community Activities (p=0.000, t=3.577) are statistically significant to explain the factor bank Employee Efficiency. This highlights how Human Resource Management techniques in the banking industry can maximise Employee Efficiency, which in turn boosts service quality. Training, leadership skills, and professional advancement opportunities for employees are all boosted thanks to these strategies.

5. Practical Implications

- Human Capital Management methods in the banking business aid in maximizing staff productivity and enhancing service quality. Training, leadership skills, and professional advancement opportunities for employees are all boosted thanks to these strategies.

- The practice of HCM in public sector banks helps the higher officials to recognize efficient employees and their true value and in private sector banks the practice of HCM develops Entrepreneurial Spirit and provides efficient training opportunities to the employees.

- The study's primary goal was to catalogue the many forms of Human Capital Management used in the financial industry; the researchers found that this strategy improved the profitability of banks on the whole. Banks need to give more detailed reports about things like how Human Capital Management affects the overall performance of the bank, the strategies used to get the most out of each employee, and the possible benefits of good management.

6. Conclusion

The analysis demonstrates that many banks may greatly enhance their Human Capital Management discussions so that they meet the same reporting standards as other, more physical assets. Human Resource Management makes it clearer to employees how important their job is to the success of the bank as a whole and how directly their efforts affect the attainment of the institution's objectives. The HCM strategy evaluates the topics that are fundamental to Human Resources in order to continue supporting the department's performance and to establish a new path. Measuring and reporting Human Capital Management performance against clear goals delivers messages to stakeholders (workers, shareholders, and consumers) about the importance of Human Capital Management in attaining sustainability and demonstrating banking responsibility.

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Work-Life Balance in Educational Institutions: A Comprehensive Review of Current Research

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Abstract

This comprehensive review article provides a deep exploration of the intricate concept of work-life balance within educational institutions. Work-life balance is a paramount consideration for educators, staff, and administrators, profoundly influencing individual well-being and institutional effectiveness. The article begins by elucidating the significance of work-life balance within educational contexts, underscoring its vital role in supporting the physical and mental health of those engaged in the educational process.

The literature review section furnishes historical context and elucidates theoretical frameworks pertinent to work-life balance in academia, elucidating the myriad factors that influence this equilibrium, ranging from workload and job demands to personal factors. A granular examination is conducted, delving into the distinct experiences of faculty and educational administrators. This exploration unveils the unique challenges and coping mechanisms characteristic of each group, shedding light on gender-related disparities within academia.

Furthermore, the review probes the nexus between work-life balance and mental health, emphasizing the imperative of maintaining a harmonious equilibrium to stave off burnout and bolster overall well-being among educators. It casts light on a panoply of interventions and support systems designed to enhance mental health and work-life balance within the educational sphere.

The impact of technology, particularly in the context of virtual teaching and remote work, is scrutinized meticulously, alongside a comprehensive evaluation of the potential merits and demerits of technological integration within educational institutions. The article culminates with

విశ్వర్షి వాసిలి సాహిత్యం - వ్యక్తిత్వం, యౌగిక తత్త్వం

భావవీణ ప్రత్యేక సంచిక

Journal of Literary, Culture & Language Studies

Vol. 19 - Issue. 10 - Spl. Edition - October 2022 - ISSN No. : 2456-4702

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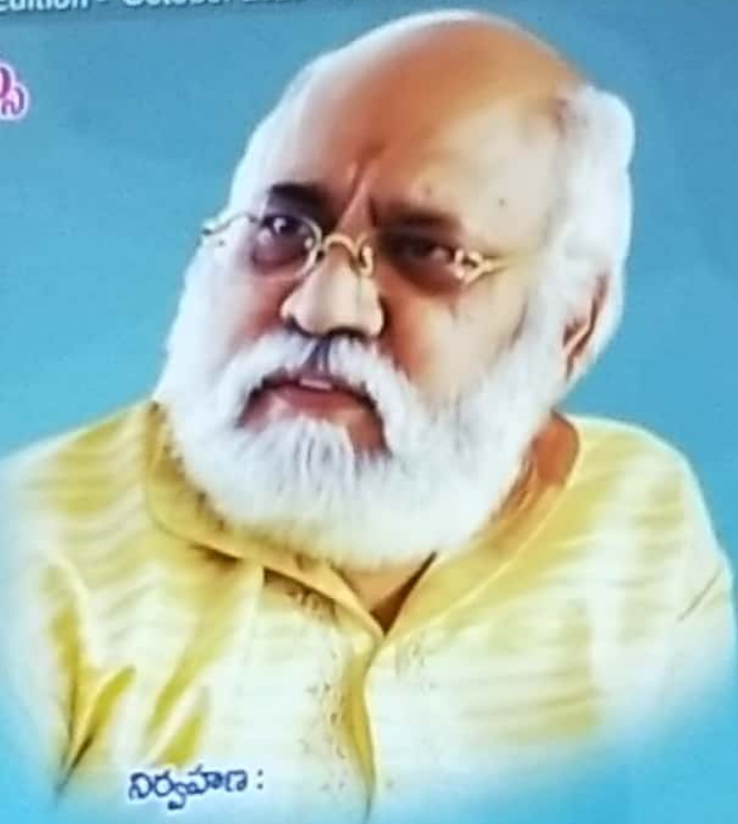

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Journal of Arts, Literary, Culture & Language Study

(కళలు - సాహిత్య-సాంస్కృతిక భాషాధ్యయన పత్రిక)

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7989781963,
9490847482.
Rohini Towers,
2/11 Brodipet,
GUNTUR-2.

Vol. 18 - Special Issue 7 - July 2021 - ISSN No. : 2456-4702 - RNI No. APTEL/2003/12253 - Rs. : 15/-

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అందులో మొత్తం 10 ప్రసంగాలు ఉన్నాయి. అవి 1. ఆధ్యాత్మికత : తిరుమల రామచంద్ర, 2. [illegible], 3. యోగమార్గాల తులనాత్మక అధ్యయనం, 4. [illegible] యోగం : ఒక అధ్యయనం, 5. [illegible], 6. [illegible], 7. [illegible] : యోగసిద్ధులు, 8. [illegible] బ్రాహ్మ ముహూర్తం, 9. [illegible], 10. [illegible]... అయితే ఈ 10 ఆధ్యాత్మిక ప్రసంగాలను నా పరిశీలనా సౌలభ్యం కొరకు 3 భాగాలుగా విభజించుకుంటున్నాను ... 1. ఆధ్యాత్మికత, 2. యోగికత, 3. శాస్త్రీయత అన్న కోణంలో.

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భగవంతునికి సేవచేయడమంటే మానవజన్మ ఎత్తినవారు తిరిగి భగవంతుని సన్నిధి చేరాలనేది సందేశం. అలా పరిపూర్ణత్వం సాధించేందుకే ఆధ్యాత్మిక జీవితమని తేల్చి చెప్పిన వైనం కనబడుతుంది. ఈ భువిపై వెలసిన ప్రతిజీవుడు "సంసిద్ధి" పొందాలంటారు. 'సం' అంటే పరిపూర్ణమని, 'సిద్ధి' అంటే ఉత్కృష్టత, ఇంటికి చేరిన వాడు అని అర్థం. ఇలా పరిపూర్ణత సాధించినవారు తిరుమల రామచంద్ర అని తేల్చిచెప్పారు. ఆయన మార్గం అందరికీ ఆదర్శవంతమైనదిగా పరిగణించాలి అని అంటారు.

యౌగికత :

శ్రీ శార్వరి సాహిత్యానికి సంబంధించిన విశ్వర్షివారి ప్రసంగాలను యౌగికత అనే ఈ ఉపశీర్షికలలో ప్రధానంగా విశ్లేషించదలచాను.

యోగాశ్రమ లేఖలు :

విశ్వర్షి రెండవ ఆధ్యాత్మిక ప్రసంగమైన 'యోగాశ్రమ లేఖలు'లో ముందుగా తమ పితృదేవులు శార్వరిగారితో తమకున్న అనుబంధాల్ని వివరించారు. శార్వరిగారు నాన్న, గురువు, మాస్టర్ అంటూ తమ తండ్రిలో మూర్తీభవించిన త్రితత్వాలైన యౌగికతత్వం, సాహిత్యతత్వం, వ్యక్తిమత్వం అనేవాటిని విశ్వర్షి వాసిలిలో చూడవచ్చు. "అన్నం ఉడికిందో లేదో చూడాలంటే ఒక మెతుకు చూస్తే చాలు కదా!" అనే వాస్తవాన్ని పుస్తక పఠనంలోనూ అనుసరించే తత్వం వాసిలిది. అంటే తాము చదవదలచుకున్న పుస్తకం తెరవగానే వచ్చిన పుటను చదివితే చాలు ఆ గ్రంథ రచయిత విషయలోతులను ఇట్టే పట్టేయగల సత్తా ఉన్న సరస్వతీ పుత్రులు విశ్వర్షి వాసిలి వసంతకుమార్ అని తెలియవస్తుంది. దీనిలో యోగపద్ధతులను, ఆత్మ భగవంతుడు వేరు కాదని, కుక్కతోకలాంటి మానవుల ఆలోచనల గురించి, మెదడు రూపం అయితే మనస్సు రూపం లేనిదని, యోగసాధకుడు మనస్సును అధీనంలో ఉంచుకుని సాధన చేసినప్పుడు భౌతిక-లౌకిక భావాలను మరచి అలౌకికత అంటే తన ఆత్మలో లీనమయ్యే స్థితికి చేరగలడంటారు. "యోగసాధన అనేది కోరిక కాదు, ఒక అవసరం అనిపించాలి", అలాగే "యోగం చేయటమనేది ఏవో కొన్ని కోరికలు తీర్చుకోడానికి అయితే దాని ఫలితాలు మనకు అందవు, మనిషికి కోరికలు ఎప్పుడూ పెరుగుతూనే ఉంటాయి" అంటారు శార్వరిగారు. (పుట 17) ఏదైనా ఒక పుస్తకం చదివిన తర్వాత ఒకమెట్టు పైకి ఎదిగేట్లుగా ఉండాలి కాని క్రిందికి జారిపోయేలా ఉండకూడదన్న సిద్ధాంతం శ్రీ శార్వరిగారిదని ఇచ్చట తెలియవస్తుంది. అదే పంథా కొనసాగిస్తున్నవారు విశ్వర్షి వాసిలి అని స్పష్టంగా చెప్పవచ్చు. మన ఆలోచనల్ని పెంచే పుస్తకాలు చదివినప్పుడే విమర్శనా దృక్పథం పెరుగుతుందంటారు. చూసేవి, వినేవి, స్పృశించేవి, అనుభూతి చెందేవి భౌతికాలు; మన మనస్సు, ప్రజ్ఞ, జ్ఞానం, భావన అందుకునేవి అభౌతికాలంటారు విశ్వర్షివారు. దేవుడూ ఆత్మా వేరు వేరు కాదు అంటూ ఆత్మకు ఏయే శక్తులున్నాయో గ్రహించాలంటే యోగసాధన చేస్తుం డాల్సిందే అంటారు.

శార్వరిగారు 'అహం బ్రహ్మ' అన్న లేఖలో మనస్సుకు మూడు దశలుంటాయంటారు. అవి జీవం, అహంకారం, దేహం. ఈ మూడు ఒకదాని కొకటి పెనవేసుకొని భౌతిక దేహంపై మమకారం చూపుతుంటాయి. "నేను" ఏర్పడటానికి మనస్సు ప్రధానం అని, తెలిసినది బుద్ధి అని, తెలియకపోతే అహంకారం అని తేల్చి చెప్పారు. 'నేను'లోని మనస్సును, బుద్ధిని, అహంకారాన్ని, చిత్తాన్ని, కర్మను, కామనను, వాసనను, ఇంద్రియాలను, ప్రకృతిని గురించి శార్వరిగారు అర్థమయ్యే రీతిలో చెప్పినవైనాన్ని విశ్లేషించారు వాసిలి.

అదే విధంగా గురుశిష్యులు ఒకరినొకరు అర్థం చేసుకున్నప్పుడే, అంతరార్థం తెలిస్తేనే తప్ప ఆత్మ వెలుగులు కనిపించవంటారు. యౌగికతలో సాధకుల్ని తనవలె తీర్చిదిద్దే ప్రయత్నం చేయడమే గురుతర బాధ్యత అని తెలిపారు. చివరగా 'యోగాశ్రమ లేఖలు'లో శార్వరీయ యోగరేఖల్ని గురించి తెలిపారు. (పుట 31, 32, 33, 34, 35, 36)

BHAVAVEENA Spl. Issue
Vol. 19, Issue. 10, July 2022
ISSN No. : 2456-4702 - RNI No. APTEL/2003/12253
భావవీణ
UGC CARE List Group - 1 Journal under Arts and Humanities Category

యోగమార్గాల తులనాత్మక అన్వేషణ :

మాస్టర్ శార్వరి రచించిన "ది డిస్కవరీ ఆఫ్ మాస్టర్ యోగ" ఆంగ్ల పుస్తకం శార్వరిగారి తొలి యోగిక రచన 1970 నవంబరు 7న వారి 41వ జన్మదినోత్సవం నాడు వెలుగు చూసింది. అప్పటికి విశ్వర్షి వాసిలికి 14 ఏళ్లు. నేడు మాస్టర్ యోగంగా ప్రాచుర్యం పొందిన "భృకుటీహిత తారక రాజయోగా"న్ని మాస్టర్ సి.వి.వి. 1910లో ప్రారంభించారు. 11 సంవత్సరాల, 11 నెలల, 11 రోజులు అనేక యోగ ప్రయోగాలు చేసి మనకు ఖగోళానికి మధ్య ఒక అనుబంధాన్ని ఏర్పరిచి, వారు భూగ్రహం నుండి నిష్క్రమించారు. వారి అడుగుజాడల్లో నడిచినవారు శార్వరిగారని విశ్వర్షి తెలిపారు. ఈ తొలి యోగిక రచనలో ప్రధానంగా యోగ సాధనకు సంబంధించిన పలు అంశాలను ప్రస్తావిస్తూ ఆధ్యాత్మికతతో ముడిపడివున్న మన జీవన మార్గ సుగమానికి మాస్టర్ సి.వి.వి. యోగ ఆవశ్యకత ఎంతో ఉందని తెలియచేశారు. 'ది డిస్కవరీ ఆఫ్ మాస్టర్ యోగా'న్ని శార్వరిగారు రెండు భాగాలు చేశారని, మొదటి భాగంలో 12 అధ్యాయాలు, రెండవ భాగంలో 7 అధ్యాయాలున్నట్లు తెలిపారు. విషయ సూచికను బట్టి మొదటి భాగం అనేక యోగమార్గాల వివరణలోనూ, రెండవ భాగం మాస్టర్ యోగ ప్రత్యేకతలతోను సాగినట్లు తెలిపారు. దీనిలోని లోతైన అంశాలను విశ్వర్షి వాసిలి తులనాత్మకంగా పరిశీలించి ఈ ప్రసంగ పాఠంలో తెలియచెప్పారు. అలాగే ఆరు అధ్యాయాల పరిచయంతో ఆపి శార్వరిగారి "ఆత్మయోగి సత్యకథ" అన్న ఆత్మకథలో 'ది డిస్కవరీ ఆఫ్ మాస్టర్ యోగ' పుస్తక రచనగురించి చెప్పిన విషయాలను చర్చించారు. (పుట 47) 'శ్రీరమణ మహర్షి' అన్న తొమ్మిదవ అధ్యాయంలో జీవన్ముక్త స్థితి గురించి తెలిపారు. "మాస్టర్ శార్వరి : మిషన్ అండ్ విజన్" అన్న విశ్వర్షి వాసిలి రచించిన 'శార్వరి జీవిత చరిత్ర' గ్రంథం లోని 'మహోద్యమం : మహోదయం' అనే అధ్యాయంలో తండ్రిని అన్ని కోణాలలో చిన్ననాటి నుండి అధ్యయనం చేసిన తనయుడిగా రాసిన విశేషాలున్నాయి. "సంసార జీవితంలో పొందుకున్న దేవతారాధన, పంచమప్రాణం అనుకున్న భానుప్రియ అర్ధాంతర భౌతిక నిష్క్రమణలతో శార్వరి జీవితం మలుపు తిరిగింది. అన్వేషణ వైపు దృష్టి మరలింది." (పుట 50)

మాస్టర్ యోగం - ఒక అన్వేషణ :

శార్వరి గురువుల "ది డిస్కవరీ ఆఫ్ మాస్టర్ యోగ" రెండవ విభాగం పేరు "ది బుక్ ఆఫ్ మాస్టర్ యోగ". నాలుగేళ్ల క్రితం ఈ గ్రంథ పునర్ముద్రణకు విశ్వర్షి వాసిలి రాసిన ముందుమాటలు Yogic Vision నుండి కొన్ని భావాలు "In an intense quest for solace, Sri Sarvari's Inquisitive mind surveyed ... of the truth! Sri Sarvari opined that it is unfair and selfish on the part of those few who resisted sharing the message of the Master" (పుటలు 53, 54) నేటి మన జీవన విధానానికి సరిఅయిన యోగమార్గం మాస్టర్ యోగమార్గమే అని తేల్చి చెప్పారు రచయిత. శార్వరి ఒక రచయితగా, ఒక సాధకుడిగా యోగం అంటే తత్త్వం కాదంటారు. నలభై ఏళ్ల ప్రాయంలో కంచుపాటి వెంకటరావు వెంకాసామిరావు "మాస్టర్ సి.వి.వి."గా పరిణమించారు. వీరు తమ యోగ చికిత్సా విధానంతో జబ్బుపడ్డవారిని ఆరోగ్యవంతుల్ని చేస్తుండేవారు. మానవ దేహాలను, ఆత్మలను సృష్టించగల ప్రజ్ఞ మాస్టర్ సి.వి.వి. స్వంతం. ఒక భౌతిక లైంగిక అనుబంధం లేకుండానే 'గాసియస్ స్టేట్' లో మానవ సృష్టి సాధ్యం అని తమ తనయుడు చందు జనన ప్రక్రియ ద్వారా చూపించారు. 'డెవలపింగ్ జీన్' లో మార్పు తీసుకురాగలిగితే ఇటువంటి అయోనిజ జన్మ సాధ్యమని తమ ప్రజ్ఞ ద్వారా నిరూపించారు. ఇలా మానవ సృష్టిలో మౌలిక మార్పు రావాలని, దానికొరకు తమ యోగసాధనలో కొన్ని ప్రత్యేక ప్రణాళికలను సిద్ధపరచారు." (పుట 55) "మానసిక సంయమనం తోనే యోగం సాధ్యం. అటువంటి యోగమే రాజయోగం అవుతుంది" అంటారు. (పుట 61) ఈ ప్రసంగంలో

రచయిత తన విద్యార్థి జ్ఞాపకాలను నెమరు వేసు కున్నారు.

'ది విజ్డమ్ ఆఫ్ మాస్టర్ యోగ' పుస్తకాన్ని సమీక్షించిన సంకలనకర్త రచయిత హిందూస్థాన్ ప్రభుత్వం అంటారు. (పేజి 68) మొత్తమీద నాటి కాలంలో ఈ నెలలు మాసిన పుస్తకం 'ది విజ్డమ్ ఆఫ్ మాస్టర్ యోగ' అని విద్యార్థి వారి అనుభవాలలో మొదటిసారి స్థానం ఆదేశించిన నిర్మాణం, ఉదాహరణం.

శాస్త్రాలు - యోగనిష్ఠలు :

ఈ విధమైన ఆధ్యాత్మిక ప్రసంగం శ్రీ విశ్వ విజ్ఞాన విద్యా ఆధ్యాత్మిక పీఠం, విశాఖపట్నం ఆశ్రమం 94వ వార్షికోత్సవ మహోత్సవంలో ఆనాడు పీఠాధిపతి ఉమర్ అలీషా "సూఫీ వేదాంత దర్శనం" గురించి. ఇది మొత్తం 35 శ్లోకాలతో సాగిన పద్యకావ్యం కాగా, రచయిత వారి అక్కడక్కడ కొన్ని అధ్యాయాలను, భాగాలను స్వీకరించి తమ ప్రసంగమున్నట్లు నా పరిశీలనలో తెలియవచ్చింది. 31వ శ్లోకం అయిన 'హృదయ' లో ఆధ్యాత్మికత, తాత్విక, యోగసాధనాపరమైన అంశాలను కలిపిన రచయిత తమ ప్రసంగపాఠంలో ప్రస్తావించారు. "అసలు యోగ సాధకులు, మూడు దశలను దాటి రాగల సమర్థులు" (పేజి 93) అంటారు. మొత్తం మీద ఈ ప్రసంగంలో షట్చక్ర తత్త్వాలను తమ యోగసాధనలో అనుభూతిచెందిన వారు కాబట్టే ఉమర్ అలీషా "ప్రాణము మూలమందమున ... ఊర్ధ్వ యానమున" అని అలవోకగా ఉదహరిస్తారు.

మహోదయ బ్రాహ్మీముహూర్తం :

ఈ ఆధ్యాత్మిక ప్రసంగంలో "శ్రీగురు ఆదేశిత యోగదర్శనం" నుండి మొదటి అధ్యాయం "మహోదయం" గురించి తెలుగు 12 పేజీలుగా సాగిస్తూ "ఇదే ఇదే సత్యమందురు విరుగు కావలసిన రోజు" అంటూ ముగిస్తుంటారు వారిది. ఆదేశిత. శ్రీగురుల తాళిపుస్తకం తాలి సర్గను మొదటిగా, తర్వాత భాగంలో శ్రీగురు అనుష్ఠాన తాలి సర్గను గురించి తమ ప్రసంగంలో ప్రస్తావించినట్లు తెలిపారు. ఇందులో సావిత్రి సత్యమందురు అంశాలు ఆధ్యాత్మిక కోణంలో సాగి పాఠకులకు ఉపదేశం చేస్తున్నట్లు విద్యార్థి భావించారు రచన సాగుతుంది. అలాగే "తూర్పు: ఉ.శ ఏకాంతి గురువు, పశ్చిమం : ఉ.శ ఏకాంతి పరిణామ యోగ స్థితి పరిణామందినా ప్రక్రియ"ల గురించి తెలిపారు.

పునరాగమన ప్రస్థానం :

ఇందులో మొదటి పుస్తకం మహోదయం, రెండవ అధ్యాయం సృష్టి గురించి తమ ప్రసంగ సారాంశం సాగుతుంది. అయితే మొదటి సర్గలో జరిగినదాన్ని గురించి అక్కడ ప్రస్తావించి రెండవ సర్గను గురించి అక్కడ తెలియజేసినట్లు తెలుస్తుంది. మొదటి సర్గలో సావిత్రి కవచిత తీరును ప్రస్తావించారు రచయిత. రెండవ సర్గలో "మానవజన్మ రహస్యం తెలుసుకోవడం సావిత్రి ప్రధాన కర్తవ్యం కాగా లౌకికత్వంతో పోరాటం సాగించడం మరి కార్యరూపం, మృత్యువుతో పోరాటం మూడోది. అయితే చివరలో సైతం తలవంచనిది స్త్రీత్వం. ఆత్మనిరూపణ నిశ్చయం. ఆత్మసాక్షాత్కారం నిత్యసత్యం", అంటూ ఆదేశిత మహర్షి అశ్వపతి సావిత్రిని, మాస్టర్ శ్రీగురు అశ్వపతి సావిత్రిని పోల్చి మాటలలో ఈ ఆధ్యాత్మిక ప్రసంగ సారాంశం సాగినట్లు తెలియవచ్చింది.

విశ్వకామునే ఆత్మప్రస్థానంగా :

ఇందులో మొదటి పుస్తకం మహోదయం, మూడవ అధ్యాయం రాజయోగం : ఆత్మ విముక్తి. మొదటి సర్గలో అటు విశ్వంలోనూ, ఇటు ప్రాపంచిక ప్రస్థానంలోని సావిత్రిలోనూ అజ్ఞానపు తెరలు తొలగి జ్ఞానప్రకాశనం కావటం యోగమంటారు వారిది. రెండవ సర్గలో సావిత్రి తన సాధనతో లౌకిక చైతన్యాన్ని అలౌకిక చైతన్యంతో నింపే ప్రయత్న ప్రస్థానాన్ని యోగమన్నారు రచయిత. సాధకుని యోగంలో కనిపిస్తున్న ఈ తృతీయ సర్గ ప్రస్థాన సావిత్రి తండ్రి అయిన అశ్వపతిది. అశ్వపతిలోని ఆధ్యాత్మిక జాగృతిని సాధకుల యోగంలో అన్వేషించడానికి ఉపయోగించును ఈ మూడవ సర్గను విశ్లేషణం

:రిగిందంటారు విశ్వర్షి. అశ్వపతి పుట్టుకతో జీవాత్మనే, ఐయితే, యోగసాధనతో శుద్ధాత్మ కావటం ఈ మూడ ర్గలో చూస్తామంటారు.

ఇందులో ఒకవైపు విశ్వరూపుడైన పరమాత్మ, మరొకవైపు పరలోక ప్రతినిధి, ఇటువైపు లౌకిక ప్రతినిధిగా జగన్మాత రూపమైన సావిత్రి రూపం లౌకిక, అలౌకిక భావాల మధ్య సంచరిస్తున్న వైనం తెలుస్తుంది. మానవరూపంలోని యుక్తులను, అతీంద్రియ శక్తులను అడుగడుగునా ఆవిష్కరించడం చూడవచ్చు. ఒకపక్క భూలోక వాసనలు, మరొకపక్క పరలోక వాసనలను సావిత్రి పాత్రలో ఇమడ్చటం అరవిందులు చేసిన మహత్తర ప్రయోగంగా రచయిత వాసిలి పరిగణిస్తారు. తెలుగులో సావిత్రి పాత్రలో యోగికతత్వాన్ని నింపటం శార్వరి గొప్పతనంగా చెప్పవచ్చు. "పరమాత్మ తత్వాన్ని నింపుకున్న ఈ జీవాత్మనే జగన్మాతకు ప్రతిరూపమైన సావిత్రికి ఆవాసమవుతుంది" (పుట 111) అరవింద మహర్షి అనుభవాక్షరాల సంయోగ యోగం అంటారు వాసిలి. "మనిషి జీవితమే ఒక సుదీర్ఘ ప్రయోగం, ఆశ నిరాశలకు, శాంతి సంగ్రామాలకు అది ఆలవాలం" (అరవింద సావిత్రి, పుట 49) చివరగా రచయిత ఈ ఆధ్యాత్మిక ప్రసంగంలోని విషయాలను సంక్షిప్తంగా పొందుపరచడం జరిగింది.

తాత్త్వికత :

ఉమర్ ఆలీషా తత్త్వము :

3వ ఆధ్యాత్మిక ప్రసంగం తాత్త్వికతకు సంబంధించిందిగా తెలియవస్తుంది. ఇందులో పిఠాపురంలో కొలువుదీరిన శ్రీ విశ్వ విజ్ఞాన విద్యా ఆధ్యాత్మిక పీఠం సప్తమ పీఠాధిపతి బ్రహ్మర్షి హుస్సేన్ షా వారి 116వ జన్మదినోత్సవ సభ జరుపుకుంటున్న సందర్భంలో నిర్వహించిన అంతర్జాతీయ అంతర్జాల సదస్సులో 'హుస్సేన్ షా' వారి తత్త్వాన్ని పునస్సమీక్షచేస్తున్న సందర్భంలో విశ్వర్షి వాసిలి ఇచ్చిన ప్రసంగ పాఠమిది.

"వ్యక్తి యొక్క మతికి ఏది స్థాయి కల్పిందినదో అదే అతని మతము" బ్రహ్మర్షి హుస్సేన్ షా దృష్టిలో "విశ్వ విజ్ఞానాన్ని అందించే ఆధ్యాత్మిక విద్యనే మతం, సమ్మతం" (పుట 80) అదే కోణంలో ఆలోచించే తత్వం మన విశ్వర్షి వాసిలిది కావడం చెప్పదగిన అంశం. విశ్వర్షి రాసిన "నేను" మొదటి యోగిక కావ్యంలో "నేను / ఏ మేధకూ అందని సిక్రసిని / మతాలకు అందని సమ్మతిని / త్రికర్మలు చేరబడని త్రికాలిని" ("నేను" యోగిక కావ్యం పుట 226) అన్నానని చెప్పడంలోనే మతం అనేది మన సమ్మతితో సాగాలే తప్ప మత సమ్మతితోనో, మతపెద్దలతోనో కాదంటూ స్పష్టం చేశారు. ఇలా ప్రతి ఒక్కరు తమ జీవితంలో తాపత్రయపడే "నేను" అనేది "మనం"గా మారినప్పుడే యోగిక మనుగడ సార్థకమౌతుందంటారు.

'సప్తమ పీఠాధిపతిగా యోగిక వర్చస్సును సంతరించుకున్నవారు బ్రహ్మర్షి హుస్సేన్ షా తమ జీవితకాలంలో రాసిన ఒకే ఒక గ్రంథం "షా తత్త్వము". ఈ గ్రంథం సంతరించుకున్న తీరు తెలిస్తే తప్పక ఆశ్చర్యానికి గురౌతాం. షా ఒక నిరక్షరాస్యుని ఎన్నుకొని తాము వాగ్రూపంగా చెబుతూ రాయించిన పుస్తకంగా ప్రతీతి. ఇది వారి ముందుచూపుకు ఒక సంకేతం అంటారు విశ్వర్షి. ఈ గ్రంథంలో మొత్తం 91 అధ్యాయాలున్నట్లు తెలిపారు. బ్రహ్మర్షి హుస్సేన్ షా గారు 91 శీర్షికలతో రాసిన అనేక అంశాలను విశ్వర్షి ఆధ్యాత్మిక ప్రసంగం అందించటం వారిద్దరి మధ్య ఏదో అతీతమైన ఆధ్యాత్మిక పరిపుష్టి కలిగిన అనుబంధం అంతర్లీనంగా ఉన్నట్లు నా ఆత్మీయ భావనగా చెప్పదలచాను. ఇది నేటి కాలంలో సమాజంలో బాబాలు, సన్యాసులు, స్వామీజీలు ఆశ్రమాల పేరుతో భగవత్ భక్తుల బలహీనతలను, కాదు కాదు వారి విస్వత్త్వవను లేదా నిరాసక్తతను, కష్టనష్టాలను, తెలియనితనాన్ని సొమ్ము చేసుకుంటున్న వారిని ఎత్తిచూపే ప్రయత్నం చేసినట్లు తెలుస్తుంది. వారిని గుడ్డిగా నమ్మే శిష్యగణాన్ని సైతం హెచ్చరించారు.

యోగిరూపం వేష, భూషణాదులతో రాదని, ఆత్మ తత్వమును ఎరిగినప్పుడే యోగితత్వము తెలియవస్తుం దంటారు.

"పునర్జన్మ" అన్న అధ్యాయంలో జీవుడు 84 లక్షల జీవరాశులుగా పరిణమించి చివరిగా ఈ మానవ జన్మ పొందడంవల్ల ఆత్మబంధంతో కూడుకున్నది కావున మరుజన్మ లేదని తేల్చిచెప్పారు. ఆ మాటలు అలౌకికమైన భూతశక్తి ఆవహించి తన నోట పలికించినట్లు చెబుతారు. (పుట 84) అదేవిధంగా 'గురువు' తన శిష్యుని సాయుజ్యునిగా తీర్చిదిద్దినప్పుడే బాధ్యత నెరవేర్చినట్లని తెలిపారు. అలా చేయనివారు గురువుగా అనర్హులని ప్రకటించిన వైనం తెలియవస్తుంది. ఈ గ్రంథంలో అనేకమార్లు పునరావృతమైన పదం "తత్వవేత్త". ఆంధ్ర, ఆంగ్ల, సంస్కృత, ఉర్దూ, పారశీక భాషలలో నిష్ణాతులైన ఉమరాలీషా కవి అని తెలిపారు. ఈ గ్రంథం శ్రీకారం చుట్టింది 1967వ సంవత్సరం షా జన్మదినోత్సవం నాడు కాగా సంవత్సరకాలం తర్వాత అంటే 1968వ సంవత్సరం వారి జన్మదినానికల్లా పూర్తిగావించినట్లు తెలిపారు. ఎనిమిదవ ముద్రణ అయిన ఈ "షా తత్వము" ముందు వరుసలో "పరంజ్యోతి" అనే శీర్షికన "హుస్సేన్ షా కవి ఎరుక చెప్పిన" 59 కవితా పంక్తులను ప్రచురించారు. (పుట 86, 87, 88, 89, 90) వాటిలో కొన్నింటిని రేఖా మాత్రంగా ఇచ్చట ప్రస్తుతించ దలచాను.

"రాను మిము జూడ . . . నే రాను రాను" అంటూ వారు పునర్జన్మ రహితులని చాటిన ఆత్మయోగిగా వాసిలి అంటారు. "మరచిపొందు ఇక నా రాక మరచి పొందు" అనడంలో మానవజన్మ చివరిదన్న భావన వ్యక్తమౌతుంది.

"వదలి వేయుదు దర్భలు వదలునట్లు / విడచి వేయుదు దారను విడుచునట్లు" అన్న వీరి మాటల్లో ఇచ్ఛారాహిత్యం తారసపడుతుందంటారు విశ్వర్షి, ఆత్మ స్వరూపాన్ని చూసిన "స్వయంభువులు తత్వవేత్త ఉమర్ ఆలీషా కవి" అంటారు వాసిలి. చివరగా విశ్వర్షి వాసిలి బ్రహ్మర్షి అయిన షాతో మమేకమౌతూ "నా సాధనా జీవితం కూడా ఇటువంటిదే". అందుకే నా "నేను" దీర్ఘ వచన కావ్యంలో "నేను / మూడడుగుల సుఖాసనంలోకి చేర్చిన / మానవతన ఆరడుగుల విగ్రహాన్ని ... నా విగ్రహంలో / నిగ్రహం ఆవిష్కృతమవుతున్నవాడిని" అని వర్తమాన జీవన శైలిని అక్షరీకరించుకున్నాను అంటారు (పుట 89 చూడుము "నేను" మొదటి యౌగిక కావ్యం 5.4 పుట 172). అంతేకాదు వాసిలి తన యౌగిక కావ్యం "నేను"లో - నేను / నిన్నటి సాక్షి సంతకాన్ని కాను / నేటి సాక్షాత్ సంతకాన్ని" అంటూ ఆత్మవిశ్వాసాన్ని ప్రకటించు కున్నట్లు చెబుతారు.

మహామౌనం - యౌగిక కోణం :

ఆధ్యాత్మిక ప్రసంగాలలో ఐదవదైన 'మహామౌనం - యౌగిక కోణం'లో శ్రీపాద రేణువుగా పరిణమించిన ముదిగొండ వీరభద్రయ్యగారు రచించిన "మహా మౌనం"పై విశ్వర్షి వాసిలి ప్రసంగ సారాంశాన్ని వీక్షిస్తే పేరులోనే రచయిత కోణం వ్యక్తమౌతుంది. బహుశా ఇది యౌగిక కోణంలో రచయిత చూసిన తాత్వికత - నావరకు నేను ప్రసంగ సారాంశం లోతుల్లోకి వీక్షిస్తే - నాకు గోచరమైంది. కనుకనే విశ్వర్షి వాసిలి యౌగిక కోణాన్ని నేను తాత్విక దృష్టితో పరిశీలించాను. ఇంకా చెప్పాలంటే నాకున్న పరిజ్ఞానంలో దాదాపు యోగసాధకులందరు తాత్విక చింతనాపరులే అనేది నా భావన. లేదంటే యోగసాధనలో పునీతులు కాలేరు. సత్యసాయిబాబా "జ్ఞాన ప్రశాంతి" నిలయాన్ని చేరుకొని వారి దివ్య పాదారవిందాల వద్ద మౌనముని అయి రచించిన కావ్యం కాబట్టే దీనికి మహామౌనం అని పేరుపెట్టినట్లు తెలు స్తుంది. ఈ కావ్యారంభంలో రచయిత భగవాన్ శ్రీ రమణులకు శతకోటి నమస్సులు అర్పిస్తూ శ్రీకారం చుట్టినట్లు తెలిపారు వాసిలి. వీరి తాత్విక గీతాన్ని గురించి ఆచార్య బూదాటి వెంకటేశ్వర్లు వారి హృదయస్పందనలో "కవి తన మానసిక జగత్తులో వెలుగుతున్న అంతర్జ్యోతి సీమల్ని నెమరు వేసుకునే నిశ్శబ్ద రాగాలాపన ఈ కావ్య సంగీతం" అంటారని తెలిపారు. ఈర్ష్యా, ద్వేష, క్రోధాదు

మద్రాసు విశ్వవిద్యాలయం, చెన్నై

లనే మూడింటిని వినిపిస్తోందుకు గురువు అవసరాన్ని తెలియచెప్పారని విశ్వర్షి అంటారు. సద్గురు బోధతో ఎగసిపడే మనసు రేకలను త్రుంచివేసి 'ఆత్మజీవి'గా పరిణమించాల్సిన అవసరాన్ని చాటిచెప్పారంటారు. చివరగా ఈ విశాల విశ్వంలో "ఉన్నదొక్కటి ... పరా ... పరమ మౌనం" అంటూ ఈ కావ్యం ఒక ఆవిష్కార హేతువుగా వెలుగుచూసిందంటారు వాసిలి. అప్రస్తుత ప్రసంగంగాను, స్వోత్కర్షగాను అనుకోవద్దంటూ "నేను / మౌనాన్ని / మౌన శిఖరాన్ని / శిఖర మౌనాన్ని" అని నేను రాసినా, ముదిగొండవారు రాసినా, మరెవరు రాసినా 'సత్యం' సాధకులకు ఒకేలా గోచరిస్తుందంటారు విశ్వర్షి. ఇలా సత్యాన్వేషి, సత్యద్రష్టయిన విశ్వర్షి వాసిలి అనటం అతిశయోక్తి కాదు. అలాగే సంసారం ఒక విషవలయమని, కీర్తికాముకత ఎంత అనర్థానికి దారితీస్తుందో చెప్పారంటారు. ముదిగొండ వీరభద్రయ్యగారు యోగసాధనా స్థితిలో స్థిరపడ్డారు కనుకనే ఇలాంటి కవితా పంక్తులు వెల్లువెత్తాయని స్పష్టంచేశారు. చివరగా యోగసాధకునికి మాత్రమే ఈ విశాల సృష్టిలోని చరాచర జగత్తులో ఋషులు, మహర్షులు, సద్గురువులు, సమస్త దేవతలు సాక్షాత్కరిస్తారని అది ముదిగొండవారి రచనల్లో చూడవచ్చని తెలిపారు.

మొత్తంమీద ఈ ఆధ్యాత్మిక ప్రసంగంలో సైతం అంతర్లీనంగా తాత్త్విక ధోరణి ఇమిడి ఉన్న వైనం గమనించవచ్చు.

ఉపసంహారం :

విశ్వర్షి వాసిలి ఈ 'ఆధ్యాత్మిక ప్రసంగాలు' అనే ప్రసంగ సంకలనంలో జన్మసార్థకతకు యోగసాధనే పరమౌషధం అని, మానవజన్మ ఉత్కృష్టమైనదని, ఈ జన్మకు సార్థకత పొందాలంటే లౌకిక దేహాలపై మోజును తగ్గించి అనంతలోకాలలో దాగివున్న సత్యాన్వేషణకు, తత్త్వబద్ధతకు కంకణబద్ధులు కావాలని పిలుపునిచ్చారు. ఇందుకు మాస్టర్ సి.వి.వి., వారి అనుయాయుల్లో నవదిన శ్రీ భార్గవిల బోధనలను పుణికి పుచ్చుకున్న మన విశ్వర్షి వాసిలి కావ్యాలు మానవ జీవిత గమ్యాలకు చుక్కాని వంటివని నాకున్న పరిజ్ఞానం మేరకు పరిశీలనాత్మక దృష్టితో చెబుతున్న మాటలు. ఈ జీవన పరమార్థాన్ని చేరుకోవాలంటే అత్యంత సులువైన మార్గం మాస్టర్ సి.వి.వి. "నూతనయోగ" అనుసరించి ఆచరించి జీవన్ముక్తులమౌదాం. చివరగా మరొక్కమాట చెప్పి ముగిస్తాను. ఈ ఆధ్యాత్మిక ప్రసంగాల పత్రాలను చదువుతున్నంతసేపు నాకు తెలియని ఏదో అనుభూతిలో ఉండిపోయానని మాత్రం చెప్పగలను.

ఆధార గ్రంథాలు :

1. విశ్వర్షి వాసిలి, ఆధ్యాత్మిక ప్రసంగాలు
2. విశ్వర్షి వాసిలి, "నేను" యోగిక కావ్యం
3. శార్వరి, అరవింద సావిత్రి

❖❖❖

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భావవీణ ప్రత్యేక సంచిక

Journal of Literary, Culture & Language Studies

Vol. 19 - Issue. 10 - Spl. Edition - October 2022 - ISSN No. : 2456-4702

రెండు రోజుల
జాతీయ సదస్సు
21 - 22 అక్టోబర్ 2022



దళిత సాహిత్యం - తాత్త్విక దృక్పథం
Dalit Literature - Philosophical Perspective



నిర్వహణ :

తెలుగు మరియు తత్త్వశాస్త్ర శాఖల సంయుక్త ఆధ్వర్యంలో

ప్రభుత్వ కళాశాల స్వయంప్రతిపత్తి

రాజమహేంద్రవరం, తూర్పు గోదావరి జిల్లా, ఆంధ్రప్రదేశ్.

Website : www.gcrjy.ac.in

ఆచార్య నాగార్జున విశ్వవిద్యాలయం -తెలుగు & ప్రాచ్య భాషా విభాగం

యు.జి.సి. సౌజన్యంతో జాతీయ సదస్సు 14, 15 ఫిబ్రవరి 2024

ज्ञान - विज्ञानं विमुक्तये

సంస్కృతాంధ్రనవలా సాహిత్యం - సామాజిక చైతన్యం

ప్రమాణ పత్రం

శ్రీ / శ్రీమతి / కుమారి / డా॥ / ఆచార్య......డా॥ N. శివకుమార్......

కళాశాల / విశ్వవిద్యాలయం......P. B. సిద్ధార్థ ఆర్ట్స్ & సైన్స్ కళాశాల...... ఆచార్య నాగార్జున విశ్వవిద్యాలయం

తెలుగు & ప్రాచ్యభాషా విభాగం నిర్వహించిన జాతీయ సదస్సులో పాల్గొని ......కాలుతున్న పూలతోట......

......నవలా నేపథ్యం......అనే అంశంపై పత్ర సమర్పణ చేశారు.

ఇ. మాధవి

ఆచార్య ఇరపని మాధవి

సదస్సు సంచాలకులు & విభాగాధ్యక్షులు

ది. 15-02-2024

నాగార్జున నగర్

ఆచార్య నాగార్జున విశ్వవిద్యాలయం - తెలుగు & ప్రాచ్య భాషా విభాగం

యు.జి.సి. సౌజన్యంతో జాతీయ సదస్సు 25,26 మార్చి 2022

UGC

సంస్కృతాంధ్ర సాహిత్యం - హాస్యం

ప్రమాణ పత్రం

శ్రీ / శ్రీమతి / కుమారి / డా॥ / ఆచార్య ......యస్. శివ కుమార్......

కళాశాల / విశ్వవిద్యాలయం ......పి.బి. సిద్ధార్థ ఆర్ట్స్ & సైన్స్ కళాశాల, విజయవాడ......

ఆచార్య నాగార్జున విశ్వవిద్యాలయం తెలుగు & ప్రాచ్య భాషా విభాగం నిర్వహించిన జాతీయ సదస్సులో పాల్గొని

......పాలేరు నాటకం – హాస్యాత్మకత......అనే అంశంపై పత్రసమర్పణ చేశారు.

తేది : 26 - 03-2022
నాగార్జున నగర్

ఎన్.వి.

ఆచార్య ఎన్.వి. కృష్ణారావు
సదస్సు సంచాలకులు

DEPARTMENT OF TELUGU

UNIVERSITY OF MADRAS

MARINA CAMPUS, CHENNAI – 600 005

INTERNATIONAL SEMINAR ON

'VISWARSHI' VAASILI SAAHITYAM - VYAKTITVAM, YOUGIKA TATVAM

10th & 11th October, 2022

CERTIFICATE

This is to certify that

~~Prof.~~/Dr./~~Mr./Ms~~. N. SIVA KUMAR

has Participated / Presided a Session / Presented a Paper entitled

విశ్వర్షి వాసిలి ఆధ్యాత్మిక ప్రసంగాలు - అంతర్యాన అవలోకనం

in the International Seminar on **'VISWARSHI VAASILI SAAHITYAM – VYAKTITVAM, YOUGIKA TATVAM'** held on the October 10th & 11th, 2022 in the Department of Telugu, University of Madras, Chennai – 600 005.

Dr. Vistali Sankara Rao

Seminar Director

DEPARTMENT OF TELUGU * UNIVERSITY OF MADRAS * CHENNAI - 5.

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Azadi Ka Amrit Mahotsav

ప్రాచీన తెలుగు విశిష్ట అధ్యయన కేంద్రం,నెల్లూరు

భారతీయ భాషా సంస్థ

(విద్యా మంత్రిత్వశాఖ & ఉన్నత విద్యాశాఖ, భారత ప్రభుత్వం)

దీన్‌దయాళ్ ఉపాధ్యాయ అంత్యోదయ భవనం, సరస్వతి నగర్ (గ్రా.), వెంకటాచలం (మం.), శ్రీ పొట్టి శ్రీరాములు నెల్లూరు (జి.) ఆంధ్రప్రదేశ్ – ౫౨౪౩౨౦

Centre of Excellence for Studies in Classical Telugu, Nellore

Central Institute of Indian Languages

(Ministry of Education & Higher Education, Govt. Of India)

A three-day National Seminar

ప్రశంసా పత్రం

This is to certify that Dr./ Smt./ Mr. N. SIVA KUMAR, has Presided/Participated/Presented a Paper on KARNA PATRA CHITRANA in the three days National Seminar on "ఆంధ్ర మహాభారతం – భారతీయ దార్శనికత" Organized by the Centre of Excellence for Studies in Classical Telugu during 27-29 February 2024 at Nellore.

Dr. L.R. Prem Kumar	Prof. Shailendra Mohan	Prof. M. Sampath Kumar
Head, Classical Languages, CIIL	Director, CIIL- Mysore	Project Director, CESCT-Nellore

BHAVAVEENA *Spl. Issue*
Vol. 19, Issue. 10, October 2022 (Spl. Issue)
ISSN No. : 2456-4702 - RNI No. APTEL/2003/12253

భావవీణ

UGC CARE List Group - 1 Journal
under Arts and Humanities Category

దళిత సాహిత్యం - నేపథ్యం

- డా. పి. నీరజ, పి. బి. సిద్ధార్ధ ఆర్ట్స్ & సైన్స్ కళాశాల, విజయవాడ.

1980 దశకం తరువాత వచ్చిన సాహిత్యోద్యమాలలో దళిత సాహిత్యం ప్రముఖమైనది.అంబేద్కర్ బోధనల నుంచి, బ్లాక్ ఫాంథర్స్ ఉద్యమం. నుంచి ప్రేరణ పొందిన దళిత పాంథర్స్ సాహిత్యోద్యమం మరాటీ సాహిత్యాన్ని పెనుమార్పులక గురిచేసింది. కులంతాలూకు అన్ని ప్రత్యేకతల్ని చర్చించి కుల నిర్మూలనా ధ్యేయం

దేశవ్యాప్తంగా అల్లుకుపోతున్న దళిత ఉద్యమాలలో భాగంగా తెలుగు రాష్ట్రంలో కూడ దళిత ఉద్యమాలు, ప్రవేశించాయని అర్ధం చేసుకోవచ్చు.ఈ రాష్ట్రంలో ముందునుంచే అనేక విప్లవోద్యమాల చరిత్ర వుంది.

తరతరాలుగా భారతదేశంలో యెడతెగని అన మానత్వానికి భౌతిక మానసికహింసకి హక్కులకి, హక్కుల రాహిత్యానికి, దళితులు గురౌతున్న వాస్తవాన్నిఁర్తించి దళితసాహిత్యం ఉద్భవించింది. పురుషాధిక్య సమాజం స్త్రీని బానిసనుచేసినట్లే అగ్రకుల ఆధిపత్య వ్యవస్థ దళితులను సేవకులుగా పీడితులుగా మార్చింది. అధిక సంఖ్యాకులైన ప్రజలు అణగారిన కులాల్లో పుట్టిన కారణంగా ఆకలి, అవిద్య, అపరిశ్రభత, అనారోగ్యం, సాంస్కృతిక వెనుకుబాటుతనం, మొదలైనవాటికి గురికావల్సి రావడం సహజంగా జరిగిన విషయంకాదు. దీనిని అల్పసంఖ్యాకులైన దీపిడీ వర్గాలు,అశేష జనాన్ని దోచుకోవడానికి పన్నిన పన్నాగంలో భాగంగా భావిస్తారు.

దళిత సాహిత్యోద్యమ కవులు, డాక్టరు అంబేద్కర్ ఈ దేశంలోని కులవ్యవస్థమీద లోతైన పరిశోధన జరిపి దాని పుట్టుకను,చలనాన్ని, అభివృద్ధిని, విశేషించి వివరించటంతో పాటుగా కులనిర్మూలనాసిద్ధాంతాన్ని ప్రతిపాదించాడు.

భారతీయ సామాజిక వాస్తవికతని గుర్తించడంతో మన మార్చునస్టలు విఫలమైకులవ్యవస్థతో తలవడలేక పోయారు. కులమేదైనా, పేదలంతా, ఒక్కటే అనే అవగాహనా లోవం వల్ల జరిగిందా, ఈ దేశంలో మార్క్సిజం కూడా అగ్రకులస్థుల ద్వారా ప్రవేశించటం వల్లా జరిగిందా అనేది చర్చనియాంశమే . కారణం ఏదైనా మార్క్సిష్టులు చెపుతున్న కేవల ఆర్ధిక వాద, వర్గ వాద తెరల్ని ఛేదిస్తూ దేశ అభివృద్ధి దళితుల అభివృద్ధి లేకుండా జరగడం అసాధ్యం అని అధిక సంఖ్యాకులై కూడ అధికంగా అన్ని రకాల దోపిడీలకు గురౌతున్న దళితుల విముకే,దేశ పీడితుల విముక్తి అనే అవగాహనతో కలం పట్టారు కొంతమేది కవులు. వారిలో ప్రసిద్ధులు శివసాగర్, గద్దర్, చరబండరాజు, వంగవండు ప్రసాదరావు, బి.యస్.రాములు, అప్సర్, సతీష్ చందర్, ఎండ్లూరి సుధాకర్, కత్తి పద్మారావు మొదలైన వారు ప్రముఖులుగా కనిపిస్తారు.

తెలుగు దళిత సాహిత్యంలో దళితుల సమగ్ర అభివృద్ధిని కాంక్షిస్తూ తగిన భావావేశంతో దళితులే రాసిన సాహిత్యం దళిత సాహిత్యం. తెలుగు దళిత సాహిత్యంలో వచనకవిత్వం,పాట మాత్రమే యిప్పటి వరకు విస్తృత స్థాయిలోవచ్చాయి. 1980 తరువాత వచ్చిన దళిత చైతన్యం వెలుగులో వచ్చిన సామిత్యం చాలా స్వల్పం.

తెలుగుదేశంలో కొత్త సాహిత్యోద్యమాలు ముందుకు వచ్చినప్రతిసారిముందుగావచ్చినకవిత్వం,పాట మాత్రవే. ఉద్యమాలను పట్టుకుంటూ వస్తూన్న చరిత్ర వుంది. అలాగే ఈనాడు వస్తున్న దళిత ఉద్యమాలను బలంగా వ్యక్తీకరిస్తున్నదీ దళిత కవిత్వ,పాట మాత్రమే అని అవగత మౌతుంది.

దళిత వచన కవితలోగాని, పాటలో గాని ప్రధానంగా అయిదు అంశాలు కనబడతాయి. 1. తరతరాల నుండి దళితులు అవమానాన్నికి గురైన క్రమం 2. దళితుడు

తన స్వీయత్వాన్ని వెదుక్కుంటున్న వైనం 3. ఆత్మ గౌరవంతో అగ్రకులాల పెత్తనాన్ని దిక్కరిస్తూ, ప్రతిఘటనాలు, ఉద్యమాలు నడుపుతున్న వాస్తవం సామాజిక విముక్తి ఉద్యమాలలో నాయకత్వానికి, 4. భారత చరిత్ర గమనాన్ని నిర్దేశించడానికి సంబంధించి తమ వాటాని దళితులు డిమాండు చేస్తున్న వర్తమాన వాతావరణం. 5. భారతమార్క్సిస్టులపట్ల విమర్శనాత్మక వైఖరిని నేటి దళిత సాహిత్యంలో గమనించవచ్చు.

దళితులు సర్వహక్కులు కోల్పోయి సర్వమర్యాదలకు, గుర్తింపుకూ, దూరంగా బతుకుతూ, అంటరానితనంతో, వుడికి పోయిన వాస్తవం ఈదేశ చరిత్రకు సంబంధించిన అమానవీకరణకు పెద్ద గుర్తని తళితుల అభిప్రాయం. దీనిని తొలిసారిగా, వ్యక్తీకరించే ప్రయత్నం జాషువా కవిత్వంలో కనబడుతుంది. ఆ తరువాత జాలారంగ కవి, కుసుమ ధర్మన్న, నక్కచిన వెంకయ్య, బోయి భీమన్న, జ్ఞానానంద కవి, సి.వి. తదితరులు ఈ పని చేశారు.

కేవలం పాటలతో ప్రజల్లోకి విప్లవ భావాలను ప్రచారంచేసి వారిని ఉత్తేజితుల్ని చేయుటయే గాక స్వయంగా కలం పట్టి కవితలెన్నో రాసిన కవిగాయకుడు గద్దర్‌తమ సమస్యలకు పరిష్కారం, తమకు రాజ్యాధికారం లభించినప్పుడేనన్న నిర్ణయానికి దళితులు రావడం ఆక్రమంలో రాజయాచరణం ముందుకు పోతుండటం గమనించవచ్చు. తాము ఇనాళ్ళు ఏమిపోగొట్టుకున్నారో రాన్ని తిరిగి పొందటమంటే అధికారాన్ని కైవసం చేసుకోవడమే అని రాజ్యాధికారానికి మాలన్న గేయంలో అంటాడు గద్దర్.

ప్రతిభా విషయంలో, అధిక్యతా విషయంలోనూ అగ్రకులస్థుల వాదనని తన కవితలలో తిప్పికొట్టినవాడు ఎండ్లూరి సుధాకర్. భారత గత చరిత్రను తవ్వి తీసి అమానవీకరణ పేర్లనూ,మూలాన్ని పట్టుకునే ప్రయత్నం కూడా చేసినవాడు ఎండ్లూరి. దళితుడు కనీప వాక్కులు ఏ విధంగా కోల్పోయాడో నెత్తుటి ప్రశ్న ఖండికలో.

దళిత పాటకు గద్దర్, చెరబండ రాజులతో కలసి శ్రీకారం చుట్టినవాడు వంగపండు, గద్దర్ తెలంగాణా మాండలికంలో పాటలు పాడుతుంటే, వంగపండు కళింగాంధ్ర మాండలికంలో పాటలు రాసిపాడుతూ ప్రచారం చేసాడు. ఆస్తిలో హక్కేకాదు, అధికారమే మనకు కావాలి. అయితే అధికారం కావాలంటే దళితులందరు ఏకమై పోరాడితే అధికారం దాసోహం అవ్వక తప్పదు అంటాడు.

భారత చరిత్ర గురించి పునర్పనాలు వేసే ప్రయద్నం దళిత ఉద్యమాలలో భాగంగా ముందుకు వస్తున్న వాస్తవాన్ని ఊరవతలి దు:ఖం కవితా ఖండికలో వేద శ్లోకాల మధ్య అణచి పెట్టిన శోకమే నాకు కావాలి అంటాడు అఫ్సర్.

పూలే భారత చరిత్రమీద వ్యక్తంచేసిన అభిప్రాయాన్ని దళితులు అంగీకరించటం జరిగింది. ఇప్పుడు ఏవర్న యితే దళితులు అంటున్నారో వాళ్ళే ఈ దేశంలో మొదటి నుంచి వున్న వాళ్ళనీ, వీళ్లని ఆర్యులు జయించి బానిసల్ని కావించారనీ, గెలిచిన ఆర్యులు ఉన్నత కులాలుగా చెప్పుకుంటూ స్వదేశీయుల్ని శూద్రులుగా చేసి అధికారాన్ని కైవసం చేసుకుకొన్నారని పూలే చెప్పిన విషయాల అవగాహనని ధ్వనిస్తూ మాస్టార్జీ మాదిగోన్ని - మాలోన్ని అన్న కవితా ఖండిక రాసారు.

అంతే కాకుండ అధికారం ఇచ్చేశక్తి ఓటుకుంది కాబట్టి 85% ఉన్న దళితులంతా తమ ఓటును సక్రమంగా వినియోగించు కోవటం ద్వారా అధికారం పొందవొచ్చం టాడు మన మేనబై యైదు శాతం అన్న కవితా ఖండికలో.

భారతీయ మార్క్సిస్టుల్ని వివరిస్తూ, విముక్తి పేరుతో, నవసమాజం పేరుతో ఆరుశతాబ్దల పైగా తమచేత ఎర్రజెండాలు మోయిప్పూ, తమ పెత్తనాన్ని పరీక్షించు కుంటూ కాలం గడిపిన వారు మార్క్సిస్టు లంటాడు శంముక దళితుల ఆత్మగౌవ నమన్యని ఖాతరు

చెయ్యలేదంటాడు తన పోయేదేమీ లేనివాళ్ళం అన్న కవిత ఖండికలో. దళిత గర్జన అనే మరో ఖండికలో దలితుల్ని ప్రతిభ లేనివారిగా ముద్రవేసి పార్టీ క్రమశిక్షణా బంధంలో మూగసేవకులుగా మార్చి విముక్తి ఉద్యమాలలో తమకు నాయకత్వం లేకుండా చేశారు.

అమానవీకరణ ఆధునిక రూపాన్ని శక్తివంతమైన కవిత్వంలో చెప్పినవాడు సతీశ్ చందర్. ఒక జననం వాయిదా ఖండికలో అంటరానితనంతో బాధపడ్డ పూర్వీకుల గురించి, చదువుకుని ఉద్యోగాలు చేసుకుంటూ బతుకుతున్న యువకుల అవమానానికీ, ఏహ్యభావానికీ గురువుతున్నారని వక్కాణం చేశాడు.

ఇంకా అనేకమంది యువకవులు ప్రత్యేకించి ఇక్బాల్ చంద్ రాములు, కల్లూరి ఆనందరావు, వరదయ్య ఇత్యాదులు అనేక మంది దళితసాహిత్యాభివృద్ధికి ఇతోధికంగా కృషి చేస్తున్నారు. సాహిత్య రచనవి కులం ప్రాతిపదికా కాదా అనేది సాహిత్యాన్ని సృష్టిస్తున్న సమాజంలో కుల సమస్య ఉందా లేదా అనే విషయం మీద ఆధారపడి ఉంటుంది. తెలుగులో ఈనాడు స్త్రీ వాద ప్రధాన శక్తిగా ఉండి, దళిత సాహిత్యం రెండో శక్తిగా ఉందనేది విమర్శకు భావన.

స్వేచ్ఛగా ఎంత ఎత్తుకైనా ఎగిరిన వ్యక్తికి భూమి మీదతాకే పురుగు కనిపించగానే ఆహారంకోసం ఎరగావున్న పురుగును భక్షించేందుకు భూమి మీదకు దిగుతూ పక్షి తన స్వేచ్ఛను కోల్పోతుంది. స్వయం ప్రకాశంగా వెలుగొందె సూర్యుడు సైతం మానవ మేధస్సుతో చేసిన గడియారపు ముళ్ళలో బంధించబడుతున్నాడు. ఆలోచిస్తే సూర్యుడి స్వేచ్ఛ మానవుడే హరించి రోజులూ, నెలలూ నిర్దేశిస్తున్నాడు.

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International Journal of Applied Pharmaceutics

ISSN- 0975-7058 Vol 14, Issue 2, 2022

Original Article

ANALYTICAL METHOD DEVELOPMENT AND VALIDATION OF DEXMETHYLPHENIDATE AND SERDEXMETHYLPHENIDATE BY USING RP-HPLC IN BULK AND PHARMACEUTICAL DOSAGE FORM

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Received: 03 Nov 2021, Revised and Accepted: 15 Dec 2021

ABSTRACT

Objective: The current investigation was pointed at developing and progressively validating novel, simple, responsive and stable RP-HPLC method for the simultaneous measurement of active pharmaceutical ingredients of Dexmethylphenidate and Serdexmethylphenidate.

Methods: A simple, selective, validated and well-defined stability that shows isocratic RP-HPLC methodology for the simultaneous determination of Dexmethylphenidate and Serdexmethylphenidate. The chromatographic strategy utilized inertsil ODS column of dimensions 250x4.6 mm, 5 μ, using isocratic elution with a mobile phase of acetonitrile and 0.1% orthophosphoric acid (70:30). A flow rate of 1 ml/min and a detector wavelength of 262 nm utilizing the PDA detector were given in the instrumental settings. Recovery, specificity, linearity, accuracy, robustness, ruggedness were determined as a part of method validation and the results were found to be within the acceptable range. Validation of the proposed method was carried out according to an international conference on harmonization (ICH) guidelines.

Results: LOD and LOQ for the active ingredient were established with respect to test concentration. The calibration chart plotted was linear with a regression coefficient of R^2>0.999, which means the linearity was within the limit.

Conclusion: The proposed method to be fast, simple, feasible and affordable in assay condition. During stability tests, it can be used for routine analysis of production samples and to verify the quality of drug samples during stability studies.

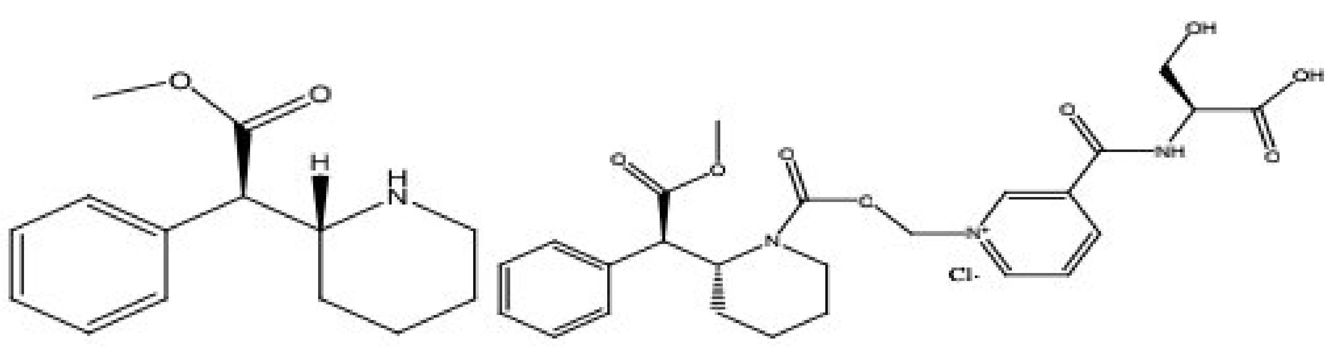
Keywords: Dexmethylphenidate, Serdexmethylphenidate, RP-HPLC, Development, Validation

DOI: https://dx.doi.org/10.22159/ijap.2022v14i2.43515. Journal homepage: https://innovareacademics.in/journals/index.php/ijap

INTRODUCTION

Dexmethylphenidate, sold under the brand name Focalin among others, is a medication [1, 2] used to treat attention deficit hyperactivity disorder (ADHD) [3, 4] in those over the age of five years. If no benefit is seen after four weeks, it is reasonable to discontinue its use. It is taken by mouth [5]. The immediate-release formulation lasts up to five hours, while the extended-release formulation lasts up to twelve hours. Common side effects include abdominal pain [6, 7], loss of appetite [8], and fever [9, 10]. Serious side effects may include abuse [11], psychosis [12], sudden cardiac death [13, 14], mania [15], anaphylaxis [16], seizures [17], and dangerously prolonged erection. Safety during pregnancy and breastfeeding is unclear. Dexmethylphenidate is a central nervous system (CNS) stimulant [18]. How it works in ADHD is unclear. It is the more active enantiomer of methylphenidate.

Serdexmethylphenidate (SDX) is a prodrug of dexmethylphenidate created by the pharmaceutical company KemPharm. The compound was first approved by the FDA as one of the active ingredients in Azstarys for the treatment of Attention Deficit Hyperactivity Disorder (ADHD) in children, adolescents, and adults in March 2021. Co-formulation of SDX with dexmethylphenidate allows for a more rapid onset of action while still retaining up to 13 h of therapeutic efficacy. Due to the delayed onset and prolonged duration of effects following oral administration of SDX, several dosage forms containing SDX are currently under investigation for use as long-acting psychostimulant [19, 20] in the treatment of various CNS disorders [21], substance use disorder (SUD) [22, 23], and sleep disorders [24]. Under the developmental codename KP484, SDX is being investigated as part of a potential "super-extended duration" psychostimulant, with therapeutic efficacy lasting up to 16 h following oral administration. The aim of the study is to estimate the pharma ingredients Dexmethylphenidate and Serdexmethylphenidate by using RP-HPLC.



A B

Fig. 1: Structure of (A) Dexmethylphenidate and (B) Serdexmethylphenidate

Till today there is only one HPLC method [25] was reported in the literature. Hence we developed a method for the quantification of Dexmethylphenidate and serdexmethylphenidate. The developed HPLC method was utilized for the estimation of the drug by *in vitro* method.

MATERIALS AND METHODS

Chemicals

Acetonitrile (HPLC-grade), orthophosphoric acid, water were purchased from Merck India Ltd, Mumbai, India. APIs of

Dexmethylphenidate and Serdexmethylphenidate standard was procured from Glenmark, Mumbai.

The instrumentation

Waters alliance liquid chromatography (model 2695) was monitored with empower 2.0 data handling system and a detector of photodiode array (model 2998) was used for this study [25, 26].

Method optimization

To optimize the chromatographic conditions, different ratios of phosphate buffer and the acetonitrile in the mobile phase with isocratic mode was tested. However, the mobile phase composition was modified at each trial to enhance the resolution and also to achieve acceptable retention time. Finally, 0.1% ortho phosphoric acid buffer and acetonitrile with isocractic elution was selected because it results in a greater response of active pharmacy ingredients. During the optimization of the method various stationary phases such as C_8, C_{18} and amino, phenyl columns were tested. From these trials the peak shape was relatively good with inertsil ODS column of 250 x 4.6 mm, 5 µ with a PDA detector. The mobile phase flow rate has been done at 262 nm in order to obtain enough sensitivity. By using above conditions we get retention time of Dexmethylphenidate was about 4.535 min with a tailing factor of 1.24. The number of theoretical plates for Dexmethylphenidate was 7328 and Serdexmethylphenidate retention time was 2.936 min with a tailing of 1.24, plate count 3319 which indicate the column's successful output the % RSD for six replicate injections were 0.25% for dexmethylphenidate and 0.25% for serdexmethylphenidate, the proposed approach suggests that it is extremely precise. According to ICH guidelines, the method established was validated.

Validation procedure

The analytical parameters such as system suitability, precision, specificity, accuracy, linearity, robustness, LOD, LOQ, forced degradation and stability were validated according to ICH Q2 (R1) guidelines [27-29].

Preparation of buffer

1 ml of orthophosphoric acid (OPA) is dissolved in 1 lt of HPLC grade water and filter through 0.45 µ filter paper.

Chromatographic conditions

The HPLC analysis was performed on a reverse-phase HPLC system with isocratic elution mode using a mobile phase of acetonitrile and 0.1% OPA and inertsil ODS (250x4.6 mm, 5 µ) column with a flow rate of 1 ml/min.

Diluent: Mobile phase was used as a diluent.

Preparation of the standard solution

For standard solution preparation, add 70 ml of diluents to 12 mg of Dexmethylphenidate and 56 mg of Serdexmethylphenidate taken in a 100 ml volumetric flask and sonicate for 10 min to fully dissolve the contents and then makeup to the mark with diluents (stock solution). Further, 5 ml of solution was drawn from the above normal stock solution into a 50 ml volumetric flask and diluted up to the level.

Preparation of sample solution

For sample solution preparation, add 70 ml of diluents to 118 mg of Dexmethylphenidate and Serdexmethylphenidate sample taken in a 100 ml volumetric flask and sonicate for 20 min to fully dissolve the contents and then makeup to the mark with diluents (stock solution). Further, 5 ml of solution was drawn from the above normal stock solution into a 50 ml volumetric flask and diluted up to the level.

RESULTS AND DISCUSSION

The main analytical challenge during the development of a new method was to separate active pharma ingredients. In order to provide good performance, the chromatographic conditions were optimized.

System suitability

In System suitability injecting standard solution and reported USP tailing and plate count values are tabulated in table 1 and the standard chromatogram was shown in fig. 2 [30].

Table 1: Results of system suitability

System suitability parameter	Serdexmethylphenidate			Dexmethylphenidate		
	Mean	Std Dev	% RSD	Mean	Std Dev	% RSD
USP Plate Count	3319	43.614	1.31	7238	48.726	0.67
USP Tailing	1.15	0.008	0.66	1.03	0.008	0.79
USP Resolution	-	-	-	7.53	0.036	0.48
Retention time	2.937	0.002	0.08	4.540	0.005	0.10

(n=6)

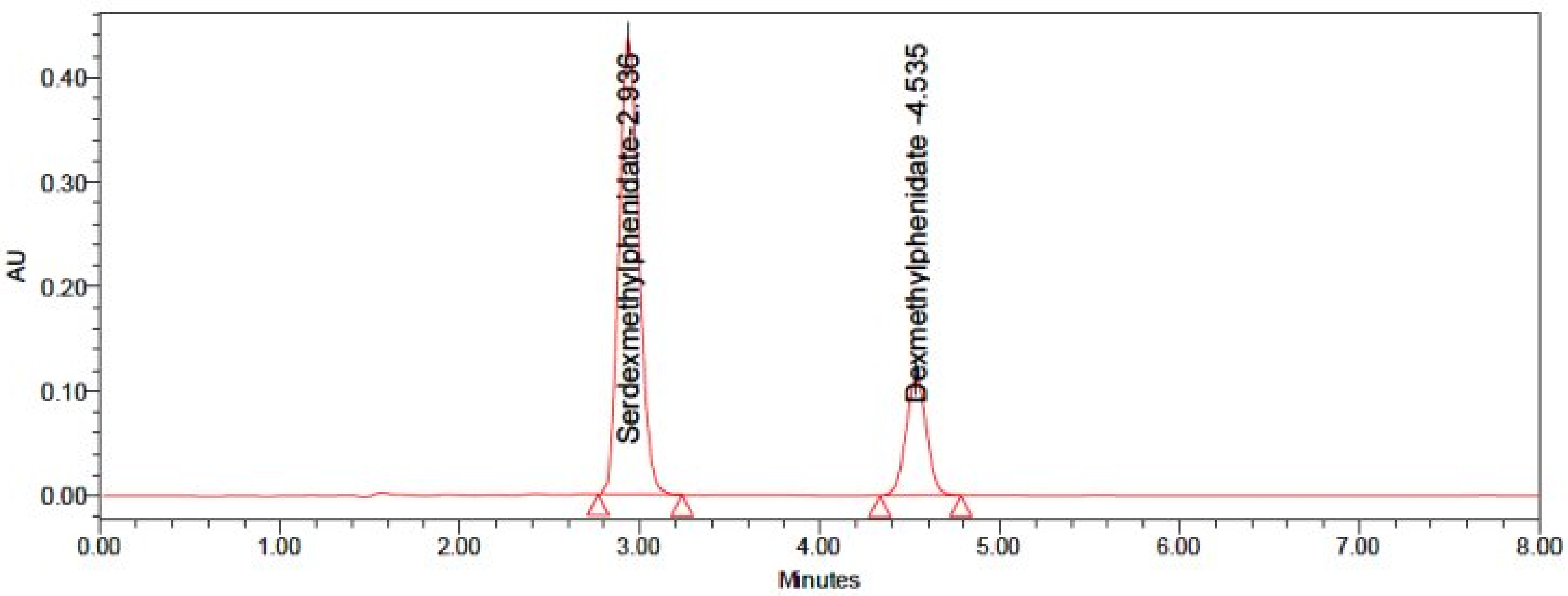


Fig. 2: Chromatogram of standard

Specificity

In this test method, placebo and standard solutions were analyzed individually to examine the interference. The below fig. shows that the active ingredients were well separated from blank and their excipients and there was no interference of placebo with the principal peak. Hence the method is specific [30].

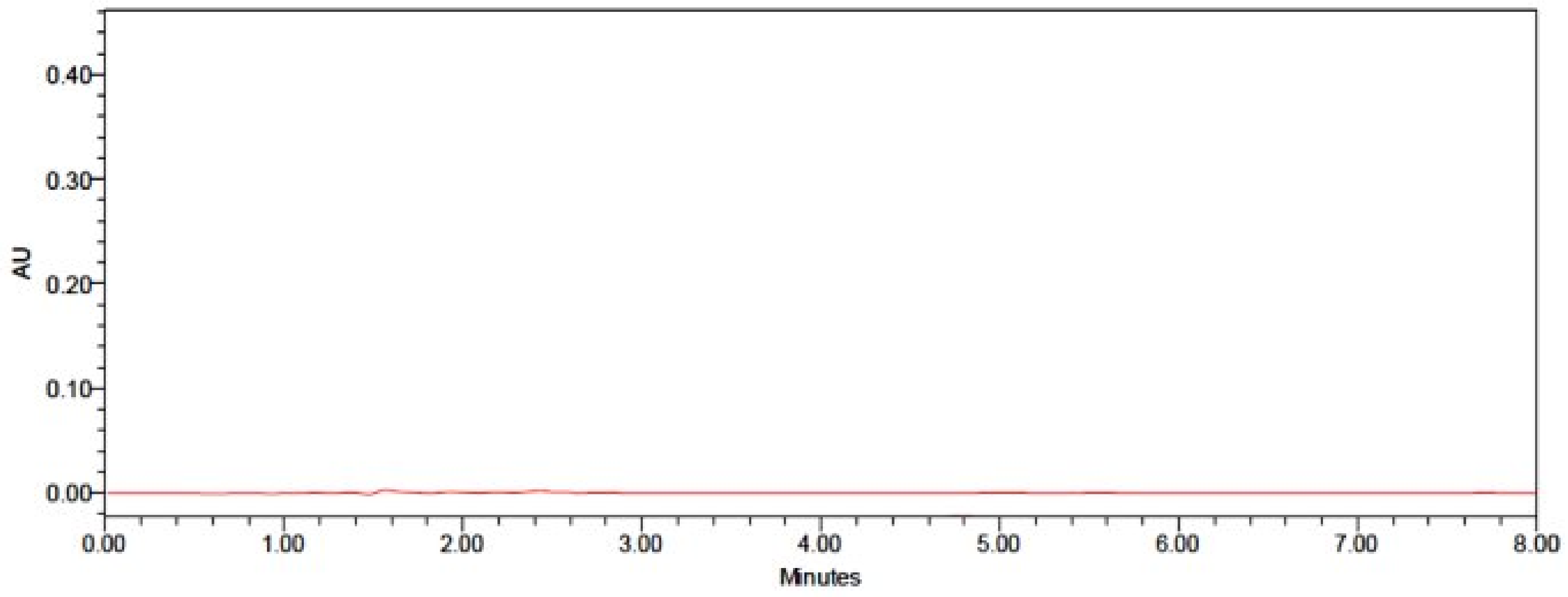


Fig. 3: Chromatogram of blank

Linearity

The area of the linearity peak versus different concentrations has been evaluated for Serdexmethylphenidate as 25, 50, 75, 100, 125, 150 percent dilutions [30], respectively. Linearity was performed in the range of 14-84 µg/ml of Serdexmethylphenidate and 3-18 µg/ml of Dexmethylphenidate. The correlation coefficient achieved greater than 0.999 for all.

Accuracy

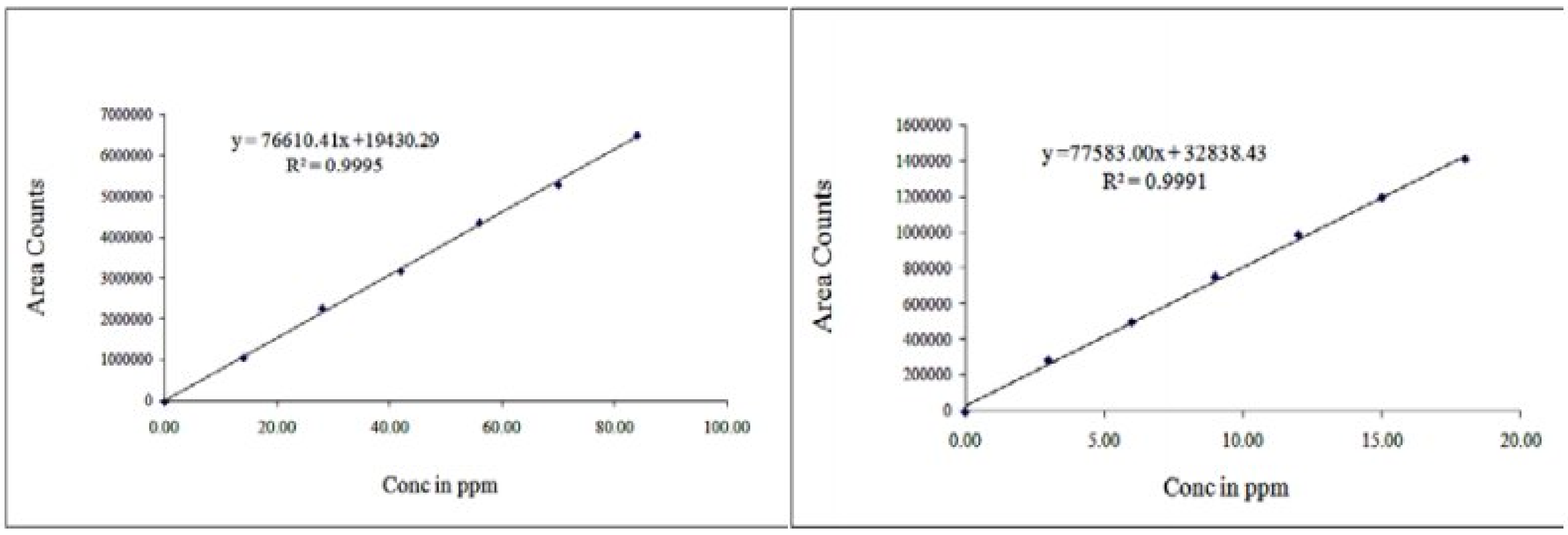
Three kinds of concentration levels of 50, 100, and 150 percent at a specified limit were used in this process to assess the accuracy of this particular method. The developed method was found to be highly accurate and reliable. The recovery percentages were given in table 3 [31].

Precision

In method, precision study prepare six different sample solutions in the concentration of Serdexmethylphenidate (56 µg/ml) and Dexmethylphenidate (12 µg/ml) were injected into HPLC system. The % assay results were found to be in the range of 98% to 102%. Peak areas were calculated, which were used to calculate mean, SD and % RSD values. These results are given below table 4 [32].

Table 2: Linearity results

S. No.	Serdexmethylphenidate		Dexmethylphenidate	
	Conc. µg/ml	Serdexmethylphenidate area count	Conc. µg/ml	Dexmethylphenidate area count
1	14.00	1058753	3.00	285651
2	28.00	2271560	6.00	498128
3	42.00	3182175	9.00	751473
4	56.00	4366503	12.00	985033
5	70.00	5287600	15.00	1190570
6	84.00	6492881	18.00	1406743
Correl coef		0.99954		0.99905
Slope		76610.41		77583.00
intercept		19430.29		32838.43



A B

Fig. 4: Calibration plot of (A) Serdexmethylphenidate and (B) Dexmethylphenidate

Table 3: Results of accuracy

S. No.	% Level	Serdexmethylphenidate		Dexmethylphenidate	
		Mean % recovery	Std dev	Mean % recovery	Std dev
1	50	99.6	0.392	99.7	0.611
2	100	100.2	0.474	100.1	0.427
3	150	98.8	0.306	98.8	0.483

n=3

Table 4: Intraday precision results

S. No.	Serdexmethylphenidate			Dexmethylphenidate		
	Conc. (µg/ml)	Area counts	% Assay as is	Conc. (µg/ml)	Area counts	% Assay as is
1	56	4362891	100.3	12	994314	100.2
2		4353789	100.1		990341	99.8
3		4335810	99.7		989739	99.7
4		4354608	100.2		996352	100.4
5		4359396	100.3		991343	99.9
6		4341312	99.8		990561	99.8
% RSD	0.26			0.27		
mean	100.1			100.0		
SD	0.258			0.273		

n=6

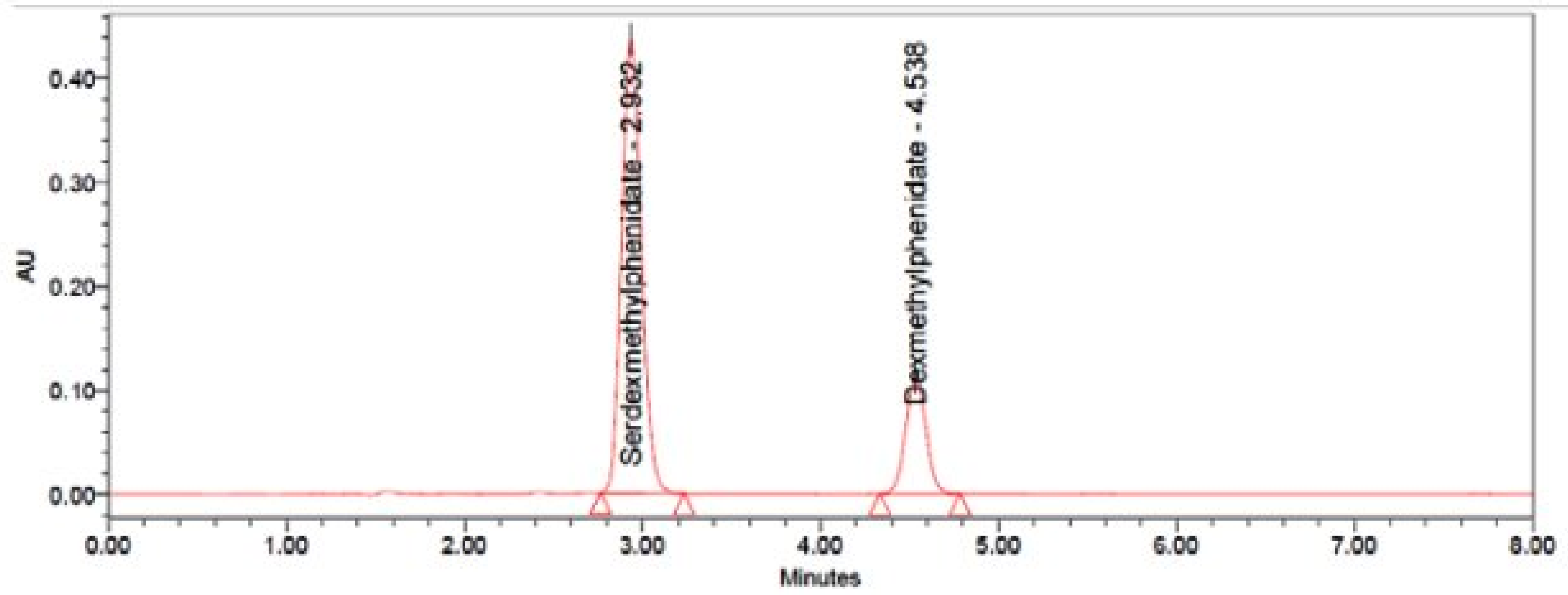


Fig. 5: Chromatogram of method precision

Intermediate precision

Separate instruments were used on different days, in different locations, for independent investigations into six different replicates of the sample solution. Mean RSD values have been calculated and determined from the peak regions. The following table shows the results. Serdexmethylphenidate (56 µg/ml) and Dexmethylphenidate (12 µg/ml) were analysed on 6 different days with 6 different samples. Mean, standard deviation and percent related standard deviation values were calculated from peak areas. Thus, it has been found that the current method yields very accurate results, with RSD values less than 2 percent and percent assay values near 100 percent. In table 5 [33] we can see the results.

LOD and LOQ

The LOD concentration of serdexmethylphenidate was 1.68 µg/ml and s/n values is 5 and Dexmethylphenidate was 0.36 µg/ml and s/n values is 3. The LOQ concentration for Serdexmethylphenidate was 5.6 µg/ml and their s/n values are 26, and Dexmethylphenidate was 1.2 µg/ml and s/n values is 22. The method is validated as per the ICH guidelines [34, 35].

Robustness

The design of the experiment was intentionally altered in order to test the robustness of the system. Examples of such changes include changing the flow rate, organic to inorganic ratio, and so on. The results were robust and tabulated in table 7 [36].

Degradation studies

Partial degradation of the drug was accomplished using various forced degradation conditions on the Serdexmethylphenidate and Dexmethylphenidate sample. Research has been carried out to see if the method works for degrading products [37, 38]. Additionally, the studies describe the conditions under which the drug is unstable, providing further information so that appropriate precautions are taken during the process of formulation in order to avoid possible instabilities [39, 40].

Table 5: Inter-day outcomes of the accuracy of dexmethylphenidate

S. No.	Serdexmethylphenidate			Dexmethylphenidate		
	Conc.(µg/ml)	Area counts	% assay as is	Conc. (µg/ml)	Area counts	% assay as is
1	56	4352889	100.1	12	994320	100.2
2		4353794	100.1		991346	99.9
3		4335815	99.7		991747	99.9
4		4354611	100.1		995359	100.3
5		4339397	99.8		990540	99.8
6		4341324	99.8		994556	100.2
% RSD	0.19			0.21		
mean	99.9			100.1		
SD	0.186			0.207		

n=6

Table 6: LOD and LOQ for dexmethylphenidate

Serdexmethylphenidate				Dexmethylphenidate			
LOD		LOQ		LOD		LOQ	
Concentration	s/n	Concentration	s/n	Concentration	s/n	Concentration	s/n
1.68µg/ml	5	5.6µg/ml	26	0.36µg/ml	3	1.2µg/ml	22

Table 7: Robustness data of dexmethylphenidate

Parameter name	Serdexmethylphenidate			Dexmethylphenidate		
	Mean	SD	%RSD	Mean	SD	%RSD
Flow minus (0.8 ml/min)	99.7	0.252	0.25	99.7	0.205	0.21
Flow plus (1.2 ml/min)	99.5	0.265	0.27	99.9	0.379	0.38
Organic minus (63:37)	100.2	0.101	0.10	100.1	0.208	0.21
Organic plus (77:23)	100.1	0.265	0.26	99.9	0.265	0.27

RSD-Relative standard deviation; n=3

Acid degradation

1 ml of sample stock solution was moved to a volumetric flask of 10 ml, add 1 ml of 1N HCl and left it for 15 min. After 15 min add 1 ml of 1N NaOH and makeup to the diluent mark. Filter the solution using a syringe filter and injected it into HPLC system.

Alkali degradation

1 ml of sample stock solution was moved to a volumetric flask of 10 ml, add 1 ml of 1N NaOH and left it for 15 min. After 15 min add 1 ml of 1N HCl and make up to the mark. Filter the solution using syringe filter and injected into HPLC system.

Peroxide degradation

1 ml of sample stock solution was moved to a volumetric flask of 10 ml, add 1 ml of 30% hydrogen peroxide solution and make up to the mark with diluents. Filter the solution using syringe filter and injected it into HPLC system.

Reduction degradation

1 ml of sample stock solution was moved to a volumetric flask of 10 ml and add 1 ml of 30% sodium bi sulphate solution and makeup to the mark with diluents. Filter the solution using a syringe filter and injected into HPLC system.

Thermal degradation

The sample solution was set in an oven at 105 °C for 6 h. The resultant solution was injected into HPLC system.

Hydrolysis degradation

1 ml of sample stock solution was moved to a volumetric flask of 10 ml and add 1 ml of HPLC grade water and makeup to the mark with diluents. Filter the solution using syringe filter and injected it into HPLC system.

All degradation results are tabulated in table 9.

Table 9: Forced degradation results of dexmethylphenidate

Degradation condition	Serdexmethylphenidate		Dexmethylphenidate	
	% assay*	% degradation*	% assay*	% degradation*
Acid degradation	87.8	12.2	89.0	11.0
Alkali degradation	87.9	12.8	88.6	11.4
Peroxide degradation	86.4	13.6	87.5	12.5
Reduction degradation	88.6	11.4	80.6	9.4
Thermal degradation	97.9	2.1	98.1	1.9
Hydrolysis degradation	98.3	1.7	98.9	1.1

*Data expressed as mean; n=3

CONCLUSION

The developed method was accurate, precise and reliable for the simultaneous analysis of Serdexmethylphenidate and Dexmethylphenidate in pharmaceutical formulations. This method was validated for linearity, accuracy, precision, robustness, forced degradation of Serdexmethylphenidate and Dexmethylphenidate. The RSD values for all parameters were found to be less 2, which indicates the validity of the method and results obtained by this method are in fair agreement. Finally, this method can be used for better analysis of Serdexmethylphenidate and Dexmethylphenidate.

ACKNOWLEDGEMENT

The authors are thankful to Shree Icon Pharmaceutical Laboratories to complete this research work.

FUNDING

Nil

AUTHORS CONTRIBUTIONS

All authors have contributed equally.

CONFLICT OF INTERESTS

Declared none

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International Journal of Applied Pharmaceutics

ISSN- 0975-7058 Vol 14, Issue 2, 2022

Original Article

ASSAY METHOD DEVELOPMENT AND VALIDATION OF CILNIDIPINE AND RAMIPRIL, CHARACTERIZATION OF ITS DEGRADANTS BY USING LC-MS/MS

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Received: 11 Nov 2021, Revised and Accepted: 03 Jan 2022

ABSTRACT

Objective: The current study focused on the development, validation of Ramipril and Cilnidipine using HPLC and characterization of forced degradation products using LC-MS/MS.

Methods: Simple, accurate, and precise method has been developed for the simultaneous estimation of Cilnidipine and Ramipril in tablet type of dosage form using X-bridge phenyl column (150x4.6 mm, 3.5m) with mobile phase of buffer and Acetonitrile in the 30:70 v/v ratio was pumped through a column with a 1 ml/min flow rate. The buffer used in this process was 0.1 percent tri ethyl amine in 1 lt of water and adjust its pH-2.5 with 0.1 percent ortho phosphoric acid. At ambient temperature, chromatography was isocratically performed and run time was 8 min. 240 nm was the optimized wave length.

Results: Cilnidipine and Ramipril retention times were 2.79 min, 5.11 min. respectively. By injecting the norm six times, device parameters of suitability have been studied and the results were found to be well under the acceptance criteria. This approach offers strong linearity over a range of 2-30 µg/ml Cilnidipine 1-15 µg/ml Ramipril concentrations. The regression coefficient R^2>0.999 from the calibrated curve implies that the linearity of the system was within the range.

Conclusion: The system was validated by using HPLC in terms of accuracy, linearity, method precision, accuracy, limit of detection, limit of quantification, robustness, degradation and the degradation products were characterized by using LC-MS/MS.

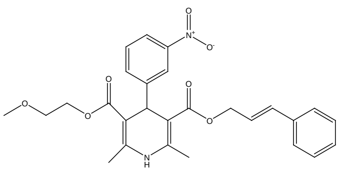
Keywords: Cilnidipine, Ramipril, Development, Validation, RP-HPLC

DOI: https://dx.doi.org/10.22159/ijap.2022v14i2.43570. Journal homepage: https://innovareacademics.in/journals/index.php/ijap

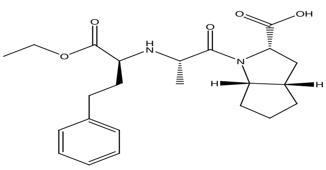
INTRODUCTION

Cilnidipine is a calcium channel blocker [1]. Cilnidipine is approved to treat hypertension [2]. Accompanied by L-type calcium channel blocking [3] functions, it is a calcium antagonist. Cilnidipine in addition on the L-type calcium channel, unlike other calcium antagonists, it can operate on the N-type calcium channel Cilnidipine reduces blood pressure and is used for the prevention and comorbidity of hypertension [4, 5] Cilnidipine dilates both arterioles and venues due to its blocking action at the L-type and N-type calcium channels, thus reducing the pressure in the capillary bed. Cilnidipine has a mild direct dromotropic effect, effective vasodepressor and arrhythmia-inhibiting effect [6, 7] and vasoselective effect.

Ramipril is a medication used to treat blood pressure, heart failure [8, 9], and kidney disease with diabetes [10, 11] also used to prevent cardiovascular disease [12, 13]. It is fair initial care and it is swallowed by mouth. Headaches [14], dizziness [15, 16], tiredness and cough [17] are typical side effects. Liver complications [18], angioedema [19, 20], kidney problems, and high blood potassium [21, 22]. Use in pregnancy and breastfeeding is not recommended. It is an ACE inhibitor [23] and works by decreasing renin-angiotensin-aldosterone [24] system activity. Fig. 1 shows the chemical structures of Ramipril and Cilnidipine. The aim of the study is to separate the pharma ingredients Ramipril and Cilnidipine by using RP-HPLC and characterization of its degradants using LC-MS/MS.



Cilnidipine



Ramipril

Fig. 1: Chemical structures of cilnidipine and ramipril

MATERIALS AND METHODS

Chemicals

Acetonitrile, tri ethylamine, orthophosphoric acid and water (HPLC Grade) were bought from Merck India Ltd, Worli, Bombay, India. All APIs of Cilnidipine, ramipril were bought from Glenmark pharmaceutical private Ltd, Andheri, Mumbai, India, were procured as reference levels.

Equipment

HPLC

The chromatographic device of Waters e-2695 quaternary pump, PDA detector of 2998 and chromatographic software Empower 2.0 was used.

LC-MS/MS

An HPLC system (waters alliance e2695 model) connected with mass spectrometer [25] QTRAP 5500 triple quadrupole instrument (sciex) was used [26-28].

Chromatographic conditions

Chromatographic separation of drugs Cilnidipine and Ramipril has been carried out in isocratic mode at room temperature using waters X-bridge phenyl column (150x4.6 mm, 3.5 µm). The mixture of 0.1% TEA pH-2.5 adjusted with OPA: acetonitrile in 30:70 v/v with a flow of 1 ml/min was used as the mobile process. The injection volume was 10 µl and at 240 nm the eluents were controlled with a running time of 8 min.

Preparation of buffer

1 ml of tri ethyl amine was transferred into 1 lt of HPLC water and mixed well; adjust the pH-2.5 with OPA. Filtered and degassed [29] through 0.45 μ membrane filter paper.

Selection of mobile phase

Prepared a buffer and Acetonitrile combination (30:70v/v). The selected mobile phase has given sharp peaks with low tailing factor.

Selection of wavelength

The absorption spectra of solution of each Cilnidipine and Ramipril were scanned over a range of 200-400 nm by using spectrophotometer and the spectra were recorded. Two drugs were absorbed maximum at a wavelength of 240 nm.

Preparation of diluent

The mobile phase was used as diluent.

Standard solution preparation

Weighed 20 mg Cilnidipine, 10 mg of Ramipril and transferred into 100 ml volumetric flask. 70 ml diluents was added and sonicated to dissolve for 15 min and made up to the mark with diluents. 5 ml of the above solution was further diluted to 50 ml with diluents.

Validation procedure

As per the guidelines of ICH Q2 (R1) analytical method was validated [30-34] in terms of parameters such as system suitability, method precision, specificity, intermediate precision, linearity, robustness, LOD, LOQ, and durability of forced degradation.

Suitability

To check the performance of the system, system suitability parameters were calculated. The parameters include the count of USP plates, USP tailing [35] and % RSD can be calculated and found to be within the limit.

Specificity

Specificity is the ability to assess unequivocally in the presence of an analyte, other impurities, and elements such as, expedients which may be assumed to be available in the sample and standard solution. It was checked by examining chromatograms of blank standard and the standard spiked [36] with Cilnidipine and Ramipril.

Accuracy

Accuracy is the closeness of the test result to the true value. The therapy was assessed by the study at three different concentration levels. A minimum of three injections have been given at each stage, the percentage recovery and the corresponding standard deviation, and the RSD have been determined.

Precision

The degree of agreement among individual tests results is the precision of an analytical technique. In terms of repeatability, intra-day and intra-day variations, the precision of the present method was evaluated. Analysis of the standards at different time intervals of the same day and on different days was carried out.

Linearity

The Linearity of an analytical method is its ability to obtain result is directly proportional to the analytes concentration. For the evaluation of the linearity range, seven series of standard solution were selected. Using peak area versus concentration of the standard solution, the calibration curve was plotted and the regression equations were measured using the method with the least squares.

LOD and LOQ

LOD is the lowest analyte quantity in the sample that can be detected, while LOQ is the lowest analyte quantity in the sample that can be determined with appropriate accuracy and precision. Based on the calibration curves, LOD and LOQ were separately determined. The LOD and LOQ were calculated according to ICH guidelines as 3.3σ/s and 10σ/s, respectively, where σ/s indicate the ratio of signal to noise.

Robustness

Analytical procedures robustness is a measure of its ability to remain unaffected by small but deliberate variations in parameters of the method and provides an indication of its reliability during normal use. The robustness study was carried out by injecting the standard solution into the HPLC system and modifying the flow rate (±0.2 ml/min), organic phase (±10 percent) of chromatographic conditions. The separation factor and retention time and maximum asymmetry have been measured.

Degradation

Stress degradation should be no interference between the peaks obtained for the forced degradation chromatogram. According to ICH guidelines [37], stress degradation studies were conducted. The peaks of degradation should be well separated and the resolution between the peaks should be at least 1.0 and the peak purity of the principal peaks [38] should pass.

RESULTS AND DISCUSSION

Method development and optimization

Initially, the RP-HPLC system was optimized using an X-Bridge phenyl (150x4.6 mm, 3.5 μm) column. To satisfy the system suitability parameters, a mixture of acetonitrile and TEA (70:30v/v) as the mobile phase (Flow rate 1.0 ml/min) was found to be more appropriate. Table 1 summarizes the optimized chromatographic conditions.

Table 1: Optimized chromatographic conditions

LC conditions		
Stationary phase	:	X-Bridge phenyl column (150x4.6 mm, 3.5 μm)
Mobile Phase	:	Acetonitrile and 0.1% TEA of pH-2.5 (70:30)
Elution mode	:	Isocratic Acetonitrile: Buffer = 70:30 % v/v
Flow rate	:	1.0 ml/min,
Sample volume	:	10μl using Rheodyne 7725i injector
Oven Temperature	:	Ambient
MS conditions		
Interface	:	ESI
Operation mode	:	MRM
Polarity	:	Positive
Capillary voltage	:	4 KV
Fragmentor voltage	:	170 V
Skimmer voltage	:	65 V
Nebulizer Gas flow	:	40 psig
Drying gas	:	10 L/min
Gasoline temperature	:	325 °C
Detection	:	m/z: 0-800
Data station	:	ABSCIEX

Tests for method validation

System suitability

To get stable baseline, the HPLC system was stabilized for 60 min. six replicate injections mixture containing 20 µg/ml of Cilnidipine and 10 µg/ml of Ramipril were performed and assessed to check the suitability of the system. From six replication injections, the system suitability parameters were evaluated. The research concludes that the system suitability and outcomes of the HPLC system being used are summarized below in table 2 [39].

Specificity

There was no interference [40] from the blank during the retention time of Cilnidipine and Ramipril. The process is, therefore, specific.

Table 2: Results of system suitability

System suitability parameter	Acceptance criteria	Cilnidipine			Ramipril		
		Mean	Std Dev	%RSD	Mean	Std Dev	%RSD
Retention time	NLT 2.0	2.79	0.010	0.35	5.129	0.007	0.13
USP plate count	NLT 2000	3741	39.484	1.06	9162	49.918	0.54
USP Tailing	NMT 2.0	1.05	0.005	0.52	0.97	0.033	1.39
Resolution	NLT 2.0	-	-	-	11.72	0.054	0.46

n=6

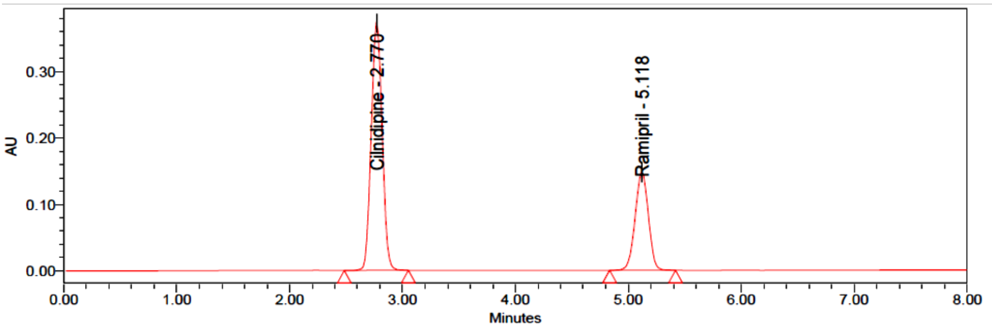


Fig. 2: Chromatogram of system suitability

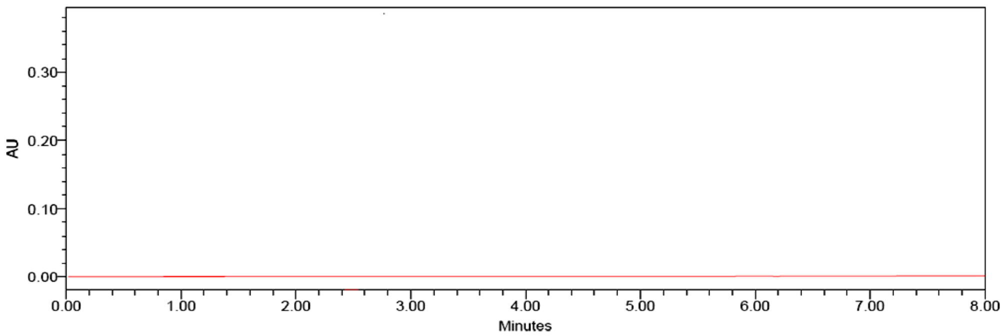


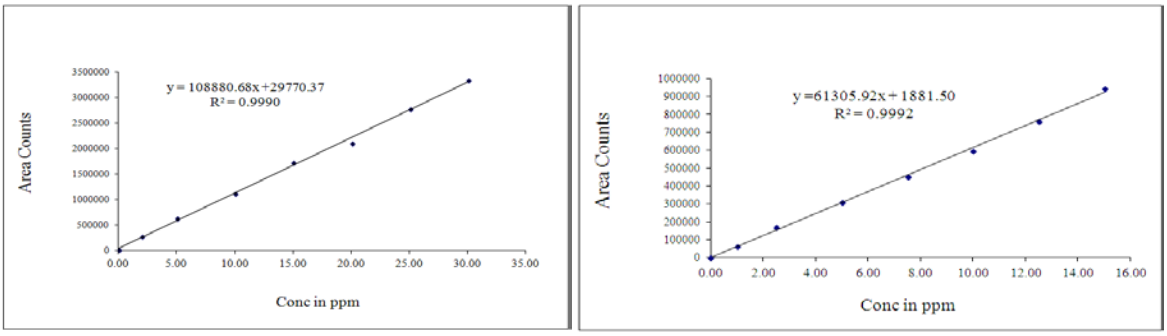
Fig. 3: Chromatogram of blank

Linearity

Linearity was calculated by plotting a calibration curve of peak area versus respective concentrations. From this calibration curve it was found that the curve was linear in the concentration range of 2-30 µg/ml of Cilnidipine and 1-15 µg/ml of Ramipril. The regression equations for Cilnidipine were Y=108880.68x+29770.37, and for Ramipril was Y=61305.92x+1881.5, respectively.

Table 3: Linearity data

Linearity level	Cilnidipine			Ramipril		
	Conc. (µg/ml)	Mean area counts	Std dev	Conc. (µg/ml)	Mean area counts	Std dev
Linearity-1	2	256890	238.854	1	62716	22.942
Linearity-2	5	621356	469.667	2.5	171818	259.485
Linearity-3	10	1105500	916.652	5	308822	15.308
Linearity-4	15	1711265	707.749	7.5	453374	963.735
Linearity-5	20	2096456	600.635	10	595546	281.896
Linearity-6	25	2771404	521.419	12.5	760828	254.772
Linearity-7	30	3325525	223.467	15	941815	300.435
Slope	108880.68			61305.92		
Intercept	29770.37			1881.5		
% RSD	0.999			0.9992		



A B

Fig. 4: Linearity plot of (A) Cilnidipine and (B) Ramipril

Accuracy

The accuracy of the method was performed by calculating the recovery experiments at three levels (50 percent, 100 percent 150 percent). APIs were prepared at concentrations of 10, 20, and 30 µg/ml of Cilnidipine and 5, 10, 15 µg/ml of Ramipril, respectively. For each spike level, the test solution was injected three times and an assay was performed as per the test method. The recovery results were close to 100 percent and the RSD values were less than 2 percent. Recovery values showed that, within the desired range, the method was accurate. The results were summarized below in table 4 [41].

Precision

In terms of intra-day and inter-day differences, the accuracy of this method was assessed. Six repeated analyses of the standard solution of Cilnidipine and Ramipril on the same day under the same experimental conditions were used to determine intraday studies. In the same laboratory, the intermediate precision of the method was carried out by studying the analysis with different analysts with different instruments. As the each concentration level, good recovery values were obtained, indicating that the procedure was accurate.

Table 4: Results of accuracy

Accuracy level	**Cilnidipine**		**Ramipril**	
	%Recovery	**Std dev**	**%Recovery**	**Std dev**
50%	100.1	0.294	98.8	0.525
100%	99.7	0.401	99.8	0.243
150%	99.8	0.071	99.4	0.365

n=3

Table 5: Results of precision

Parameter	**Cilnidipine**			**Ramipril**		
	Mean % recovery	**Std dev**	**Conc. (µg/ml)**	**Mean % recovery**	**Std dev**	**Conc. (µg/ml)**
Method precision	99.7	0.231	20	100.3	0.153	10
Intermediate precision	99.1	0.782	20	100.4	0.451	10

n=6

LOD and LOQ

Using the calibration curve process, LOD and LOQ were calculated separately. By injecting a progressively lower concentration of standard solution using the established RP-HPLC process, the LOD and LOQ of the compounds were calculated. The LOD values of Cilnidipine and Ramipril were 0.6µg/ml, 0.3µg/ml and s/n values were 6, 3 respectively. Cilnidipine and Ramipril LOQ values were 2.0 µg/ml, 1.0 µg/ml s/n values were 26, 24 respectively.

Robustness

As per ICH norms, small but intentional differences were made in the parameters of the method, for instance, like the change in the rate of flow (±0.2 ml/min) and organic phase (±10%) to check the method capacity to remain unaffected [42].

Table 6: Results of robustness

Change in parameter	Cilnidipine (% RSD)	Ramipril (% RSD)
Flow plus (1.2 ml/min	0.26	0.17
Flow minus (0.8 ml/min)	0.11	0.49
Organic plus (77:23)	0.37	0.24
Organic minus (63:37)	0.45	0.36

RSD-Relative standard deviation; All the values are presented as Mean (n=3)

Forced degradation

The proposed analytical method can be used for release and stability studies [43] for successful evaluations for and can be considered as a stability-indicating method. The survey of forced degradation [44] was conducted according to ICH guidelines includes acid, base, peroxide, reduction, thermal and hydrolysis degradation [45-47]. From the chromatograms, it is evident that selected drugs were stable under the applied stress conditions though the degradation peaks were obtained. The degradation samples were characterized by using LCMS.

Acid degradation

Acid degradation of Cilnidipine and Ramipril was studied in 1N HCl. 15.1% of Cilnidipine and 15.6% of Ramipril degradation was observed in HPLC, two degradation peaks of D_1 and D_4 were formed.

Alkali degradation

Alkali degradation of Cilnidipine and Ramipril was studied in 1N NaOH. 14.9% of Cilnidipine and 14.4% of Ramipril degradation were observed in HPLC, two degradation peaks of D_1 and D_4 were formed.

Peroxide degradation

Peroxide degradation of Cilnidipine and Ramipril was studied in 30% hydrogen peroxide. 13.2% of Cilnidipine and 11.3% of Ramipril degradation was observed in HPLC, two degradation peaks of D_2 and D_5 were formed.

Reduction degradation

Reduction degradation of Cilnidipine and Ramipril were studied in 30% sodium bisulphate solution. 12.8% of Cilnidipine and 11.7% of Ramipril degradation was observed in HPLC, two degradation peaks of D_3 and D_6 were formed.

Thermal degradation

In thermal degradation sample was exposed to 105 °C for 6 h, 1.4% Cilnidipine and 2.3% Ramipril degradation was observed in HPLC. No degradation products were formed.

Hydrolysis degradation

Hydrolysis degradation of Cilnidipine and ramipril was observed in HPLC water. 1.2% Cilnidipine and 0.8% Ramipril degradation was observed. No degradation products were formed.

MS/MS degradation product

Fig. 6 shows the fragmentation mechanism of degradation product 1 of m/z-554, which was observed under conditions of acid and alkali degradation. Abundant productions are seen on the spectrum at m/z-432 (loss of $C_6H_4NO_2$ from m/z-554), m/z-390 (loss of $C_2H_2O_2C1_3$ from m/z-554), m/z-269 (loss of $C_6H_4NO_2$ from m/z-390), m/z-192 (loss of C_6H_5 from m/z-269) and m/z-108(loss of $C_4H_4O_2$ from m/z-192). The proposed structures were confirmed by the MS/MS experiments in combination with precise mass measurements.

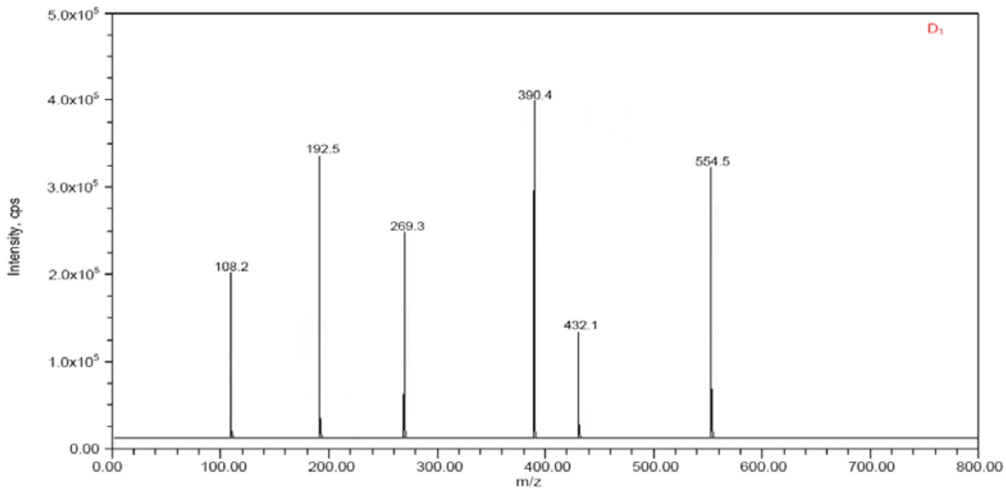
MS/MS degradation product

Fig. 7 shows the degradation product 2 fragmentation mechanism of m/z-434 observed under the condition of peroxide degradation. Abundant productions are seen on the spectrum at m/z-331 (loss of $C_4H_8O_3$ from m/z-434), m/z-228 (loss of $C_4H_8O_3$ from m/z-331), m/z-107 (loss of $C_6H_4NO_2$ from m/z-228), m/z-312 (loss of $C_6H_4NO_2$ from m/z-434). The proposed structures were confirmed by the MS/MS experiments in combined with accurate mass measurements.

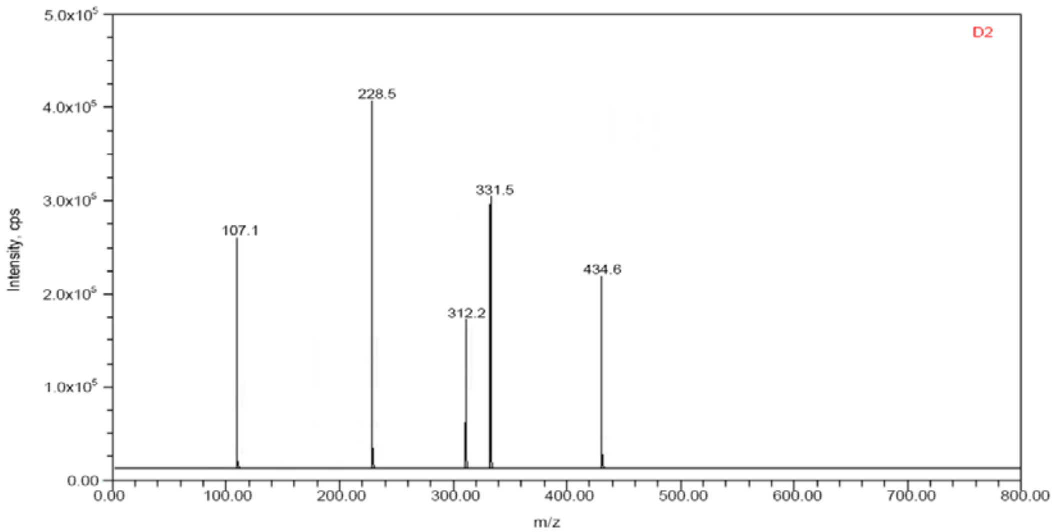
Table 5: Results of forced degradation

Stress condition	Cilnidipine % degradation	Ramipril % degradation
Acid degradation	15.1	15.6
Alkali degradation	14.9	14.4
Peroxide degradation	13.2	11.3
Reduction degradation	12.8	11.7
Thermal degradation	1.4	2.3
Hydrolysis degradation	1.2	0.8

Data expressed as mean, (n=3)



A



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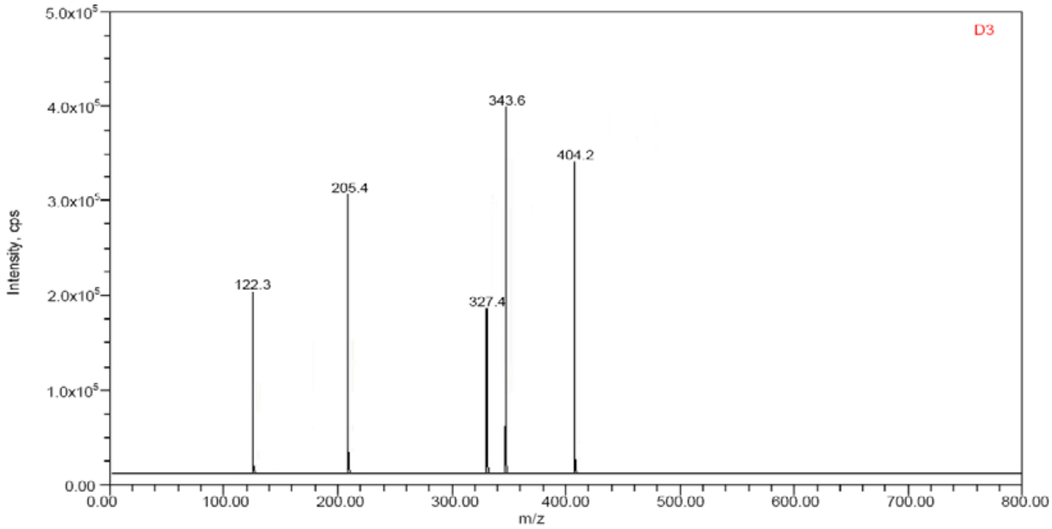
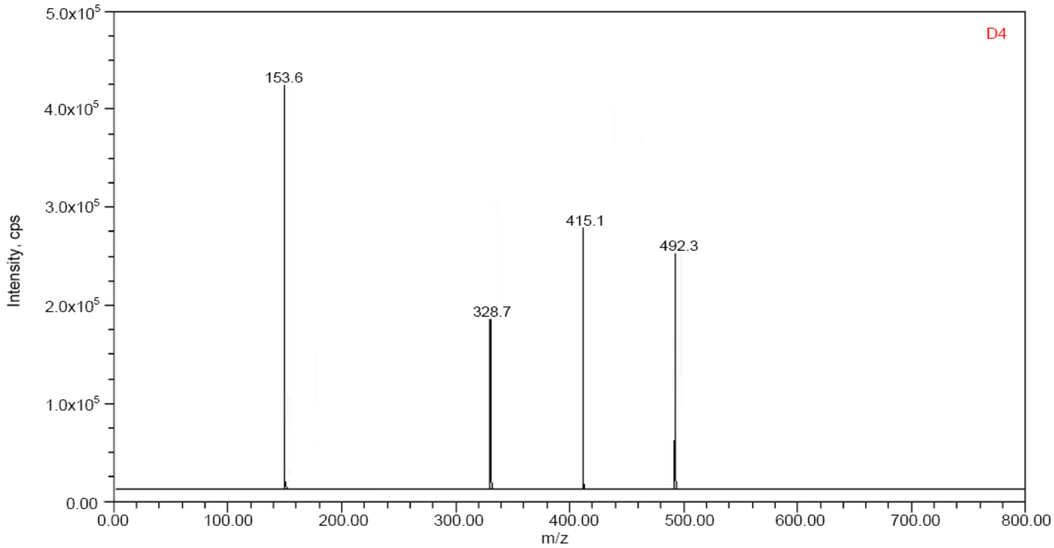
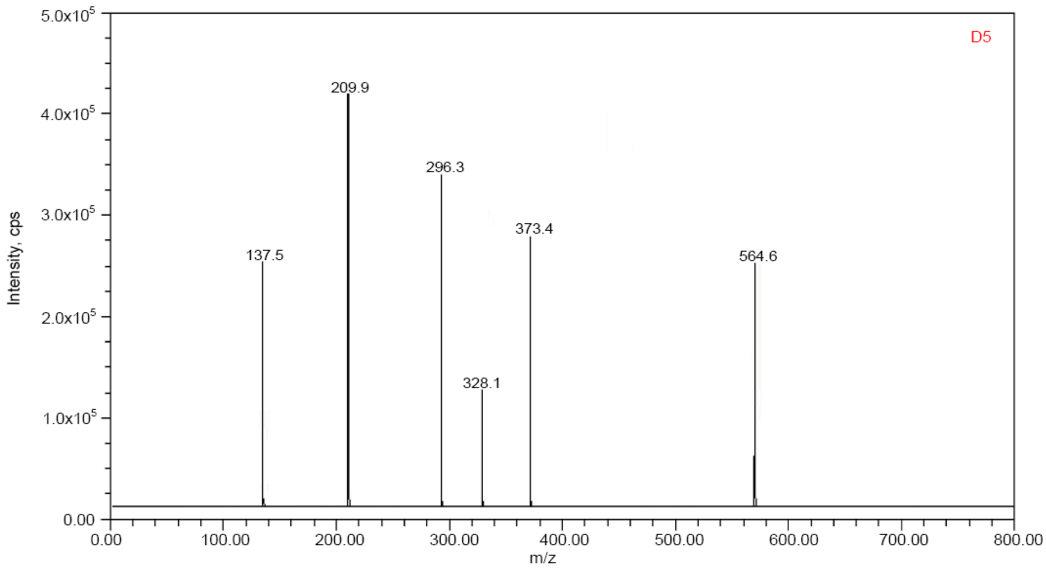

D3
5.0x10^5
4.0x10^5
3.0x10^5
2.0x10^5
1.0x10^5
0.00
Intensity, cps
122.3
205.4
327.4
343.6
404.2
0.00
100.00
200.00
300.00
400.00
500.00
600.00
700.00
800.00
m/z

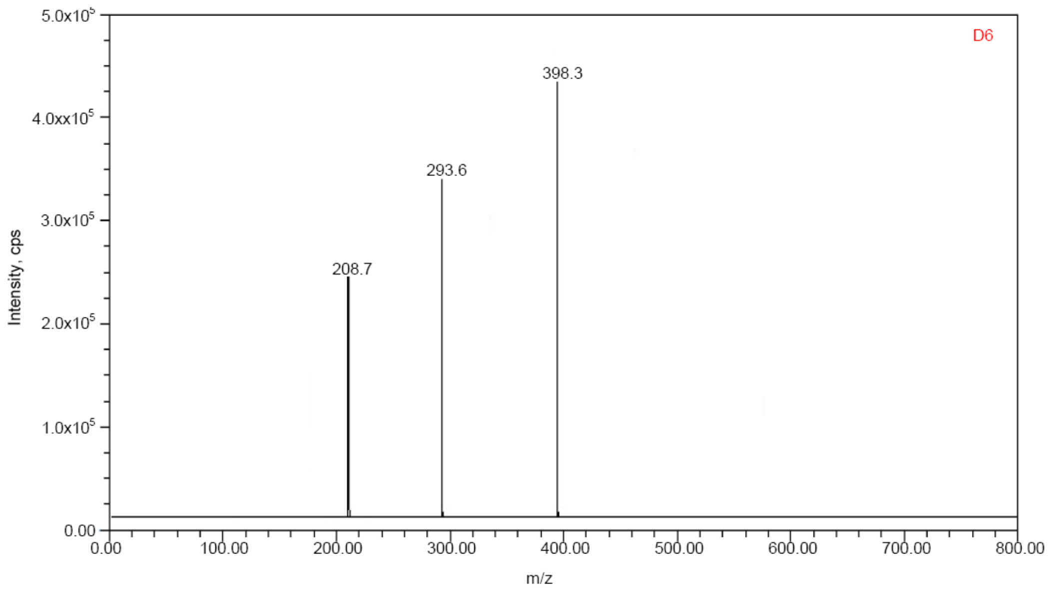
C


D4
5.0x10^5
4.0x10^5
3.0x10^5
2.0x10^5
1.0x10^5
0.00
Intensity, cps
153.6
328.7
415.1
492.3
0.00
100.00
200.00
300.00
400.00
500.00
600.00
700.00
800.00
m/z

D


D5
5.0x10^5
4.0x10^5
3.0x10^5
2.0x10^5
1.0x10^5
0.00
Intensity, cps
137.5
209.9
296.3
328.1
373.4
564.6
0.00
100.00
200.00
300.00
400.00
500.00
600.00
700.00
800.00
m/z

E



F

Fig. 5: Mass spectras of (A) D_1 (B) D_2 (C) D_3 (D) D_4 (E) D_5 and (F) D_6

Collision induced dissociation of cilnidipine and ramipril

Scheme 1

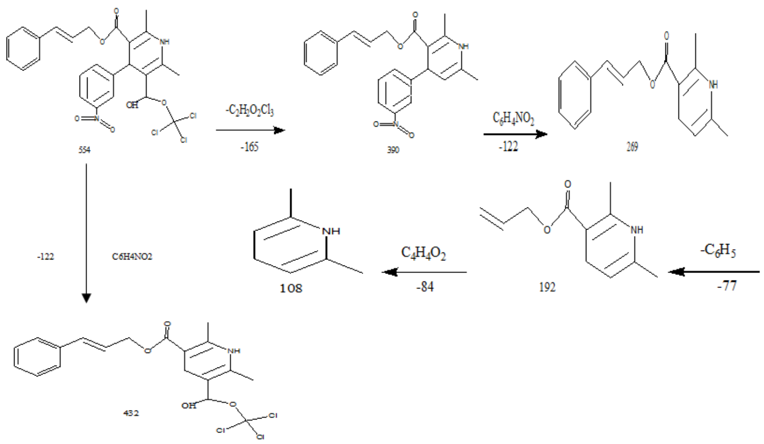


Fig. 6: Mechanism for proposed fragmentation of DP_1 (m/z-554)

Scheme 2

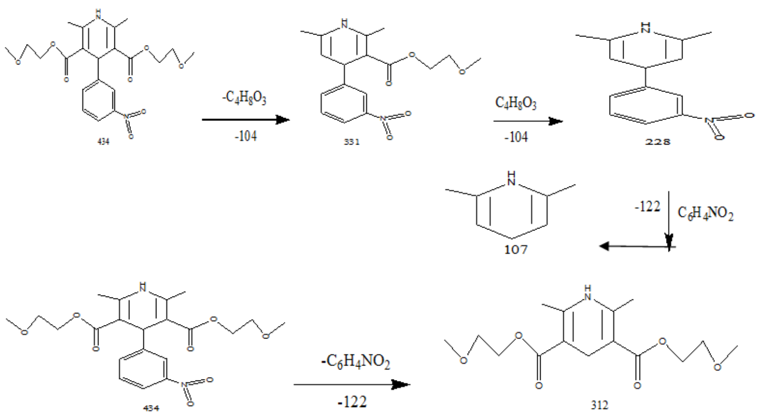


Fig. 7: Proposed fragmentation mechanism of DP_2 (m/z-434)

Scheme 3

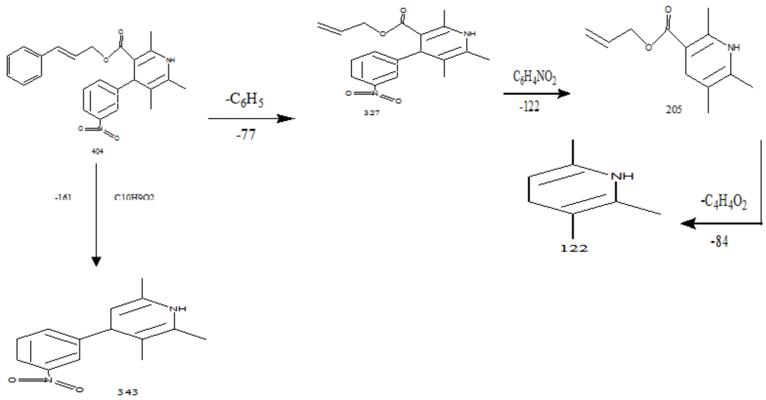


Fig. 8: Proposed fragmentation mechanism of DP_3 (m/z-404)

MS/MS degradation peak

The fragmentation mechanism of degradation product 3 of m/z-404 observed under the reduction degradation condition is shown in fig. 8. Abundant product ions are seen on the spectrum at m/z-343 (loss of $C_{10}H_9O_2$ from m/z-404), m/z-327 (loss of C_6H_5 from m/z-404), m/z-205 (loss of $C_6H_4NO_2$ from m/z-327), m/z-122 (loss of $C_4H_4O_2$ from m/z-205). The MS/MS experiments combined with mass measurements have confirmed the proposed structures.

MS/MS degradation peak

Fig. 9 shows the proposed fragmentation mechanism of degradation product 4 of m/z-492, observed under conditions of acid and alkali degradation. Abundant substance ions are seen on the spectrum at m/z-415 (loss of C_6H_5 from m/z-492), m/z-328 (loss of $C_4H_7O_2$ from m/z-415), m/z-153 (loss of $C_3H_3NOCl_3$ from m/z-328). The MS/MS experiments, combined with accurate mass measurements, have confirmed the proposed structures.

Scheme 4

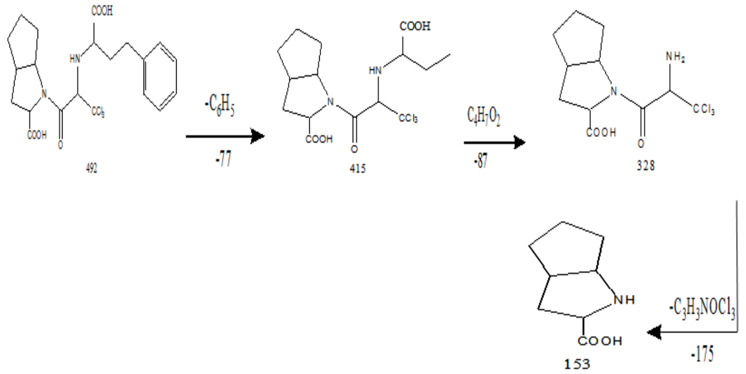


Fig. 9: Mechanism for proposed fragmentation of DP_4 (m/z-492)

Scheme 5

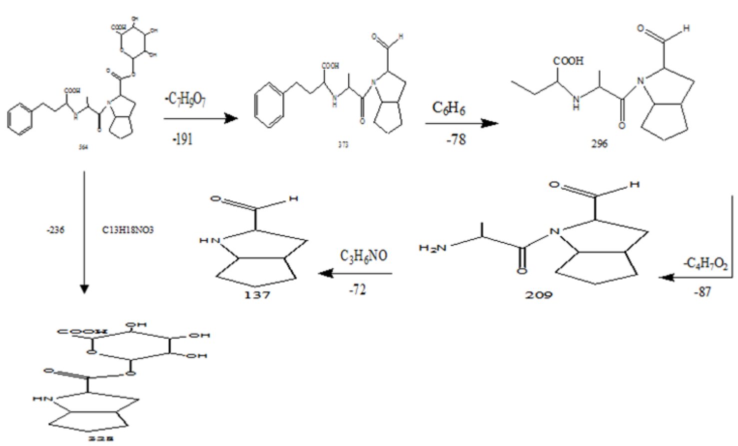


Fig. 10: Proposed fragmentation mechanism of DP_5 (m/z-564)

MS/MS degradation peak

The proposed fragmentation mechanism of degradation product 5 of m/z-564 observed under the condition of peroxide degradation is shown in fig. 10. Abundant productions are seen on the spectrum at m/z-373 (loss of $C_7H_9O_7$ from m/z-564), m/z-296 (loss of C_6H_5 from m/z-373), m/z-209 (loss of $C_4H_7O_2$ from m/z-296), m/z-137 (loss of C_3H_6NO from m/z-209), m/z-328 (loss of $C_{13}H_{18}NO_3$ from m/z-564). The proposed structures were confirmed by the MS/MS tests in combination with accurate mass measurements.

Scheme 6

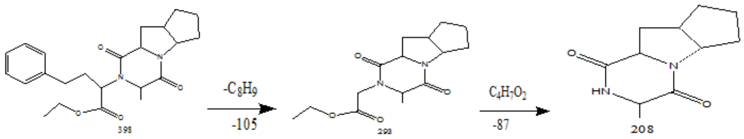


Fig. 11: Proposed fragmentation mechanism of DP$_6$ (m/z-398)

MS/MS degradation peak

The proposed fragmentation mechanism for degradation product 6 of m/z-398 observed under the reduction degradation condition is shown in fig. 11. The spectrum shows abundant product ions at m/z-293 (loss of C_8H_9 from m/z-398), m/z-208 (loss of $C_4H_7O_2$ from m/z-293). The proposed structures were verified in combination with accurate mass measurements by the MS/MS experiments.

CONCLUSION

In this a novel, simple, fast, economical, sensitive and easily available method of HPLC was developed for the simultaneous determination of Cilnidipine and Ramipril in the form of tablet dosage. The main advantages of this method were there is no HPLC methods were reported. In this method, shorter run time, low price, accessibility, sensitivity, reliability and reproducibility these properties were important when a large number of samples are to be analyzed. The validation of all the parameters like linearity, accuracy, specificity, robustness, stability was done and found to be within the acceptable limit. For all the parameters, RSD were found to be less than 2 percent which the validity of the process is suggested and the results obtained by this process are in good agreement. So the proposed procedure was easily applied for routine analysis and pharmaceutical formulations of Cilnidipine and Ramipril in quality control laboratories without any preliminary separation.

ACKNOWLEDGEMENT

The author was thankful to the management of P B Siddhartha college of Arts and Science for their encouragement and Shree Icon Pharmaceutical Laboratories for providing laboratory equipment.

FUNDING

Nil

AUTHORS CONTRIBUTIONS

All the authors have contributed equally.

CONFLICT OF INTERESTS

Declared none

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LCMS METHOD DEVELOPMENT AND VALIDATION FOR THE ESTIMATION OF TIVOZANIB IN RAT PLASMA

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Abstract

An easy, quick, precise, active and reproducible LC-MS/MS technique was developed for the bio analytical method of tivozanib using Deuterium as internal standard. This article summarizes the recent progress on bioanalytical LC-MS/MS methods using Waters C8 (100x4.6 mm, 3.5µ) column and organic mobile phase of Ammonium formate and methanol in 70:30 ratio. The calibration curve was linear in the concentration of 50ng/ml for tivozanib. Accuracy, precision, recovery, matrix effect and stability results were found to be within the suitable limits. Simple and efficient method was developed and utilized in pharmacokinetic studies to see the investigated analyte in body fluids. The application denotes all the parameters of system suitability, specificity, linearity and accuracy are in good agreement with USFDA guidelines and applied effectively for the investigation of pharmacokinetic studies in rat.

Key words: *Tivozanib, LCMS, method development, validation, ICH guidelines.*

Introduction

Tivozanib[1,2] isanorallybioavailableinhibitor of vascular growth factorreceptors[3,4](VEGFRs) 1, 2 and 3 with potentialantiangiogenic[5] and antineoplastic activities. Tivozanib bindsto and inhibitsVEGFRs 1, 2 and 3, whichmay result in the inhibition of endothelial cell[6,7] migrationandproliferation, inhibition oftumour angiogenesis and tumourcell death. VEGFR tyrosine kinases, frequently overexpressed by a variety of tumourcell types, play a key role inangiogenesis.Tivozanib is used in form of the hydrochloridemonohydrate, whichis a white to light brown powder. It is practically insoluble inwater and has low solubility in aqueous acids, ethanol and methanol. Itis not hygroscopic[8,9]and not optically active.

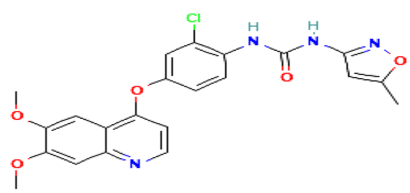

Fig 1: Tivozanib

The common side effects include fatigue [10-12],hypertension, diarrhea, decreased appetite, nausea, dysphonia, hypothyroidism, cough, and stomatitis.

1. Experimental Study

Chemicals

Acetonitrile and HSA-Hexane Sulphuric Acid, water (HPLC grade) were purchased from Merck (India)Ltd, Wroli, Mumbai, India. All APIs of tivozanib as reference standards wereprocured from Zydus Cadila, Ahamdabad

Instrumentation

An HPLC system (waters alliance e2695 model) connected with mass spectrometer QTRAP5500 triple quadrupole instrument(sciex) was used. By the Empower 2.0 software operation wasperformed [13-17].

Selection of animals:

In the following study, 6 healthy white New Zealand rats (2.0-2.5 kg) were obtainedfrom Biological E Limited, Hyderabad, India. The protocol of animal study was approved byinstitute of animal ethics committee (Reg.No:1074/PO/Re/S/05/CPCSEA).

Chromatographic conditions:

Chromatographic separation, using Waters C8 (100x4.6 mm, 3.5µ) column, was administered in isocratic mode at room temperature. As a mobile phase, a mix of Ammonium formate and methanol at 70:30 v/v with a flow of 1.0 ml/min was used. 10µl was the injection rate and the run time was 8 minutes.

Preparation of standard and internal control samples:

Preparation of standard stock solution:

Take 10mg of tivozanib working standards is taken into a 50mlvolumetric flask and add small amount of acetonitrile and small amount of hexane sulphuric acid, then sonicate for 10minutes to dissolve the contentscompletely and make up to the mark with equal amounts of acetonitrile and hexane sulphuric acid, Further dilution by taking 1.0ml into 10mlvolumetric flask. From theabove solution 0.8ml of the solution is taken into the 10ml volumetricflask and make up to the mark with the diluent.

Preparation of internal standard:

Take 5mg internal standard of tivozanib into a 10ml volumetric flask and make up to the mark with diluent and sonicate for ten minutes to dissolve the contents completely. From this solution take 1.0ml of solution into 10ml volumetric flask. From the above solution 0.8ml is taken into the 10ml volumetric flask and make up to the mark with the diluent.

Preparation of standard solution:

For standard preparation 200µl of plasma was taken and 200µl of ACN into a 2ml centrifuge tube and 100µl of standard stock solutions and 100µl of IS and 900 µl of diluents were added and vortexed for 10 min. These samples further subjected for centrifuge at 2000rpm for 30 min. Collect the solution and filter through 0.45µ nylon syringe filter and the clear solution wastransferred into vial and injected into a system.

Bio analytical Method validation:

The method was validated in selective, sensitive, linearity, accuracy and precise, matrixcondition, recovery study, re-injection reproducibility[18-19]and stability.

Selectivity:
By analyzing the six different rat plasma samples and to check interference at the retention time selectivity was conducted.

Matrix effect:

By comparing the height area ratio from the six various drug free plasma samples for tivozanib to get matrix effect. Experiments were performed at MQC levels in triplicate with six different plasma lots with the suitable precision of 15 %.

Precision and accuracy:

It was determined by replicate analysis of internal control samples at a lower limit of quantification (LLOQ), low quality control (LQC), medium quality control (MQC), top quality control (HQC) levels. The half of CV should be less than 15% and accuracy should be with in 80-120% except LLOQ where $\leq$20%.

Recovery:

The analysis of six samples reproduce at each internal control concentration is by extracting thetivozanib. By comparing the height areas of extracted standards to the height areas of unextracted standards, recovery is evaluated.

Carry over:

Carry over deals with the analyte retained by the chromatographic system during the matrix with an analyte [20] concentration ULOQC and above the diluting this sample with blank matrix.

Dilution integrity:

By spiking the matrix with an analyte concentration above the ULOQC and diluting this sample with blank matrix, the dilution integrity should be explained.

Stability:

By comparing the act of stock solution stability under the stability sample with the sample from the fresh stock sample preparation. Sample Stability studies in plasma were performed at LQC and HQC concentration levels using six replicates at each level. Analyte was considered stable if the change is smaller amount than 15 % as per US FDA guidelines. The perfectness[21] of spiked rat plasma stored at room temperature was evaluated for 24hrs. The stability of spiked rat plasma stored at RT in auto sampler was evaluated for 24 hrs. The auto sampler stability (LQC,MQC and HQC) was evaluated by comparing the extract plasma samples that were injected immediately, with the samples that were re-injected after storing with wet extract stability at room temperature after 12 h and 18 h at 2-8^{0}C . There injection reproducibility was evaluated by comparing the extracted plasma samples that were injected immediately, with the samples that were re injected after storing in the dry extract stability at room temperature after 12 h and 18 h at -20 ^{0} ± 30^{0}C. the freeze thaw stability was conducted by comparing the steadiness samples that had been frozen at -31^{0}C and thawed 3 times, with freshly spiked internal control samples. The short term stability was conducted 7 days at 7^0 C. For long term stability evaluation the concentrations obtained after 24 hwere compared with initial concentration.

The plasma for the above experiment has been extracted from Albino[22-26] rat i.e., shown in figure 2.

Fig 2: Albino rat

2. Results and Discussion

The maximum response on air pressure chemical ionization mode selected in this method is byhaving the electro spray ionization[27]. The mobile phase flow of 10 µl/min Tivozanib are highly responsive in the positive ion mode to offer sensitivity and signal stability withcontinuous flow to electro spray ion.

Specificity:

The specificity of the method to research Tivozanib simultaneously is proved. Thechromatograms of blank and standard as shown in figure 3,4. The chromatograms of blankrat plasma and standard having no interference peaks were observed.

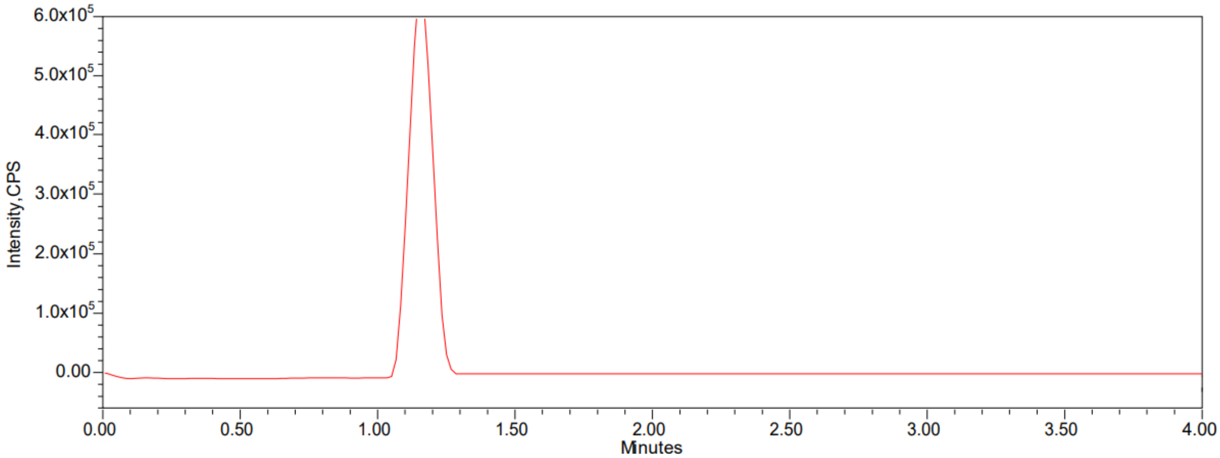

Fig. 3. Chromatogram of blank plasma

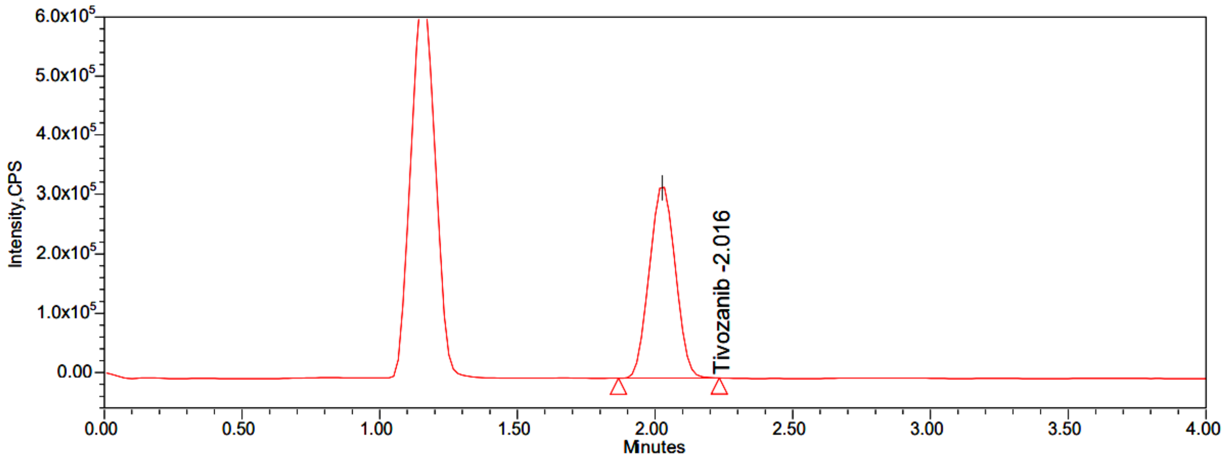

Figure 4. Chromatogram of Standard

Matrix Effect

Percent RSD for within the signal, ion suppression/enhancement was observed as 1.0 percent for in LC-MS/MS, suggesting that under these circumstances the matrix effect [28-30] on analyte ionization is within an acceptable range of ionization. In matrix effect HQC and LQC of Tivozanib were 97.73 and 99.13%. %CV of the drug at HQC level were 0.19 and LQC level is 0.69%. It indicates that the matrix effect on the ionization of the analyte is within the suitable limit.

Linearity

From the calibration curve, it was clear that the peak area ratios were proportional to the concentration. The concentration range of Tivozanib is 5-100ng/ml . The calibration curves were appeared linear and correlation coefficient was found to be 0.999 for Tivozanib. Linearity results of Tivozanib are shown in table 1.

Table 1. Linearity results of Tivozanib

Linearity	Tivozanib	
	Conc. ng/ml	Peak response
1	5.00	6259
2	12.50	16584
3	25.00	31287
4	37.50	47569
5	50.00	63254
6	62.50	79635
7	75.00	93521
8	100.00	122659
Slope	0.0231	
Intercept	0.00087	
CC	0.99967	

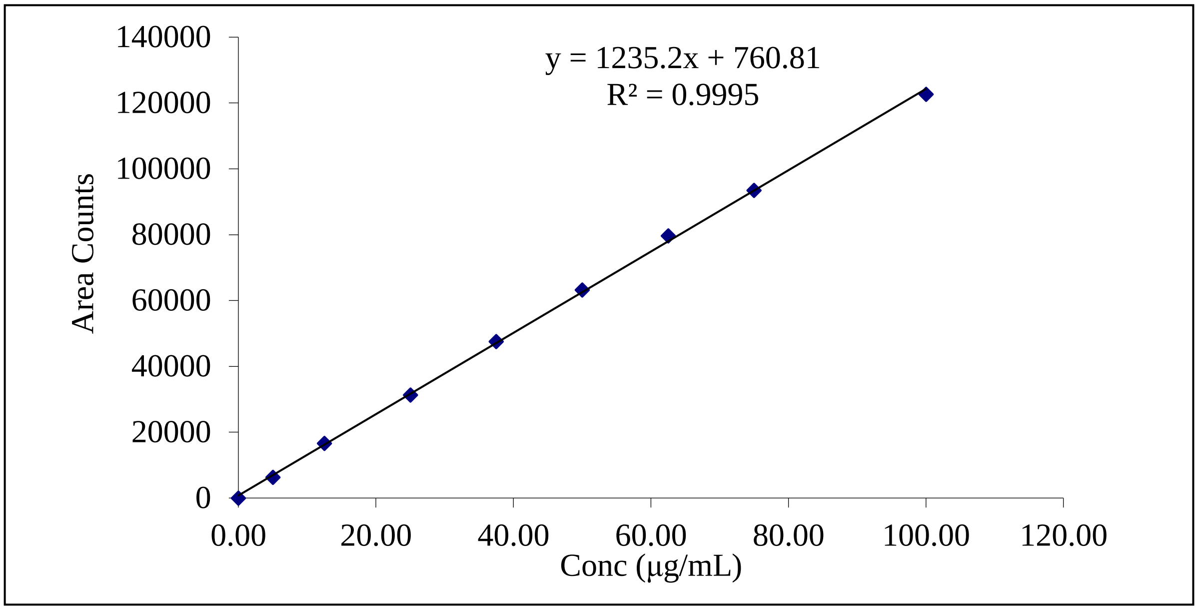

Figure 5. Calibration plot of Tivozanib

Precision and Accuracy

The intra-assay precision and accuracy were estimated by analyzing six replicates containing tivozanib at six different QC levels. The inter-assay precision [31-33] was determined by analyzing the four levels QC samples on four different runs. The criteria for acceptability of the data include, accuracy within 85–115% from the actual values and a precision of within ±15% relative standard deviation (RSD) except for LLQC, where it should be within 80–120% for accuracy and <20% of RSD

Table 2. Precision and accuracy of Tivozanib

QC Name	LLQC	LQC	MQC	HQC
Conc.(ng/ml)	5 ng/ml	25 ng/ml	50 ng/ml	75 ng/ml
QC sample -1	6235	31142	63529	93456
QC sample -2	6198	31578	63124	93740
QC sample -3	6207	31659	63857	93851
QC sample -4	6224	31027	63765	93376
QC sample -5	6189	31246	63329	93451
QC sample -6	6199	31285	63058	93652
Mean	6209	31323	63444	93588
SD	17.466	247.253	330.289	188.417
%CV	0.28	0.79	0.52	0.20
Accuracy (%)	97.37	98.24	99.49	97.84

Recovery

The recovery of drug and IS was evaluated at three concentration levels namely low, mediumand high quality control. Recovery was calculated by comparing its response in replicate samples with that of neat standard solution responses. Analyte recovery from a sample matrix (extraction efficiency) is a comparison of analytical response from an amount of analyte added to that determined from sample matrix. Because of basic properties of Tivozanib extraction was carried out using Acetonitrilesolvent. Experiments with spiked compounds resulted in recoveries of analyte 91.78 % - 101.06% and for IS 94.25 %

Ruggedness

The percent recoveries and percent CV of tivozanib determined byanalyst on a specific columnwere within acceptable criteria in HQC, LQC, MQC andLLQC samples. The results proved method is ruggedness.

Auto sampler carryover

Peak area response of tivozanib, wasn't observed within the blank rat plasmasamples after successive injections of LLQC and ULQC at the retention times of tivozanib. In auto sampler carryover this method doesn't exhibit auto sampler carryover

Stability

Tivozanib solution were prepared with diluents for solution stability analysis andplaced in a refrigerator at 2-8^{0}C. Fresh stock solutions were associated with stock solutions thatwere prepared 24 hours earlier. The plasma stability of the bench top and auto sampler wasstable for 24hours, and 24 hours at 20^{0}C in the auto sampler. It became apparent fromfuture stability that tivozanib were stable at a storage temperature of -30^{0}C for up to 24 hours. The overall stability results of tivozanib have been stated in the belowtable 5.

Table 3. Stability results of Ezetimibe

Stability experiment spiked plasma		Spiked plasma Conc(n=6,ng/ml)	Concmeasured (n=6,ng/ml)	%CV
Bench top stability	LQC	100	100.32	0.64
	HQC	300	300.45	1.73
Auto sampler stability	LQC	100	100.52263	0.89
	HQC	300	300.56567	0.525
Long term (28days) stability	LQC	100	100.436	0.29
	HQC	300	300.322	0.08
Wet extract stability	LQC	100	100.69935	1.095
	HQC	300	300.43425	0.445

Dry extract stability	LQC	100	100.284	0.99
	HQC	300	300.513	0.49
Freeze thaw stability	LQC	100	100.4543	0.6
	HQC	300	300.5132	0.17
Short term stability	LQC	100	100.415	0.37
	HQC	300	300.308	0.11

3. Conclusion

For the primary time higher sensitive HPLC-ESI-LCMS/MS method was developed and validated for the determination of tivozanib in rat plasma. Here the described method is rugged, fast, reproducible bio analytical method. This method was validated according to USFDA guidelines. Simple and efficient method was developed and may be utilized in pharmacokinetic studies and to see the investigated analyte in body fluids.

Acknowledgement

I thankful to my guide for encouragement and supporting to finish this research work.

Conflicts of Interest

Authors declare that there were no conflicts of interest.

Funding Source

None

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ORIGINAL ARTICLE

Evaluation of Fumonisins Contamination using Liquid Chromatography Mass Spectrometry in Corn Samples Collected from Different Locations

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Abstract

Aim: The aim of the study was to determine fumonisins (FMS) using liquid chromatography coupled with mass spectrometry in maize. **Materials and Methods:** FMSs are mycotoxins frequently found in contaminated corn samples. The presence of FMSs in corn samples should be continuously controlled to protect the population form risks associated with its proven toxicity. About 24 corn samples were collected in different locations of Andhra Pradesh such as harvesting area, storage area, and dumping area of godown for determination of contamination by FMSs. **Results and Discussion:** The retention time of the well-defined peak of FMS B1 and B2 was found 1.15 min and 2.59 min which is similar to the obtained method. Among 24 samples, about 7 corn samples were found positive contamination by FMS when subjected to liquid chromatography-mass spectrometry analysis. The high levels of FMS contamination were found in sample number 7(s-7) which is collected from the dumping area of storage godown. The fungal damaged sample was found B1concentration of 242.11 μg/kg and FB2 of 117.15 μg/kg. The concentration of FB1 is very high in the sample compared to the regulatory guidelines limit. The low amount of FMS is identified in sample number 8(s-8) which is collected from the dumping area and in damaged condition. FB1 concentration was found 15.0 μg/kg. The sample 4(s-4) is found contaminated with FB2 with 15.780 μg/kg concentration. **Conclusion:** Based on the results, it can conclude that corn samples collected from the dumping area of godown are found more contaminated with mycotoxin (FMS) than the other sample collecting area such as storage area and harvesting area.

Key words: Corn, fumonisins, liquid chromatography and mass spectrometry, mycotoxins

INTRODUCTION

Mycotoxins are secondary toxic metabolites released by some fungi. Different types of mycotoxins in the world most frequently observed and mostly affects health of humans and livestock are ochratoxins A, aflatoxins, and fumonisins.[1] Fumonisins are majorly produced by *Fusarium verticillioides* and *Fusarium proliferatum* strains. This fumonisins (FMS) group contains FMS Type A1 and A2, these are produced in very small amounts and nontoxic. The other type contains B1, B2, B3, and B4,[2] among them, B1 is the most toxic and abundant toxic substance produced by certain fungal strains. The B1 and B2 are majorly found contaminants in corn (maize).[3] Chemically, FMSs are made of two methyl groups and single amine groups (-NH2), 1-4 (-OH-), and bistricarboxylic ester groups present at different positions along with the (c-18) polyketide backbone. FMSs are having structural similarity to sphingosine and these are involved in the process of cell signaling, communication, and growth. FMS B1 chemically called as: 1, 2, 3-propanetricarboxylic acid, 1, 1′-[1-(12-amino-4,9,11-trihydroxy-2-methyltridecyl)-2- (1-methylpentyl)-1,2-ethanediyl] ester whose molecular formula is: C34H59NO15

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Received: 22-03-2022
Revised: 16-05-2022
Accepted: 27-05-2022

and molecular weight is: 721.[4,5] The contamination of crops or stored foods by FMS is due to agro climatic conditions.[6]

Dietary utilization of FMS causes many abnormal health conditions in both humans and animals. It increases risk factors to increase in esophageal cancers. This compound is also showing effects on the liver and also acts as nephrotoxic in many animal species, these toxins are also responsible for, pulmonary edema syndrome in pigs, and apoptosis in many other types of cells.[7] Every year 25% of harvested crops are affected due to mycotoxins contamination, which causes a huge economic loss to the agriculture and industrial sector. The aggregation of FMSs observed in different developmental stages of kernel. Due to Lower humidity, kernels lead to destruction by insects and also causes the growth of FMSs in plants.[4] These FMSs are stable in food items and will not eliminate during the processing, cooking, backing, pasteurization, and roasting. Grains contaminated with moderate amounts of FMS are known to be toxic to either horses or swine.[8] Hence, it is necessary to detect the FMS and their contamination levels in various foods items in their processing stages. The most accurate methods to detect the contamination of FMS s are high-performance liquid chromatography (HPLC) with fluorescence detection and/or mass spectrometry and/or enzyme-linked immunosorbent assays. Liquid chromatography mass spectrometry (LC-MS) has capability to multiplex several analytes with in a single analytical run. It provides superior specificity, sensitivity, and accurate compared to other analytical techniques. In recent years, HPLC-MS applications in agri sector are among the fastest developing fields. The present study is aimed to LC-MS determination of FMSs contamination in maize samples collected at different storage and harvest conditions.

MATERIALS AND METHODS

Samples

Total 24 Maize (Corn) samples have been collected and among them 10 samples at dumpig area, 11 samples at storage area, and 3 samples at harvesting area. The sampling points for FMSs are collected from harvesting area, storage area godowns, and dumping areas located at the godowns and agricultural markets situated in different locations in Karnool, Kadapa, Anatapur, and Guntur Districts in Andhra Pradesh, India.

Chemicals and solvents

All the solvents used for LC-MS analysis are HPLC grade chemicals and chemicals used for the extraction and preparation of samples are analytical grade. Methanol and water (HPLC-grade) were acquired commercially from Thermo Fisher Scientific India Private Limited, Mumbai. The HPLC grade acetonitrile was purchased from the Merck Chemicals Private Limited, Mumbai. The other chemicals such as formic acid purchased from Thermo Fisher Scientific India Private Limited, Mumbai. The standard FMSs (B1 and B2) and the extracting solvent Supelclean® primary secondary amine (PSA) were purchased from Sigma Aldrich, Bangaluru, India.

Standard solutions

The standard FMS B1 and FMS B2 stock solutions were prepared by dissolving standard FMSs in mixture of acetonitrile and water (50:50 v/v) as a diluent solvent. About 100 mg of FMS B1 and FMS B2 are weighed and taken in to 100 mL volumetric flask. About 10 ml of diluent added and sonicated for 15 min to prepare 1000 µg/mL each FMS B1 and FMS B2 as combined standard stock solution. This standard stock solution was further diluted with diluent to prepare 2, 5, 20, 50, 100, and 400 µg/mL of calibration solutions.

Instrumentation

The instrument was worked and incorporated with Waters 2695 Alliance HPLC system (waters Corporation, Milford, MA, USA) consisting of quaternary pump, column chamber with temperature control, auto injector, online degasser, and ultra violet detector (water 487 model). The liquid chromatography is interfaced with a mass spectrometer coupled with an electrospray ionization source operated in the positive mode. Mass spectrometry analysis was carried out with Micro mass ZQ mass detector model LAA 1369 (Micromass Ltd, UK). The chromatography and mass data interpretation were carried out with masslynx software.

Sample preparation

Extraction of mycotoxins FMNs for LC-MS analysis was performed by method described by.[9] The corn samples picked from different areas (Dumping area, harvesting area, and storage area,) are made to dried and grind to a fine meal with laboratory mill. 2 g of the sample was accurately weighed and taken into a 50 mL polypropylene tube. 20 mL of methanol/water (3:1 v/v) added and placed in ultrasonic water bath for 10 min at room temperature for sample extraction. 25 mg PSA of 5 ml plastic centrifuge with aliquot of the extract (2 ml) was mixed. This solution was shacked vigorously and tube was centrifuged for 5 min at 5000 rpm. Supernatant was discarded and 2 mL of 1.0% formic acid in methanol was added in tube. The supernatant was diluted with water in 1:1 (v/v) proportion. Preceding final instrumental examination, test solution was shifted to 0.2 µm nylon layer filter.

The estimation of FMS by HPLC-MS analysis

Determination and estimation of mycotoxins FMSs by LC-MS analysis were performed by method described by Yang and Wu.[9] HPLC carried out with stationary phase of Zorbax Eclipse XDB-C18 column (150 mm × 2.1 mm, 3.5 µm) with temperature (column temperature) is 30°. Mobile phase of methanol: water: formic acid in the ratio of 75:25:0.2(v/v) has been used as eluent with flow rate of 0.2 mL/min. The injection volume was 10 µL. The observation was carried out onESI (Turbo Ion Spray) positive ion mode in the range of 40–1000 amu. The following FMS B1 and B2 mass operating conditions are: The nitrogen gas flow 3.8 bar; desolation gas temperature 350°C, temperature of source lamp 120°C; capillary voltage, 3.5 kV; cone; 40V, and extractor voltage 3V. The detection was carried out in multiple reaction monitoring mode.

RESULTS AND DISCUSSION

Agricultural commodities, products, and foodstuffs consist of variety of molecules with diverse structural characteristics, biological properties, and nutritional values. Among them, some of the compounds such as starch, triglycerides, and fatty acids are the large molecules and some of them such as flavonoids and phenolic compounds are less in minor components. Some of the undesirable compounds such as pesticides and mycotoxins are very less components. Various studies have been reported for contamination of mycotoxins in agricultural, food, and feed samples especially aflatoxins in India.[10-12] FMSs are the mycotoxins produced by *F. verticillioides* and *F. proliferatum* strains. Among all other sub group compounds of FMSs, Type B1 and B2 Figure 1 are found very frequently found toxic compounds and B3, B4, A1, and A2 are produced in very small amount and non-toxic. Dietary utilization of FMS causes many abnormal health conditions such as esophageal cancers and nephrotoxic in both humans and animals. It increases risk factors to increase in esophageal cancers. Hence, it is necessary to detect the FMS and contamination levels in various foods items in their processing stages. Liquid chromatography coupled with mass chromatography is used in many industries such as pharmaceuticals, biopharmaceuticals, forensic, industrial, food, and environmental sector. LC-MS technique has always been desirable due its sensitive and highly specific nature of MS compared to other chromatographic detector.

About 24 corn samples were collected in different locations such as harvesting area, storage area, and dumping are of godown for determination of contamination by FMSs. The images of collected samples are presented in Figure 2 and the condition of the samples is reported in Table 1. The comparison of FMSs contamination with respect to the collected area also done. Before analysis, a simple extraction step is required to concentrate the analytes of interest and eliminate non-desirable matrix components. This is particularly important for analysis of FMSs because low regulatory limits established for FMSs and the large sample size required to obtain necessary method sensitivity. The retention time of the well-defined peak of FMS B1 and B2 was found 1.15 min and 2.59 min which is similar to the obtained method. Standard calibration curve was plotted for quantification of FMS [Figures 3 and 4]. Figure 5 shows the standard chromatogram of FMS B1 and B2 standard mixture solution and individual injections are run for conformation of FMS B1 and B2. The blank chromatogram is presented in Figure 6. The precursor ion of the FMS B1 obtained from ESI was the adduct [M+H]+, m/z 706 for FMS B2, and m/z 723 for B2 which is similar to the theoretical mass value of m/z 706 for FMS B2 and m/z 722 for B2, respectively. The mass spectra of standard chromatogram of FMS B1 and B2 are

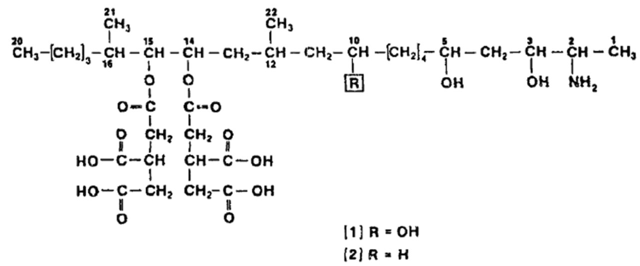

Figure 1: Chemical structures of FMS B1 and FMS B2[6]

Figure 2: Images of corn samples collected in different locations

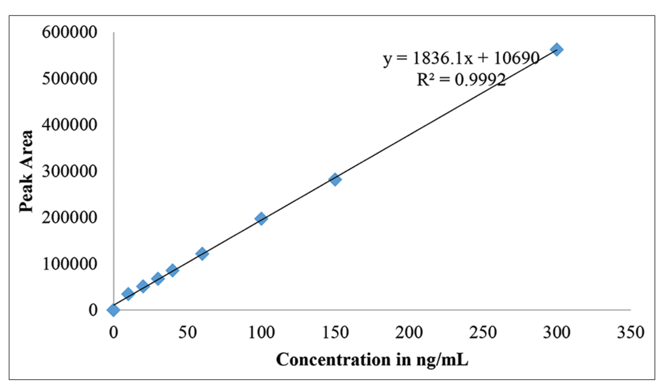

Figure 3: Standard calibration curve of FMS B1

Table 1: The representing the list of samples collected in different area and their moisture value with physical condition

Sample	Location	Moisture	Physical condition
S1	Dumping area	15.3	Damaged
S2	Storage area	14.3	Slightly damaged
S3	Harvesting area	14.0	Good
S4	Dumping area	14.9	Damaged
S5	Storage area	13.2	Good
S6	Storage area	13.3	Damaged
S7	Storage area	14.7	Damaged
S8	Dumping area	15.0	Damaged
S9	Dumping area	17.5	Damaged
S10	Dumping area	21.2	Damaged
S11	Dumping area	16.4	Damaged
S12	Harvesting area	14.6	Slightly damaged
S13	Storage area	13.0	Good
S14	Dumping area	13.8	Damaged
S15	Storage area	14.9	Slightly damaged
S16	Harvesting area	14.2	Good
S17	Storage area	17.6	Damaged
S18	Storage area	17.9	Damaged
S19	Dumping area	22.6	Damaged
S20	Dumping area	20.3	Slightly damaged
S21	Dumping area	18.3	Slightly damaged
S22	Storage area	19.7	Damaged
S23	Storage area	22.4	Slightly damaged
S24	Storage area	15.1	Good

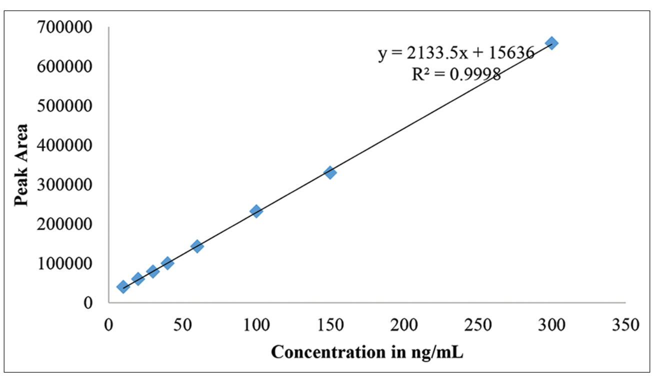

Figure 4: Standard calibration curve of FMS B2

represented in Figure 7. The calibration curves of FMS B1 and B2 are retrieved by plotting the concentrations in µg/ml (10, 20, 30, 40, 60, 100, 150, and 500) versus peak area of two compounds. The regression equation is y = 1836.1x + 10690 for FMS B1 where y = 2133.5x + 15636 for FMS B2 with the correlation coefficients(r) of FB1 and FB2 is 0.999 and 0.999, respectively. The retention time and product ion spectra of FMS B1 and B2 in the corn sample were similar to those of the standard solutions. Figures 8 and 9 represent the chromatograms of sample 7 and 20. The contamination of FMSs study is evaluated by analyzing 24 corn samples which are collected from the various types of locations such as harvesting area, storage area, and dumping area. Among 24 samples, about seven corn samples were found positive contamination by FMSs when subjected to LC-MS analysis. The list of corn samples contaminated by the FMSs and their concentrations is presented in Table 2. A high amount of FMS identified in sample number 7(s-7) which is collected from the dumping area of storage godown. The fungal damaged sample was found B1concetration of 242.11 µg/kg and FB2 of 117.15µg/kg. The concentration of FB1 is very high in the sample compared to the regulatory guidelines limit. The low amount of FMS is identified in sample number 8(s-8) which is collected from the dumping area and in damaged condition. FB1 concentration was found 15.0 µg/kg. The sample 4(s-4) is found contaminated with FB2 with 15.780 µg/kg concentration. FB1 and FB2 were not found in remaining other 17 samples as no peak was found similar to the standard retention times of FB1 and FB2. Based on the results, it can conclude that corn samples collected from the dumping area of godown are found more contaminated with mycotoxin (FMS) than the other sample collecting area such as storage area and harvesting area. The abundance of B1 and B2 compared and presented in Figure 10. The impact of moisture content in the FMSs contamination also assessed and presented in Figure 11. The damage of the corn is found high in samples with high moisture content and similar fungal contamination was observed.

Similar contamination studies are reported by various authors for determination of FMS in feed and corn samples. The study of[13] reported feed contamination by FMS B1 up to 8 mg/kg affected about 9700 hens with sticky diarrhea, egg production, rapid decrease in take-feed and body weight highly reduced, and death in Andhra Pradesh state, India. Similarly, Jindal *et al*., (1998)[14] were reported the FMS B1 contamination in mazie and poultry feed samples collected eight districts of Haryana state in India. He reported 91% of maize samples ranged from 0.1 + 87.0 ppm and 84% of poultry feed samples ranged from 0.02 to 28 ppm were contaminated with FMS B1. Asrani *et al*.[15] studied the effects of feeding Japanese quail with *F. verticillioides* cultures containing known amount of FMS B1. The quails supplemented with 300 ppm of FMS B1 and found symptoms such as ruffled feathers, reduced feed and water intake, poor body growth, and greenish mucus diarrhea with 59% mortality. About 30% birds have showed the nervous signs and increase in aspartate transaminase and alanine transaminase, concentration of total serum and albumin, serum calcium and cholesterol levels, and creatinine. Waliyar *et al*.[16] have studied the mycotoxins

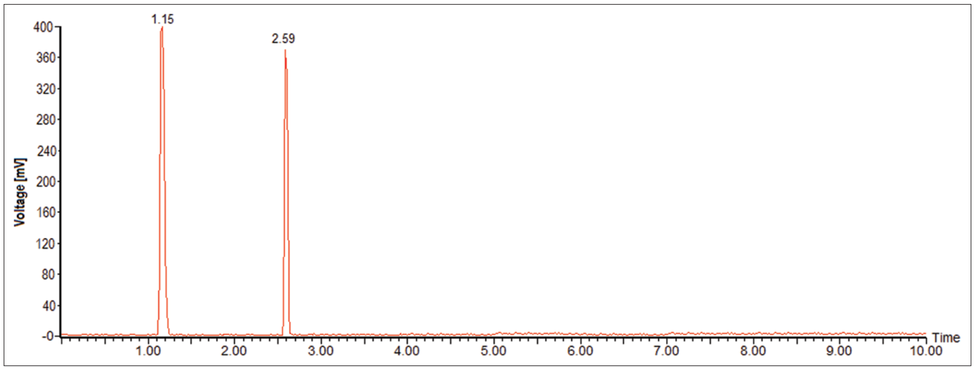

Figure 5: Standard chromatogram of FMS B1 and B2 (Rt 1.15 represents the B1 and Rt 2.59 represents the B2 FMS)

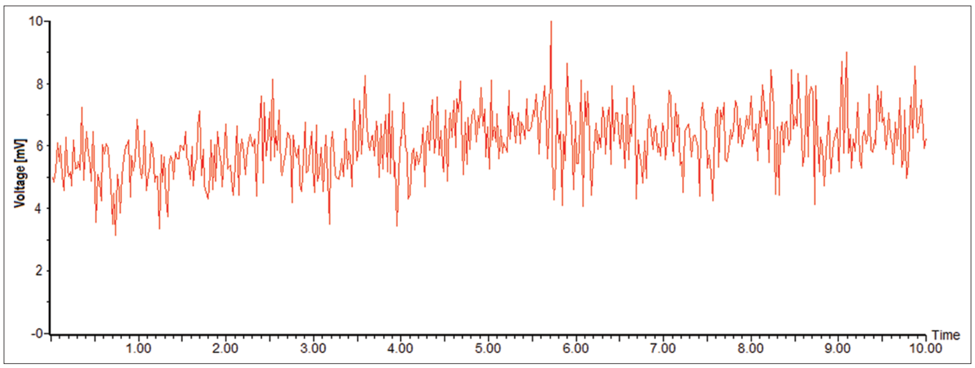

Figure 6: Blank chromatogram

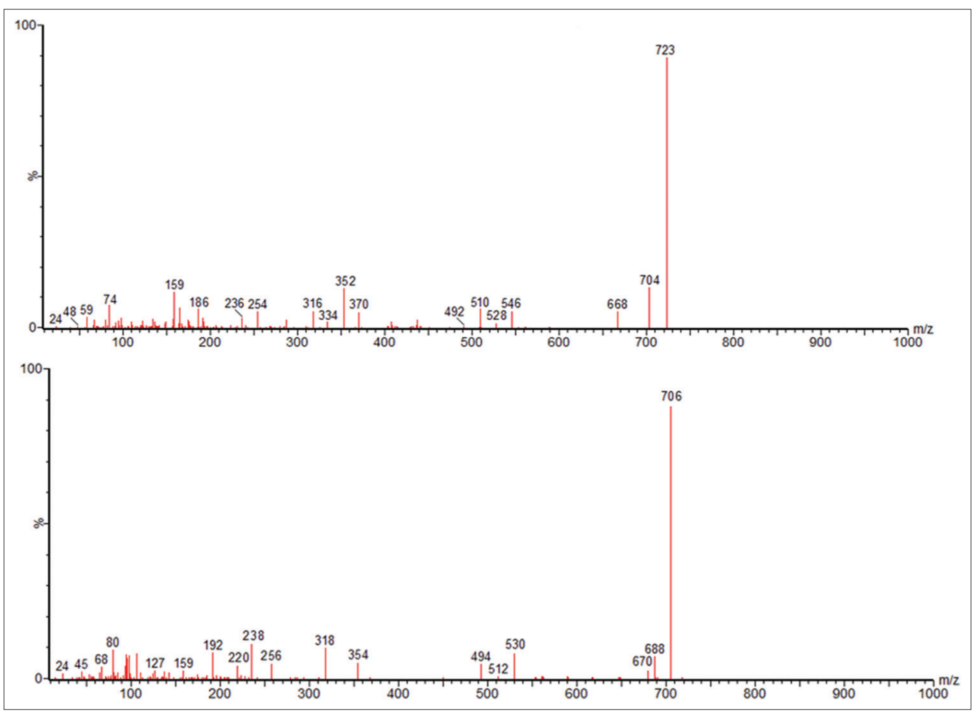

Figure 7: Mass spectra of FMS B1 and B2 (m/z 723 represents the B1 and m/z 709 represents the B2 FMS)

contamination (aflatoxins and FMSs) in sorghum grain samples in Andhra Pradesh and Maharashtra samples. The higher aflatoxins levels in Andhra Pradesh samples were found 0–362 μg/kg and lower levels of FMS contamination were found in Maharashtra samples. The European commission has recommended the FMSs contamination levels range 5 ppm for pets and 50 ppm for adults. Maize is the essential for protecting the livestock and animal feed.

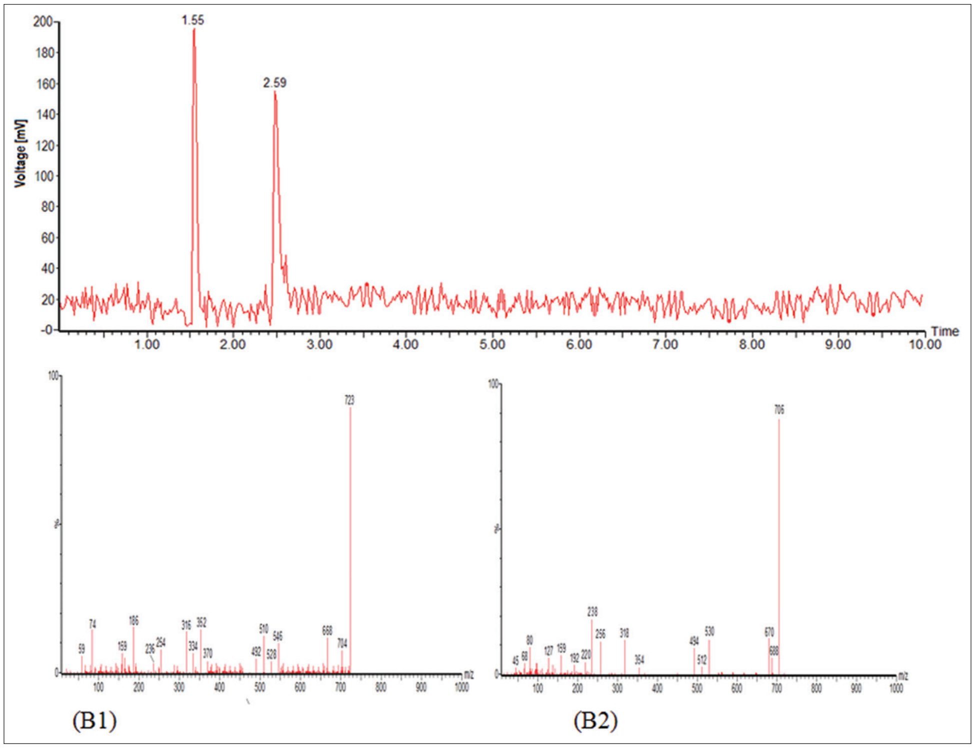

Figure 8: Chromatogram and mass spectra of Corn sample number 7

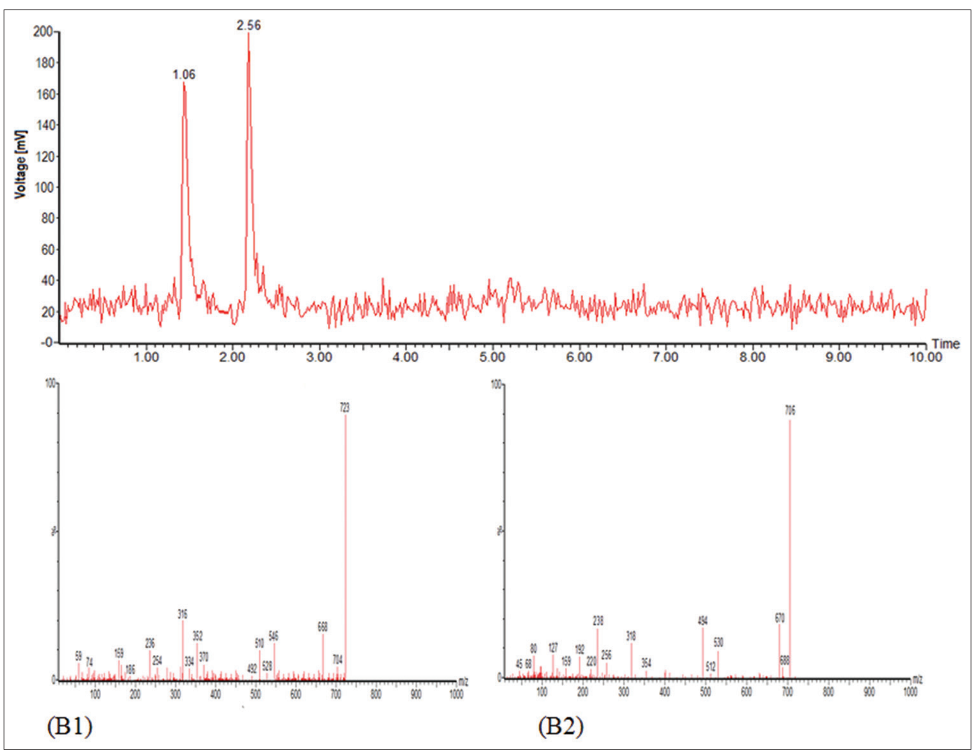

Figure 9: Chromatogram and mass spectra of Corn sample number 20

The FMNs are the common mycotoxins that contaminates maize. The acceptable limit of FMSs in feed products is not more than 5 ppm for horse and 100 ppm for other animals as the US FDA guidance levels.[17] The dumping area of the storage points found more contaminated by the fungi where more damaged samples are present and the content of the FMS also found high than the allowable limit. Therefore, monitoring these FMS in corn samples should be continued and maintenance of the dumping areas at different storage points with control methods is recommended.

Table 2: Results of FMS estimation in positive corn samples

Sample	Fumonisins compound	Amount estimated in µg/kg
S2	B1	42.25
S4	B2	15.78
S7	B1	242.11
	B2	117.15
S8	B1	17.14
S10	B1	47.69
S17	B2	72.18
S20	B1	106.67
	B2	38.06

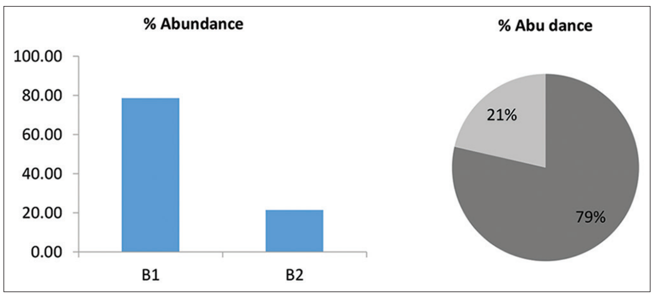

Figure 10: Comparative graph of the abundance of B1 and B2 in positive corn samples

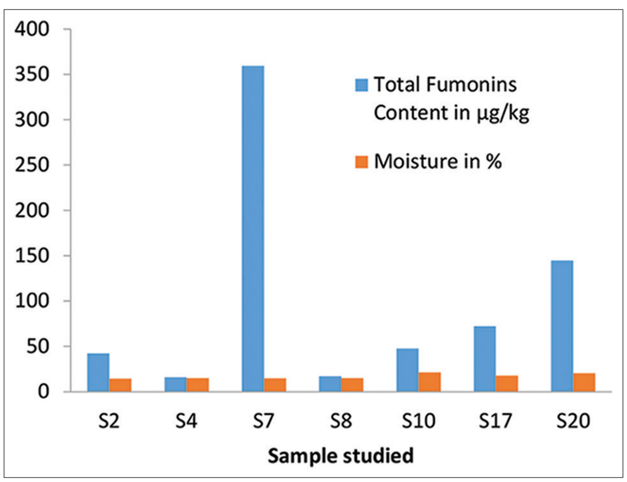

Figure 11: Comparison graph of impact of moisture content in the total FMS concentration in positive corn samples

CONCLUSION

The present study investigated the FMS contamination in corn samples collected from different locations. The study results confirm the fungal contamination and exceeding amounts of FMSs presence in the collected samples. Among 24 samples, about seven corn samples were found positive contamination by FMS when subjected to LC-MS analysis. Based on the results, it can conclude that corn samples collected from the dumping area of godown are found more contaminated with mycotoxin (FMS) than the other sample collecting area such as storage area and harvesting area. As the exceeding FMS concentration are observed in the dumping area of storage godown, it is not an alarming situation for FMS contamination in corn. The assessment of corn samples during the storage helps the processing chain by cautioning the usage of contaminated corn. The exceeding of FMS concentration than regulatory levels can cause synergetic effects to human and animals. It is necessary that efficient control methods are to prevent and monitor contamination of FMS in corn and other food grains.

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Source of Support: Nil. **Conflicts of Interest:** None declared.

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"Kanpur Philosophers" ISSN 2348-8301 is an international journal of Humanities, Arts, Culture, Law, Modernity and other allied disciplines of Historical and Sociological studies and research.

"Kanpur Philosophers" is biannually published in English, Hindi and Sanskrit languages by "New Archaeological and Genological Society" Kanpur India, a registered organization with wide registration no. 346-2009-2010 under societies registration act 21, 1860.

Editorial Board

Kanpur Philosophers
ISSN 2348-8301
International Journal of humanities, Law and Social Sciences
Published biannually by New Archaeological & Genological Society
Kanpur India

Vol. X, Issue I(F) : 2023

A STUDY ON CAREER STARTS WITH TCS (TATA CONSULTANCY SERVICES) EMPLOYEES - AMENITIES WITH WORK-LIFE BALANCE

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Abstract

According to a recent check conducted by Job buzz, youthful Indian professionals prefer to work for transnational pots. Out of a total number of 8000 replies, roughly 22 % were of the opinion that MNCs offer a better pay package; around 1000 replies say it's because of a better work-life balance; and another 1300 said they prefer multi-nationals because of the well-defined career path TCS is one of the top-notch transnational information technology service, consulting and business results companies in the country. Nearly every IT graduate aspires for a job in Tata Consultancy Services (TCS). Being placed then a dream come true for them. But it requires thetop-most grades and unknown aptitude for a successful TCS career. Working at TCS can be an enriching experience as the company offers a superb working terrain and a transparent elevation system. The career or job scale is like the scale within any IT company. It starts with the intern or trainee at the nethermost position and moves forward towards the loftiest position positions as the hand earnings experience and knowledge. TCS is treated as veritably good company for Fresher's. It provides job security, and good pay to freshers piecemeal from it there are numerous retired benefits of joining TCS for Freshers. I'm describing retired benefits. Health insurance- 2 lakh for hospitalization, Food rates- minimum in the canteen, Advanced education it provides advanced education for the workers, Access to the library- TCS gives access to the library for workers, Abatements on shopping, On time payment, Great literacy openings, Work with foreign guests, Payment of your quantum, Fun conditioning. Holistic well-being programs within TCS promote a healthier life, offer work-life balance, and take into account emotional health.

Keywords: Job buzz, transnational pots, work-life balance, career path, transparent elevation system, job security, health insurance, canteen, library.

Introduction

There must be some work to live, but that work should not be life. Nowadays, the gap between professional life and personal life is blurred for many people. Especially time for personal life is lost. They are living such a busy life that they cannot take care of their family and personal needs. As most of the day is devoted to working, personal life shrinks, resulting in increased frustration. Showing frustration on others creates more problems. Physically and mentally tired and suffering from diseases. Career satisfaction is achieved only when there is a balance between work life and personal life. Physical and mental health is good. Relationships are healthy. But the real challenge is achieving this balance that is so beneficial to your well-being. It is not easy to come by.

By understanding the significance of maintaining a healthy work-life balance, anyone will get motivated to take the necessary way for achieving this balance. Work-Life balance is profitable for the workers and association as well. A balance between work and particular life helps in perfecting hand productivity, morale and health condition. In fact, work-life balance should be a precedence for all of us. An imbalance in any of the fronts will make life delicate and pose several hazards or challenges in terms of health, happiness, and emotional stability.

Tata Consultancy Services

Founded by Jamshedji Tata in 1868, the company gained international recognition after acquiring several international companies. Each Tata company operates independently under the guidance and supervision of its own board of directors, and shareholders. Recognized as the founder of the Tata Group, Jamshedji Tata is sometimes considered the 'Father of Indian Industry'.Tata Consultancy Services (TCS) is the largest IT Company in India. It is a subsidiary of Tata Group. Its head office is located in the city of Mumbai, India. TCS operates in 149 locations covering 46 countries.In April 2018, TCS became the first Indian IT company to reach $100 billion market capitalization. Brand Finance 2022 Global 500 Report has named Tata Consultancy Services (TCS) as the second most valuable brand in IT services worldwide.Tata Consultancy Services Limited originally started as "Tata Computer Systems", was established in 1968 by Tata Sons Limited. In 1980, TCUS established India's first software research and development center, the Tata Research Development and Design Center (TRDDC) in Pune.Tata Consultancy Services Limited is an IT Services, Business Solutions, and Outsourcing organization. The company offers a consulting-based, integrated portfolio of IT-based services including Application Development, Maintenance, Business Intelligence, Enterprise Solutions, Assurance Services, Engineering, Industrial Services, Infrastructure Services, Consulting, Asset Leveraged Solutions, and Business.It operates in the following segments namely Banking, Financial Services, & Insurance, Retail & Consumer Business, Communication, Media, & Technology etc. Tata Consultancy is a part of Tata Group (India), the largest multinational business group. It has more than 5,92,000 of the world's best-trained consultants in about 55 countries. The chairman of Tata Sons is usually the chairman of the Tata Group. As of 2020, there have been seven chairmen of Tata Group.

- Jamsetji Tata (1868–1904)
- Sir Dorabji Tata (1904–1932)
- Nowroji Saklatwala (1932–1938)
- J. R. D. Tata (1938–1991)
- Ratan Tata (1991–2012)
- Cyrus Mistry (2012–2016)
- Ratan Tata (2016–2017)
- Natarajan Chandrasekaran (2017–present)

Mission

The TCS Reality is a diverse and innovative company comprising of professionals and individuals sharing a common goal and commitment to provide the highest level of professional service and expertise to the people of our community.

Vision

To be the most trusted and respected company setting the highest of standards for ourselves and empowering customers and clients through knowledge and expertise to achieve their real estate goals.

Values

Honesty, Accountability**,** Respect, Code of Ethics and Standards of Practice, Family Culture**,** Leading Edge Service, Growth through innovation

TCS Recruitment Process

The TCS recruitment process consists of four rounds of selection and includes:

- **Written exam**
    - Quantitative Aptitude
    - Programming Language Efficiency
    - Coding Test and
    - E-mail Writing

Be especially careful while trying the dispatch questions as that's a crucial elimination round. See that you follow the precise instructions while trying the question.

- **Specialized interview**

This round is grounded on your capsule, branch of specialization, favourite subjects, etc. Be set to answer introductory questions relating to each of these motifs. Don't be surprised if you're asked to write law. Also be ready to answer mystification questions. In certain cases, the canvasser may also try and confuse/ mislead you into giving the wrong answer so watch out for similar trick questions.

- **Directorial interview**

A lot depends on your canvasser in this round. You could either be asked general specialized and HR questions, or it could be a pressure interview to hand your responses. Achievements mentioned in your CV could be questioned, and you may need to defend them. Alternately, you could be asked general questions about your work experience, council degree, specialization, amenability to dislocate, etc. In any case, no way fail to be gracious irrespective of which direction the interview takes.

- **HR interview**

Anticipate questions on work experience, education, pursuits and family background piecemeal from the usual HR questions like strengths and sins, reasons for applying to the company, why you should be hired, etc. Utmost campaigners tend to suppose that the HR interview is easy, but flash back that a bad HR interview could end your chances of getting the job indeed after passing all the former obstacles (aptitude test, specialized round, etc.). The key then to remain polite and confident. Interviews can be long and teary so do not forget to wear a smile! With TCS being named one of the world's top employers by the Top Employer Institute for successive times, a career at this company could be rich and satisfying experience for job campaigners. In order to be eligible you need to have a minimum of 60% throughout your degree with no backlog. A gap in career up to a maximum of two years is permissible but with a valid explanation

TCS Career Hierarchy

Working at TCS can be an enriching experience as the company offers a superb working terrain and a transparent elevation system. The career or job scale is like the scale within any IT company. It starts with the intern or trainee at the nethermost position and moves forward towards the loftiest position positions as the hand earnings experience and knowledge. To understand the career scale at TCS more, you can go through the following given information.TCS taken performance appraisal given below.

a. Project end appraisal for fresher's: a. Fresher's can apply to appraisal called for as first anniversary performance appraisal.B. Need to apply before 2 months of eligibility.C. Path – Ultimate's – speed – first anniversary appraisal.
b. Annual appraisal for experienced.
c. Setting all the goals and attributes.

TCS updated the anniversary policy for Experienced and freshers

Date of Anniversary in ongoing Financial year	Type of appraisal to be initiated in the ongoing Financial year
April & May	Annual Appraisal
June to January	Project end Appraisal from date of anniversary to end of Financial year
February and March	No appraisal for the ongoing Financial year

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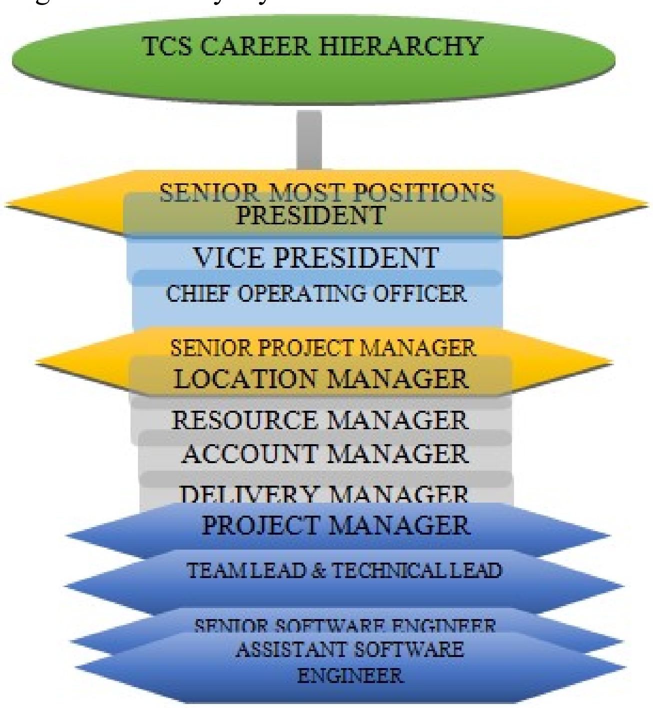
Career Management

TCS has multiple initiatives to help employees grow in their careers.

- XCELERATE is an integrated platform to capture associates' aspirations and map them to future opportunities.
- ICONNECT is a highly collaborative tool designed to help employees reach out to senior mentors for guidance on career paths, and have face-to-face dialogues about their roles and career. It provides flexibility for group mentoring as well as individual mentoring.
- INSPIRE is the high potential program for mid-level employees. It helps identify high potentials as early as possible, invest in them continuously, enable accelerated growth and transition them to leadership roles, and reward and recognize the success of their efforts.
- TALENT REVIEW is TCS process to assess and review the leadership pool in the organization. It enables leaders to share their career aspirations and preferences of mobility, followed by an assessment of their leadership attributes. The objective of the program is to create and sustain healthy leadership.
- EXCITING OPPORTUNITIES is the internal platform to publish niche and critical requirements to the leadership and high potential communities, thereby facilitating talent mobility. This embodies the company's philosophy of giving the first right of refusal for all leadership positions to internal candidates, thereby enabling better leadership development and building strong organizational loyalty.



Research Methodology

The present research is based on descriptive research design which tries to explain the relationship between career growth and benefits with work life balance. Employee performance is considered as dependent variable whereas work life balance is considered as independent variable. In this study data is collected secondary sources of data. For collecting Secondary data, TCS website in different articles, and research papers published in various journals, and different job portals-employee reviews are taken.

Objectives of the Study

1. To learn the components prompting the status of work life in TCS.
2. To understand the amenities provided by TCS to its employees
3. To study the existing system of Work-Life Balance of Employees in TCS
4. Seeking an entry- position to begin my career in a high-position professional terrain. apply strategies to ameliorate their adaptability and better manage with stress

Importance of the Study

- Prioritizing your health and heartiness
- freeing from technology from time to time
- Taking short breaks during extended working hours
- Chancing work that you enjoy doing
- Setting boundaries during off- work hours
- Making time for musketeers and family
- Picking up pursuits you enjoy
- Engage in employer-patronized conditioning outside of the plant

Literature Review

Seema Sharma(2018), in hear study said that reaching for the sky has come a habit with Aarthi Subramanian, The first woman to be appointed to the board of Tata Consultancy Services(TCS), Ms Subramanian has banked on gift, industriousness and resolve to find and fulfil her life's calling. And a luxurious calling it has been. Appointed as administrative director to the TCS board in March 2015. Ms Subramanian has operated in a variety of pivotal positions at TCS and has worked in, besides India, Sweden, the United States and Canada. She opens up in this interview with Christabel Noronha on the road that has brought her this far and the gests that have amended the trip. I like to call it work- life prioritisation because I do not know if there's a 13 balance. Either, a company like TCS gives you the openings and inflexibility to manage your constraints. TCS is a huge company and professional atmosphere is what we liked the most. Lot of conditioning related to social Seema Sharma (2018), in hear study said that reaching for the sky has come a habit with Aarthi Subramanian, The first woman to be appointed to the causes take place every now and also. Hand engagement conditioning is really amazing; similar as work life balance. My job is relatively gruelling and intriguing, good platoon work and job culture is another major factor that distinguishes TCS from other company's workers have worked with.

Ritu Anand, Vice President and Deputy Head of Global HR, TCS, say "The knowledge assiduity is characterized by a veritably youthful and dynamic pool. The new strain of IT professionals Aspires for a work terrain that's holistic, balanced and complete. A flexible work Environment and work- life balance are crucial motorists of hand satisfaction. "

Pranav Mittal (2020), set up in his study that People working in software assiduity find it veritably hard to maintain the work- life balance. Still, 23 people believe that TCS offers them occasion to balance their work as well as their particular life. Another important factor that lures the pool towards TCS is the company's work terrain. About 16 of workers suggested TCS for furnishing a favourable and healthy work terrain. Associates are the people with whom you spend utmost of your time at plant. Also, for running a design successfully, an understanding and collaborative platoon is an absolute necessity. About 15 of the repliers say that it's one of the major reasons they're associated with TCS. People tend to like a company that understands the requirements of its pool. A hand-friendly leave policy and regulations are among the top five reasons why people continue to work with the establishment. 14 people have approved of TCS of having good leave policy.

Sandeep Mellam(2021), said the impetuous response to the COVID- 19 situation and lockdown was to allow the workers to work from home(WFH). Numerous companies are now switching to endless work from home, with top companies similar as TCS planning to allow 75 of its workers to work from home by 2025. Nearly half of the workers who are working ever from home are happy with their job and don't want to change the way they work in the near future. Transformation to work from home is one of the biggest challenges HR directors are facing in this epidemic script. When the WFH accreditation was arrived at, some associations were suitable to acclimatize more snappily than others. The primary reason is the capability of the structure and the mind set to identify, embrace and execute new technologies. The druggies need a tool which can be penetrated from anywhere using any device with insignificant commotion. A productive terrain for remote working requires a strong, loyal, secure and scalable operation that supports positive hand productivity and collaboration.

Poojary Pallavi Poojary (2021), TCS pays a lot of attention to life outside work, especially the physical good of its workers. From sports clubs to marathons and gift events, TCS encourages workers to balance work with fun. A special citation has to be made about the significance given to fitness and physical health at TCS. Free spa access, periodic marathons. 15 are just many ways in which the platoon is encouraged to stay fit. Workers sounded to have a good work-life balance and authentically love the work that they were doing. TCS encourages its workers to continuously over-skill and keep up with trending technologies in the assiduity. It’s both in the company’s and the hand’s interest to do so as the assiduity becomes further and further skill-concentrated.

TCS Employee Amenities

1. **Job Security**
   - The most effective is job security in comparison against the other IT industries which attracts many senior employees join TCS.
   - I’ve not heard of any incident within TCS where employees are forced to quit because of cost-cutting or inadequate performance.
   - Firing very rare and your job id stable unless you violate any HR or Company policy.
   - In TCS, nobody will keep track of your actual working hours, the swipe in and out time that your credit card, just as other companies.
   - They keep track of both your swipe in and out, and if you fall short of the hours required, the payment is automatically taken off, or you are required to take a leave application for the day.
2. **Work Burden**
   - Integrating batch scheduling processes across diverse IT environments
   - Ensuring security for job scheduler databases
   - Reducing batch windows
   - Upgrading scheduler and software tools
   - Developing a single point of control in the service suite
3. **Compensation On Working Hours**
   - Regular timings is 8 hours per day. The company need employee services in extra time they are given OT (Over Time).
   - OT depending upon our basic salary 13% per hour
4. **Leave Policy**
   - Sick Leave: -
     - 3 days per month / 10 days per year

    - There is unexpired.
    - Carry forward to next year.
- Casual Leave: -
    - 7 days per year
    - There is expired
- Plane Leave: -
    - This is non-paid (Long Leave)
    - Informed before week to higher officer.
- Leaves: -
    - You get approximately 33 days of leaves(Other than public holidays and National holidays).
- Festive Leaves: -
    - 2 days per year based on Location / Culture.
- Earned Leave: -
    - 16 days per year
    - There is unexpired.
    - Carry forward to next year. Up to 48 days leaves only.
    - Not need to leaves to Earn cash to basic salary.
- Unpaid Leave: -
    - Leave without pay (Higher Education). After 2 years' experience to TCS
- Maternity Leave: - Maternity Benefit Act, 1961
    - 13 weeks leaves applicable for life time for twice.
    - Maternity Leaves for women not taking the paid maternity leave for after six months went back to work.
    - PATERNITY LEAVE – 5 additional paid vacation days for new fathers.

5. **Work From Home**
    - TCS also announced Vision 25x25 wherein by year 2025, only 25% of the workforce will need physically present in TCS offices in any point and an employee needs to spend no more than 25% of their time in a TCS office to be 100% productive
6. **Health Insurance**
    - Reimbursement up to of 6,000 Rs for medical bills and up to 2,00,000 rupees for hospitalization.
    - Health insurance covered for lesser premium in comparison with other companies
7. **Employee Allowance**
    - Shift allowance, night shift allowance, and overtime payment depending on working hours.
    - One (first) time marriage tax allowance available
8. **Higher Education**
    - If you also give an external certification and pass the exam, the organization that you work for will reimburse the amount you paid for the Certification exam
    - It supports in the higher education its employees TCS tie-up with other colleges and universities.
9. **Access To The Library**
    - Employees can access the Safari Books website
10. **Discounts**
    - TCS employees can get a discount of 5 % on any product of West Side.
    - TCS Employees can also get a discount of Rs. 10000 – Rs. 40000 for different models of Tata car.
    - Croma Store currently offers Rs 2000-3000 Discounts in Sling Box HD and Sling Box Pro HD.

- TCS Employees in Tanishq will Get 10% Discount on Making Charges
- Hotel Discounts for Tata and TCS Employees
- TCS employees can enjoy this TAJ group hotel at a very affordable price.
- TCS employees can get a 5% discount on any West Side product employees get Rs 2500-4000 off Voltas Window AC & Split AC.

11. **Learning Opportunities**
    - Lots of technical contests are also moving from the TCS that can help one to research your professional understanding.
    - TCS offers free education through internal sites like Involve. Some good educational videos are available on the TCS videos website.
    - There are always various webinars and session lists that are being held throughout the TCS locations.
    - It is only necessary to sign up to join the **Webex** or take part in the classes to take part in these training sessions.
    - Internal soft skill training, external training, web-based training, etc are available.
    - Professional Development – Leadership training, workshops, and communities are available which helps employees to prepare their future roles.
    - Language Courses (Twice a year)
    - Leadership Development – leadership and specialist opportunities program
12. **Salary On-Time**
    - TCS paid on-Time salaries
13. **Food Rates On The Cafeteria**
    - The price list of food at the canteens is low in contrast to this surface price list.
14. **Transportation**
    - If you're employed in changes, TCS supplies taxi support.
    - If a lady associate is in nightshift, she needs to be mesmerized by yet another gent partner for her staying place. As a portion of security,
    - Free transportation.
15. **Reimburse Your Amount**
    - In case you'd some outside certificates in just about any tech, TCS will repay the amount you paid for this certification exam.
    - Employee Family tour amount will repay.
16. **Fun Activities**
    - one of the most modern infrastructure facilities, including a Volleyball court and a basketball court. Badminton, Table tennis, Gym (with good instructors), a Yoga and Dance space, and many more.
17. **Shopping Mart**
    - TCS Employee can avail this below TAJ group hotels at very low price.
    - TCS Employee can avail discount of 5% on any product of West Side.
    - TCS Employee can buy 3 books by paying for 2 books
18. **Work With Foreign Clients**
    - TCS provides the opportunity to work with foreign clients based on our performance.
19. **Women Security**
    - THE 5S safety training program was designed by Tata Consultancy Services, which has over 100,000 women on its rolls and is one of the world's largest employers of women.
    - is one of the components of TCS' employee safety program, which is a half-day training module covering theory and practice sessions.
    - he 5S Strategy stands for Scan, Shout, Stun, Scoot and Share.
20. **Child Care**
    - Some offices have maintainedday-carecentreson-site.

- Reimburse the day-care amount.

21. **Technical Competition**
    - TCS CodeVita has helped spread awareness about coding, and introduce thousands of students to the concept of programming as a sport.
    - online programming competition has led to fulfilling careers at TCS for participants.
    - Its continuing success underscores an emerging recruitment trend – the gamification of hiring.
22. **Appreciations**
    - Appreciation awards/rewards for an outstanding performance like Star of the Quarter Award, Star of the Month Award, Best Team Award, Star of the Year Award, etc.
23. **Awareness Programmes & Safety Measures**
    - TCS takes lots of security precautions to be able to prevent fire injuries or every other emergency scenario.
    - In reality, they are going to provide you virtual training about what best to handle any emergency circumstance.
24. **Fit For Life**
    - The majority of those TCS offices have been posh green arenas with a lot of gardens and also walking trails.
    - You'd like taking a walk in the night or just sitting near the gardens (Yes you have the time to squander in gardens, It's enjoyable)
    - You may enjoy gymnasium facilities, and there's a well-maintained sports stadium in just about most the campuses. You may delight in attending them.
    - Availability of Gyms and relax rooms.
25. **Dress Code & Id Card**
    - Monday to Thursday Formal Dress, and on Friday Jeans and collar T-shirts for men.
    - Chudidhar and saree for women.
    - ID card is Mandatory.

Data Interpretation and Analysis

The study was conducted at the Jobbuzz website. JobBuzz is **a** research website that gives active and passive job seekers the knowledge and resources to make intelligent career decisions.It has user generated content about company reviews, ratings, interviews and salaries. The TCS reviews based upon most of the youngsters they career starts with TCS. The influencing factors are given below.

TCS Company Reviews

Reviews about TCS company overall rating 3.33/5. The totalnumber of respondents of the TCS company 148.3k. It's undertaken with a view to assessing the level of satisfaction of candidates and understanding the various factors influencing them to join the youngsters at the company.

Factors	Salaries	Work-Life Balance	Culture	Growth
Rating	**3.15/5**	**3.52/5**	**3.46/5**	**3.18/5**

The above-mentionedratings of the different factors say most of the reviewers feel happy to work with TCS

Conclusion

TCS maintains quality of work life to continue to attract and retain employment it will positively nurture a more flexible, loyal, and motivated workforce leading to reduce employee retention to stress. The TCS Companyneeds to be more flexible so that they develop their talented workforce and gain their commitment and tin competitive advantage the organizations must be concerned about their human resources who are their most important assets and take consistent and steadfast measures to improve them and employ high-quality work-life experiences. Remunerations and Compensations as per work along with additional monetary benefits play an important role in enhancing employee job satisfaction levels. Thus organizations need to be more concerned and sensitive about these factors.Availability and use of work-life balance practices, more provided by Management and their further support will cut back work-life conflict and the organization's productivity will increase.

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International Journal of Science Engineering and Advance Technology
IJSEAT
ISSN : 2321-6905

E-VOTING FOR UNIVERSITIES USING FACE RECOGNITION

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ABSTRACT

This report describes an online voting system designed to meet the needs of colleges and universities. Voting is a widely spread, democratic way of making decisions and can be used for electing student presidents and class representatives at the college level. The main objective of the proposed system is to develop a more secure and user-friendly voting system compared to the existing methods. The process of voting is critical in terms of safety and security. The proposed system allows the voters to scan their faces, which is then matched with the already saved images within the database. There is a high chance that the voter's choice to be revealed in the traditional system, which is not the case in this proposed system. By using face recognition, it provides enough security to eradicate the dummy votes. The system also provides clear visualization of data regarding the percentage of total votes cast, the percentage of votes each party secured, and the final winner in the election.

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Full Text: PDF [FULL TEXT]

REFBACKS

There are currently no refbacks.

As per UGC guidelines an electronic bar code is provided to seure your paper

International Journal for Modern Trends in Science and Technology, 8(03):118-120, 2022

ISSN: 2455-3778 online
DOI: https://doi.org/10.46501/IJMTST0803024
Available online at: http://www.ijmtst.com/vol8issue03.html

Face Mask Detection using Opencv

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To Cite this Article
Bakkathatla.Naga Bhargavi, Vanga .Tanuja, Kethe .Vara Prasad, Ganta.Krishna Chaitanya and K.Udaya Sri. Face Mask Detection using Opencv. International Journal for Modern Trends in Science and Technology 2022, 8(03), pp. 118-120. https://doi.org/10.46501/IJMTST0803024

Article Info
Received: 08 February 2022; Accepted: 10 March 2022; Published: 16 March 2022.

ABSTRACT

Coronavirus pandemic has quickly impacted our everyday life disturbing the world exchange and developments.These virus transmitted through droplets from one person to another person easily. Inorder to prevent this spreading of virus almost all of us need to wear a mask.Wearing a defensive facial covering has turned into another ordinary. Sooner rather than later, numerous public specialist co-ops will request that the clients wear veils accurately to profit of their administrations. Therefore, facial covering identification has turned into a pivotal undertaking to help worldwide society...

So our web application developed by using the methods open cv and tensor flow.Opencv which detects faces of a person and tensor flow detects whether the person is wearing a mask or not. This methods help us to detect whether the particular person is wearing a mask or not.If the person is not wearing a mask then the system finds out the particular person details from the database and then it sends a warning text message to the Admin of the institute who is monitoring whether the person wearing the mask or not.

1. INTRODUCTION

Covid 19 affects Many people in different ways. Most covid 19 affected people will develop mild symptoms to moderate illness and recover without hospitalization. The covid 19 pandemic severe affect on the social and economic trade around the world these pandemic disturbed the studies of the Young people are particularly vulnerable to the disruptions the pandemic has caused, and many are now at risk of being left behind in economic, education moments and health and wellbeing during a crucial stage of their life were develop By using mask we can protect ourself from virus.The development of an solution to detect if the person is wearing a face mask and allow their entry would be great help to the society.

We cannot keep an eye on every person whether they are wearing a mask or not while they are coming to work .Therefore the need of face mask detection takes place. In this model we are using the Convolutional Neural Network. It is a deep neural network model used for analyzing any visual imagery. It takes the image data as input, captures all the data, and send to the layers of neurons. It has a many layer, which processes which gives the output that is the prediction output of the image.

In this project we are maintaining dataset. The dataset consists of the attributes like Name of the person,image of the person .

In our web application we are using Opencv.It is an open-source library .which is primarily used for computer vision Applications that can be used to perform tasks like face detection, objection tracking, landmark detection, and much more. Opencv uses CNN algorithm to detect the image and analyze the visualary.

Tensorflow is used to detect whether the person wearing a mask or not.Here tensor flow uses DNN algorithm. If the person is detected without mask in the dataset then the system sends warning text message to the admin who is monitoring in the system to take safety measures.

EXISTING SYSTEM

Face mask detection is done by using the approach Convolutional Neural Network.Previously it can be done by using SVM, OpenCV,Naïve Bays .Convolutional neural network which is used to analyze the image.It takes image as input and then it assign importance to various object present in image to different one from another face mask detection system is capable to load the data both with and without mask.

2. PROPOSED SYSTEM

We use OpenCv to get the faces and tensor flow to search the mask on the person face. Here OpenCv uses the CNN model to detect the face of the person in the live stream video for to improve the accuracy and efficiency of the detection we use ImageNet CNN .CNN is used for analysing the image into subparts and gets the charecteristics of the person in the live video stream. Tensor flow uses DNN model to detect whether person wearing a mask or not .Next once again opencv model is used to detect the person.Tensorflow model is used to detect the person who is not wearing a face mask.If the identified person's details are in the dataset, then it will a sent a text message to the operator of this web application that they are not wearing a mask and if the person details are not identified then the person image is stored in the dataset.

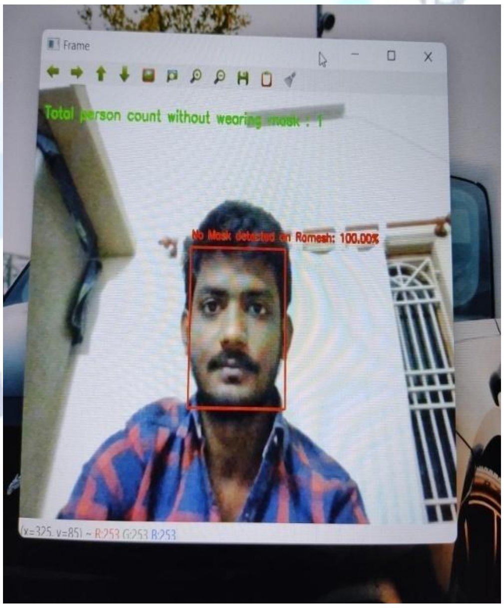
In this system the loaded dataset is first trained and after that the data is tested. The webcam is involved for live streaming video.If the person is not wearing mask and their details are not in the database, then the captured image is stored.By implementing the web application and by using the image net CNN we can get the results more accurately and efficiently.

3. IMPLEMENTATION

(modules)

Let us visualize the total number of images in our data set of with and without mask.In the data agumentation the face that is detected from the live video stream. The detected face will rotate and flig in our data set.After that we split our data into two types that is training data and testing data.The training data set which consists of images of with and without mask ,By using CNN model the image is trained and then it will test with faces whether the faces contain mask or not.CNN model consists of various models by using this we build our model sequentially.Now we are training our model and fitting our image in the training set to our model. The face of the person is labelled with the rectangular bounded boxes .

If the face of person is detected with mask then a green color rectangular box otherwise red color rectangular box is displayed on the image of person .Green color box indicates the person with mask otherwise we represent withmask as 1 and without mask as 0. We are using open computer vision libraries to run number of loop to use web Cam.Our web system able to detect both the categories of with and with out mask of persons by bounding a box over the face of a person.



Without Mask

With Mask

4. CONCLUSION

By using OpenCV, Tensorflow we are able to detect whether the person wearing a mask or not. By wearing mask we can prevent ourself and others from this virus.

Wearing a mask and allowing the person to this society is a great help and by wearing mask we can protect people from these virus transmission through the face mask detection. .

5. FUTURE SCOPE FOR FURTHER DEVELOPMENT

Our present web application gives good results in group of person faces contain with and without mask. For detection of some people face masks , it gives good results.Our web application easily works on desktop just with live streaming video which was scrolled web cam.

It doesnot need any other third parties .It can easily run on web browser. Further, we will work to Implement these web applications to detect large number of people who were detected without a mask.We also implement to give accurate result and fast the process of detection. We also work to import these web applications in public places using ID details as dataset in order to import Challan on the people who are not wearing the face mask.

Conflict of interest statement

Authors declare that they do not have any conflict of interest.

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International Journal of Marketing and Human Resource Management (IJMHRM)
Volume 13, Issue 2, May-August 2022, pp. 27–33, Article ID: IJMHRM_13_02_005
Available online at https://iaeme.com/Home/issue/IJMHRM?Volume=13&Issue=2
ISSN Print: ISSN 0976 – 6421 and ISSN Online: 0976 – 643X
DOI: https://doi.org/10.17605/OSF.IO/GFUD

A STUDY ON SHARPENING SKILLS FOR THE WORK LIFE BALANCE FOR CAREER ASPIRANTS

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ABSTRACT

Skill implies the ability to attempt to something great or it means one's aptitude in playing out some work or errand. There are a lot of aptitudes which at whatever point acquired can lead you to the flood of accomplishment. There are various capacities which are required for one's work part to perform well and assurance one's calling advancement. These aptitudes may consolidate capable capacities, managerial capacities, definitive aptitudes, bunch building aptitudes, coherent aptitudes and principal capacities. In the event that one has a premium, any aptitude is frequently learned and competency on an equal are regularly achieved. an individual can hone the range of abilities, in the event that the person includes a development mentality, includes a resolve to discover, is in a situation to yield criticism from disappointments and difficulties, has the persistence and determination to acknowledge insight and has the starvation to turn into a specialist. Individuals that have recognized their ability must sustain and clean the ability however learning and information to make a magnificent life and vocation out of their ability. On the contrary hand we will recognize those ranges of abilities which are extensively fundamental for a development in our present vocation and life circumstances and start putting our time and energy in development those ranges of abilities. Henceforth, decide the abilities which will get you on top and work on them tirelessly. Once, you have gained those ranges of abilities, you have the best resources for fruitful returns.

Key words: Ability, Accomplishment, Advancement, Managerial Capacities, Competency, Starvation, Resources.

Cite this Article: M. Karuna Sudha and S. Babu Rajendra Prasad, A Study on Sharpening Skills for the Work Life Balance for Career Aspirants, *International Journal of Marketing and Human Resource Management (IJMHRM)*, 13(2), 2022, pp. 27–33.
https://iaeme.com/Home/issue/IJMHRM?Volume=13&Issue=2

1. INTRODUCTION

Regardless of whether we are grinding away, an occupation searcher, understudy, instructor or parent, or just keen on building up our key abilities, we will discover a lot of data here about fundamental abilities. We trust that this data and these assets will assist you with improving your own and expert life. We are energetic about giving top notch data and assets that assist you with learning and build up the abilities you need to benefit as much as possible from regular daily existence.

1.1. Defining Essential Life Skills

Certain abilities might be pretty much pertinent to you contingent upon your life conditions, your way of life, convictions, age, geographic area, and so forth Be that as it may, in 1999, the World Health Organization distinguished six key everyday issues abilities:

- Communication and relational aptitudes. This extensively depicts the aptitudes expected to jump on and work with others, and especially to move and get messages either recorded as a hard copy or verbally.
- Decision-production and critical thinking. This portrays the aptitudes needed to get issues, discover answers for, only them or with others, and afterward make a move to address them.
- Creative reasoning and basic reasoning. This depicts the capacity to think in various and unordinary ways about issues, and find new arrangements, or produce ground-breaking thoughts, combined with the capacity to evaluate data cautiously and comprehend its significance.
- Self-mindfulness and sympathy, which are two key pieces of enthusiastic knowledge. They depict getting yourself and having the option to feel for others as though their encounters were going on to you.
- Assertiveness and poise, or restraint. These portray the aptitudes expected to go to bat for yourself and others, and resist the urge to panic even notwithstanding impressive incitement.
- Resilience and capacity to adapt to issues, which portrays the capacity to recuperate from mishaps, and treat them as occasions to learn, or basically encounters.

1.2. Objectives

Business Insider reports that 57% of the business chiefs studied said they accept delicate abilities are a higher priority than hard aptitudes.

- To offer a free assistance open to all.
- To create and distribute excellent, well-informed and simple to-peruse data about fundamental abilities.
- To keep awake to-date with ebb and flow issues, patterns and research, and to mirror this in our substance.
- To create joins with instruction suppliers and other significant bodies.

1.3. Scope

- Be emphatic and express troublesome feelings when important
- Stay proactive, not receptive, even with a troublesome individual
- Learn how to bob back from misfortune

- Express feelings right up front, individual connections
- Keep a receptive outlook
- Always edit what you have composed
- Ask an associate to edit significant records
- Review sentence structure rules online at destinations like Daily Writing Tips and learn one new word every day by having Merriam-Webster's statement of the day shipped off your inbox

1.4. Need

- Learn how to decrease negative feelings
- Learn how to remain cool and oversee pressure
- Split up work equally
- Lend a hand when an associate is out of luck
- Never make suppositions
- Make everybody feel significant and esteemed
- Use the implicit spell-check and sentence structure capacities found in many word preparing and profitability programming applications

1.5. Importance

Undoubtedly, understudies of today are the future bosses and workers of productive worldwide organizations.

For understudies to stand apart as promising resources for worldwide associations, they need to put resources into the honing of what are marked as delicate aptitudes.

These capacities which are connected to character characteristics are a large group of relational abilities that will help the current day understudies to change into remarkable corporate assets.

So, if understudies are hoping to build up an effective expert profession, here are the various manners by which delicate aptitudes are significant for them to appreciate an edge over other people who are not side by side with these ground breaking "relationship building abilities"

2. REVIEW OF LITERATURE

The writing on Work-life offset with various imminent are contemplated and accessible, as of late, there has been an expanded interest in work family interface in the human asset the executives writing, particularly in regards to the sources and results of contention between these two circles. Various examinations have tended to this issue from alternate points of view. Greenhaus and Beutell (1985) and Greenhaus et al. (1989) inspected the precursors of contention among family and work, Goodstein (1994) and Ingram and Simons (1995) introduced an institutional point of view on associations' reactions to work-family issues. What's more, Campbell, Campbell and Kennard (1994) have examined the impacts of family duties on the work responsibility and employment execution of ladies. The work-family issue is much additionally extended to address the relationship of business-marriage accomplices (Foley and Powell, 1997).

Rebbecca Bundhun cites in ―The National (2009), an Abu Dhabhi National Paper‖1 that ―Women and men by and large have an alternate view of what the "life" some portion of the equilibrium includes. For ladies it will in general be committing more opportunity to family, while for men it is investing more energy seeking after close to home interests. She likewise cited the paper of Dr Katty Marmenout, an exploration individual at the INSEAD School in Abu Dhabi with his words that ―work-life balance isn't essentially about similarly isolating the time spent on one's work and individual life, however building up an amicability that mirrors a person's priorities‖. Thus, this takes into account acknowledgment of the upbeat compulsive worker or the fulfilled stay-at-home mum or father. "How might we quantify or assess work-life balance? The best pointer would be that it should feel right," she said. Though specialist Murphy and Doherty (2011) uncovered that it is unimaginable to expect to quantify work-life balance in a total route as there are close to home conditions which impact the way that is seen yet setting up a congruity that mirrors a person's needs though representatives must draw a firm line between their home and work lives and be certain that the line is in the ideal spot (Harvard Business Review, page184).

Miller (1978) stressed that prior the work life used to start at age 16 and end at age 70 and now starts at 20 furthermore, closes at 62 for the majority of the working personals. In any case, controlled impacts of the expansion in normal length of life in the course of the most recent 80 years might be related with specific changes in work-life history as more individuals arrive at the more established ages with their wellbeing to allow them to appreciate recreation and picture of the retirement years. Regardless of that changing perspective on marriage like connections likewise influences work-life balance the same number of ladies are done anticipating long lasting accomplices, and thus they stress the significance of procuring aptitudes and capabilities as expressed by scientist Lewis et al. (1999) though in logical inconsistency to the above Milkie and Peltola (1999) focused on that more joyful relationships are identified with a more noteworthy feeling of achievement in adjusting work and family.

Higgins et al. (1992), Hochschild (1989), Kelley and Voydanoff (1985), Hochschild (1989) Thompson and Walker (1989) uncovered that working ladies face all around archived clashes because of their proceeding with part as essential overseers for their homes, youngsters, and additionally older guardians being ladies' more noteworthy obligation regarding kids and other family individuals and they experience a larger number of interferences than men coming about normal family unit issues. Nonetheless, at family front analyst Milkie and Peltola (1999) expressed that one will feel less effective in accomplishing their own work-family balance if life partner needs to do the more modest segment of housework while Kiecolt (2003) found that who look for some kind of employment a sanctuary spends no a larger number of hours at work than those with high work-home fulfilment. Notwithstanding, Higgins and Duxbury (1992) communicated that work struggle is a more noteworthy wellspring of work-family strife while individual or family lives, meddle with work are related for less hours however work that meddles with life matters as uncovered by the analyst Reynolds (2005). Whether we are another alumni attempting to sort out some way to get an advantage in our profession, may be considering what are the main aptitudes you need to assist you with getting where we need to go. While it's, obviously, imperative to build up your industry-explicit hard aptitudes, what's similarly as basic to your prosperity are your delicate abilities. Delicate abilities are the way you work in the work environment and communicate with others. And keeping in mind that they're not effectively instructed in a homeroom or estimated, they are key abilities that we as a whole need to have. Also, in our more globalized, quick changing workplace, there is presently a premium on the sorts of delicate aptitudes that permit you to stay up with the fate of work. Along these lines, in case you're hoping to quicken your profession, here are the 08 delicate aptitudes that you need to succeed.

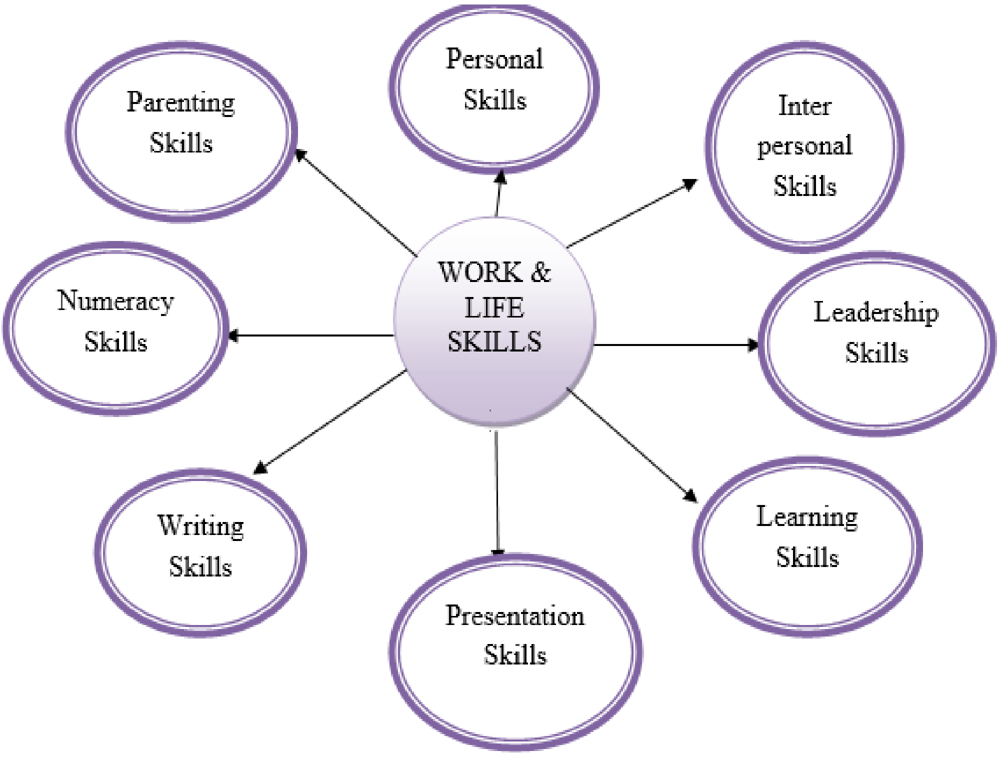

Figure 1

3. PERSONAL SKILLS

Personal skills are the essential life skills we need to help maintain a healthy body and mind. Being able to manage anger and stress can also be essential life skills. Learning about anger and stress, recognising what may trigger them Many people battle with low self-esteem and confidence, which can cause stress and prevent them from reaching their full potential. Our pages Improving Self-Esteem and Building Confidence provide practical ways to overcome these issues.

4. INTERPERSONAL AND COMMUNICATION SKILLS

The second important area of life skills is interpersonal and communication skills. These are the skills that we use to make connections with other people and are therefore an important part of what makes us human.

Effective listening skills, together with techniques such as clarification and reflection, can help prevent misunderstanding.

Verbal and non-verbal communication, include both how to use your voice and choose the right words, and also the use of tone of voice, body language and how you dress. They can help to build rapport.

Unfortunately, there are also many barriers to effective communication in any communication situation. These can lead to misunderstanding or even conflict.

5. LITERACY: READING AND WRITING SKILLS

Most people communicate, at least some of the time, using the written word—through letters, emails, reports, text messages, social network feeds and a host of other methods. Being able to write clearly and concisely is a very powerful way to communicate, either one-to-one or to a much larger audience. We provide articles that will help you to improve your written communication and learn or refresh your knowledge on some of the fundamental rules of writing. Our Writing Skills section includes lots of help and practical advice to help you improve your writing.

6. NUMERACY SKILLS

Many people struggle with maths or numeracy. Developing or refreshing your numeracy skills, however, can give you a real boost in life. Better numeracy skills can:

Make you more employable;

Help you to develop a better understanding of the world around you;

Save you time and money; and even

Improve your mental health.

7. CONCLUSION

Many companies decide to increase their total spending on leadership development initiatives within the next seven years—now training professional development as a crucial component of their business strategy. With strong leadership in such high demand, improving your leadership skills can offer you a competitive advantage, because, contrary to popular belief, you don't get to be during a C-level role to be considered a pacesetter. Best leaders exist—and are highly valued—at every level of business to inspire, engage, and influence their colleagues and stakeholders. "In many organizations today, leaders and managers are promoted because they're good at a skill. once they enter the leadership position, though, they struggle because they haven't studied management approaches or skills. Leadership may be a skill that must be continuously developed and worked on."

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Shodhsamhita: Journal of Fundamental &Comparative Research
Vol. IX, No. 5: 2022
ISSN: 2277-7067

"A STUDY ON WORK LIFE BALANCE – PROBLEMS, CHALLENGES AND EMPOWERMENT BY WOMEN EMPLOYEES IN EDUCATION SECTOR OF TELANGANA STATE"

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Abstract

As we have a tendency to all apprehend that education is crucial inside the event of any country. Teachers and lecturers play a vital role in society – they educate, nurture and form the thinking of the long run men, citizens, oldsters and members of communities. the foremost focus of this analysis is to spot the issues two-faced by operating girls in education sector. girls have invariably dominated the primary/secondary college and faculty sector. analysis informs. that presently forty seventh of lecturers inside area union} are feminine. curiously, Surveys indicated that there has invariably been a gender imbalance in relevancy the distribution of promoted posts (i.e. Principal, Head of the Department, Head Teachers). Relative to the number of male lecturers operating within the education sector, the men occupying the high posts In 2020, male teacher illustration outlined as a social structure within which men hold primary power and dominate in roles of political leadership, ethical authority, social privilege, and management of property. This out-of-date system of social structure has determined and formed the lives of {girls of ladies} and girls since centuries, and continues to do to to thus. the bulk of the oldsters and sure relatives ar adjunct towards their girl serving within the education sector. All our respondents powerfully believed that the married girls face larger challenges than single girls. though their husbands ar co-operative however their kids ar actually neglected. Despite the adjunct perspective of their oldster's single girls still face challenges like transportation and managing time between personal and social life. Most of the respondents, married or single, believed that their regular payment and system isn't satisfactory that they blame "Favouritism". In spite of all the facts, our analysis concludes that the education sector of Telangana State for feminine teacher is fairly sensible. . it's a woman plays a dominant role in the basic life of a child. Women are a crucial section of our society. Education as a way of empowerment of women can bring about a positive attitudinal change. It is, therefore,

crucial for the socioeconomic and political progress of India

Keywords: Women, Education, Empowerment, Problems, challenges, favouritism, work life balance

Introduction to Education and Women

EDUCATION starts at home for everyone. Parents are the first teachers for all of us. Only our parents teach us how to speak in mother tongue. After our parents we are teachers and they play a diverse role in our lives by teaching us special subjects. Education is very important in everyone's life. If a man wants to be wise. They should study well. Education is like money hidden in secret. People get education, beauty, fame and prestige. Education teaches discipline values. As educated people come to know about our government and our rights as citizens. Education is the greatest god. There is no other wealth in this world that compares to education.

Quotation – 1
"Education is the most powerful weapon which you can use to change the world."

"Nelson Mandela"

Quotation – 2
"Teachers are the backbone of the any country, the pillar upon which all aspirations are converted into realities"

"Dr. APJ Abdul Kalam"

WOMEN
W – Wonderful O – Outstanding M – Marvellous E – Energetic N – Nice

Women square measure the centre of our society and that they square measure successful and self-trained personalities answerable for the ethical development of their youngsters, inspiration for the family, Associate in Nursingd an example for the society to follow. In past days tho' girls enjoyed the theoretical importance because the married woman} World Health Organization was outlined because the higher – half, in follow she had a lower position than man. There are many signs of modification. Indian womanhood is on the high aspect. they're returning into their own. Today, girls fancy equal standing with men. Today, fashionable girls square measure thus smart and self-sufficing that they will be simply known as superwomen. Economic freedom and television have caused a sea-change in attitudes. girls started collaborating in several spheres. they're taking over employment in several areas each regular and part-time. girls started collaborating within the economic lifetime of the state in a very sort of ways in which.

Quotation – 3
" The country that does not respect women have never become great, nor ever be in future "

"Swami Vivekananda"

Education system in Telangana

Education plays a significant part in the development of any state or country. The Government of Telangana is constantly working toward raising the education norms within the state. still, the knowledge rate of the state isn't veritably emotional. The education system in Telangana is still in progress and is perfecting with every passing day. As per the Census 2011, the sections that are now part of Telangana have a knowledge rate of66.46. manly and womanish knowledge rates in the state are74.95 and57.92, independently. Hyderabad is the most knowledgeable quarter with80.96 knowledge. The state's knowledge rate is lower than India's knowledge rate. Scroll down to find applicable details related to education in Telangana

` The indigenous and sanctioned language of the Telangana is Telugu. Other verbal groups in the state include speakers of Urdu and Hindi. Telangana Education is offered through a number of institutes spread across the state. In Telangana the education system is of 10+ 2 system before joining under scale. First standard to Tenth standard classes are conducted by the School Education under the administration of the School Education Department and eventually the Tenth Class(S.S.C.) Public examination at the state position is conducted by the Board of Secondary Education. After this two-time Intermediate Education under the administration of the Board of Intermediate Education. The state would give reservation in advanced education to weaker sections of society on the pattern of Tamil Nadu, bypassing the 50 limit

The Telangana has a number of public and private seminaries and these are moreover combined to the Board of Secondary Education Telangana or Central Board of Secondary Education(CBSE), ICSE, IB, IGCSE. Government of Telangana is working towards erecting the excellent academy system. Telangana is the 5th place for education passing chance of 2018. Telangana has enforced colourful skill set in education system to make enhancement on all the areas.
The Telangana State Government established the Telangana nonages Domestic Educational Institutions Society in 2015 to give domestic education for children from nonagon populations

Universities include:

- Dr. B.R. Ambedkar Open University, Hyderabad
- English and Foreign Languages University, Hyderabad
- ICFAI Foundation for Higher Education, Hyderabad
- Jawaharlal Nehru Architecture and Fine Arts University, Hyderabad
- Jawaharlal Nehru Technological University, Hyderabad
- Kakatiya University, Warangal
- Kaloji Narayana Rao University of Health Sciences, Warangal
- Mahatma Gandhi University, Nalgonda
- Maulana Azad National Urdu University, Hyderabad
- NALSAR University of Law, Hyderabad
- Osmania University, Hyderabad
- Palamuru University, Mahbubnagar
- Potti Sriramulu Telugu University, Hyderabad
- Professor Jayashankar Telangana State Agricultural University, Hyderabad
- Rajiv Gandhi University of Knowledge Technologies, Adilabad
- Satavahana University, Godavarikhani, Karimnagar

- Sri Konda Laxman Telangana State Horticultural University, Hyderabad
- Sri P.V. Narasimha Rao Telangana State University for Veterinary, Animal and Fishery Sciences, Hyderabad
- Symbiosis International (Deemed) University
- Telangana University, Nizamabad
- University of Hyderabad, Hyderabad

Institutes

- Birla Institute of Technology and Science, Hyderabad
- Indian Institute of Technology, Hyderabad
- International Institute of Information Technology, Hyderabad
- Indian School of Business, Hyderabad
- National Institute of Fashion Technology, Hyderabad
- National Institute of Technology, Warangal
- Nizam's Institute of Medical Sciences, Hyderabad
- School of Planning and Architecture, Hyderabad

Research Institutes

- CR Rao Advanced Institute of Mathematics, Statistics and Computer Science, Hyderabad
- Electronics Corporation of India Limited, Hyderabad
- National Institute of Animal Biotechnology, Hyderabad
- National Institute of Rural Development, Hyderabad
- NIPER Hyderabad
- Tata Institute of Fundamental Research, Hyderabad
- Tata Institute of Social Sciences, Hyderabad
- Indian National Centre for Ocean Information Services, Hyderabad

Women worker challenges in Education Sector

Although teaching is one amongst the best professions that bring changes to society, nation, and therefore the world as a full, it's nevertheless to receive the respect it deserves. The occupation that produces leaders, entrepreneurs, social activists, and professionals is commonly downplayed by several.

we area unit aiming to quote the six most typical issues sweet-faced by girl's academics in Telangana.

1. skilled standing

The fact that students routinely shoot for to be everything from doctors and engineers to pilots and models however a lecturer says tons concerning the standing of this role.

2. Lack of designing Time

The majority of the highly-potential academics would attest to the very fact that they don't get decent time to arrange and implement their ideas. girls academics face tons of pressure from management, administration, and fogeys for the completion of the course. girl's academics typically find yourself finishing the chapters in haste rather than applying innovative teaching methodologies to boost the standard of education. this type of chaos and management is avoided by designing sessions well earlier and assignment duties to non-teaching employee's members or hiring specific professionals.

3. Non-Teaching Tasks

It brings North American country to the purpose of non-teaching tasks that area unit typically bimanual over to the academics in faculties. they're loaded with surveys, documentation, writing communication papers, record preparations, admissions, and far a lot of. These jobs is performed by body employees equally expeditiously, and academics would get ample time to organize for his or her lessons.

4. Inefficient skilled coaching

This unskillfulness of skilled coaching limits the academics during this nation from developing further skills and matching international standards.

5. Challenges within the schoolroom

Students typically become the naughtiest creatures once they aren't willing to check. There area unit several teacher issues within the schoolroom, to call a few:

- Apathy
- Lack of students' participation
- Late assignments submissions
- Misbehaviour
- Unnecessary cellular phone usage

6. Work-Life Balance

The problems of lady's teacher education don't finish here. hanging a correct work-life balance has become a true struggle for girl's academics, particularly once the pandemic.

Working Women faced by problems at workplace and family

Problems at Work Place	Problems at Family
1. Gender Bias	1. Family Duties
2. Insufficient Maternity Leave	2. Time Balance
3. Mental / Physical Harassment	3. Mother Responsibilities
4. Unequal Pay	4. Occasions and tours
5. Leadership	5. Health / Fitness

Women worker problems in Education Sector

I Problems faced by the working women at work place

Society is the biggest reason behind the problems faced by women, to move ahead is has to be left behind

- Relationship with colleagues
- Problems of transport
- Lack of basic facilitates
- Sexual harassment
- Women face a salary discrimination
- Fear of oppression and exploitation
- Often deprived of promotions and growth
- Unfair behaviours
- Ego clashes

II Problems related to the attitude of society and family

- Dual responsibility
- Working women and children
- Control over income
- Restrictions on movement

III Common problems faced by working women

- Job security
- Unemployment
- Health problems

IV Domestic restrictions

- Restricted to their homes and their primary role is to take care of household chores.
- Maximum Percentage of working women can be seen as health workers, educationist, clerks or any other low paid job that are not much preferred by men. Because of the lack of growth opportunities and low pay scale
- Female dominate environment

V Married working women

- Traditionally, men are the bread earners of the house. And it is not appreciable if women support the family financially if women earn more than men.
- It is not possible for them to work in late hours.
- The majority of new mothers cannot balance between their works and their kids.

VI Mental harassment

- Less capable and inefficient in working as compared to men.
- Gender bias creates obstacles in their recruitment.
- No one thinks of upgrading their skills with technological advancement which makes it easy to terminate women's employment and hire other persons.

VII Security, Life and dignity

- Lack of the art of self-defence for their security
- Not equal pay for men and women
- Low dignity and no ownership of her own earnings

VII Gender Biases

- Gender discrimination is when there are unfair rights between male and female. It differs because of their gender roles which ultimately leads to unequal treatment in life.
- Performance evaluation
- Duty assignments
- Postponing opportunities for advancement
- Taking unpaid leave
- Scaling back hours
- Seeking more flexible or inconsistent work, such as part-time work, contracting, and freelance jobs

IX Physical Harassment

- Derogatory remarks on female's workers.
- Gender discrimination.
- Unpleasant complements, body shaming, stroking, or grabbing without consent.
- Sharing pornographic materials through notes or emails.
- Spreading rumours about personal life.

THE ROLE OF WOMEN IN EUCATION SYSTEM

Quotation – 4

"When girls are educated, their countries become stronger and more prosperous"

"Michelle Obama"

Education is taken into account the most important tool for empowering women in society. it's not only limited to developing the personality of an individual but also plays an important role in economic, social and cultural development. The theme for this year being- 'Women in leadership: Achieving an equal future within the world', women empowerment remains a far-fetched idea. With only 2.4% of girls in a CEO seat at a Fortune 500 company, the ladies have a vital role. From women being kept faraway from education to having some revolutionary women in the education sector in India, we've come a long way!

Education plays a critical role in Women's Economic Empowerment. It takes the centre stage, except for a long, most girls especially in the rural areas have been denied this right and have been subjected to very degrading practices and responsibilities. Education empowers girls to realize more in their social, career, economic and family lives. To women, education can mean visiting class or being trained on capacity building and skills development or better yet being mentored on very essential aspects of WEE.

A number of studies have revealed that uneducated women have high-level morality, low potential for earning, poor dietary status and tiny independence in the household. the shortage of education also has a drastic effect on the health and well-being of the kids. In India, the infant deathrate rate was negatively related to the mother's educational level. additionally , the absence of education can bring a negative change within the country's development.

Women's education may be a multi-faceted factor that can be held responsible for the low rate of education among women in India. The factors like social, demographic, political and economic are the backbone of low or high literacy rate. The low acceptance of women in schools is one of the main reasons, which hurdles within the way of women's liberation in India. consistent with reliable sources, 50% of all girls haven't been to school. Whereas, two out of ten girls of the age 6 to 11 years haven't yet enrolled in schools.

The role of girls in the education system can play a big part in society. The factors like cultural, social, political and technological changes within the world have revolutionized the education and social life of women. If schools for female raise human capital, economic process and productivity as that of male schooling, the women's disadvantage in education is economically wasteful. Studies have shown that the speed of economic growth from women's education matches with those from men's education.

Women Empowerment may be a global issue and discussion on women political right are at the forefront of many formal and informal campaigns worldwide. The concept of girls empowerment was introduced at the international women conference at NAROIBI in 1985. Education is that the milestone of women empowerment because it enables them to respond to the challenges, to confront their traditional role and alter their life. Hence, we cannot neglect the importance of education in regard to women empowerment. to work out the development in women education India is supposed to the upcoming superpower of the world in recent years. With the increasing change in women education, the empowerment of girls has been recognized as the central issue in determining the status of women. For becoming a superpower we've mostly to concentrate upon women's education. By which it'll force women's empowerment.

As per United National Development Fund for ladies (UNIFEM), the term women's empowerment means:

• Acquiring knowledge and understanding of gender relations and therefore the ways in which these relations maybe changed.

• Developing a way of self-worth, a belief in one's ability to secure desired changes and therefore the right to control one's life.

• Gaining the power to generate choices exercise bargaining power.

• Developing the power to organize and influence the direction of social change, to make more just social and economic order, nationally and internationally.

Thus, empowerment means a psychological sense of private control or influence and concern with actual social influence, political power and legal rights. it's a multi-level construct referring to individuals, organizations and community. it's an international, ongoing process centred within the local community, involving mutual respect, critical reflection, caring and engagement, through which individuals lacking an equal share of valued resources gain greater access to control over these resources.

INSPIRING AND INFLUENTIAL FEMALE EDUCATORS OF INDIA

S. no	Name	About Her	Photo
1	SAVITRIBAI PHULE	Savitribai Phule was the first female teacher of India. Born on January 3, 1831, India's first feminist grew up in a country ruled by the British Raj, where women rights were non-existent. We know how hand in hand with her social reformer husband, Jyotirao Phule, she achieved the revolutionary act of establishing the first school for girls.	
2	VIMALA KAUL	Twenty years ago, sitting at home and not doing anything after retirement was never an option for Vimla Kaul and her husband. A visit to a village called Madanpur Khadar in Delhi was enough to give her the motivation to do something to improve the lives of the people living there. She started with teaching kids who could not attend school and, since then, the couple has never looked back.	
3	GEETA DHARMARAJAN	Geeta Dharmarajan is the founder of Katha — a 33-year-old "profit-for-all" voluntary organisation that aims to enhance the joy of reading among all by bridging the literature to literacy continuum. She received the Padma Shri in 2012 for her work in literature and education. Geeta Dharmarajan was also named "frugal innovator" by the Millennium Alliance, set up by the governments of India and the US; and the co-winner of Business Standard Award for the Social Entrepreneur of the year, 2018. Having written many critically-acclaimed books for children and adults, Geeta has over 30 years of professional experience which includes her service at the India Today Group of Companies, The University of Pennsylvania and INTACH, before founding Katha.	

Conclusion

Women empowerment may be a pivotal part of any society, state or country. it's a woman who plays a dominant role in the basic life of a child. Women are a crucial section of our society. Education as a way of empowerment of women can bring about a positive attitudinal change. It is, therefore, crucial for the socioeconomic and political progress of India. The Constitution of India empowers the state to adopt affirmative measures for promoting ways and means to empower women. Education significantly makes difference within the lives of women.

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ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 11, Iss 12, Dec 2022

A STUDY ON SUPERVISED LEARNING MODEL – K-NN CLASSIFICATION

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DOI : 10.48047/IJFANS/V11/I12/740

Abstract:
In the world of machine learning, the k-Nearest Neighbors (kNN) algorithm has emerged as a powerful tool for classification tasks. With its simplicity and effectiveness, kNN has gained popularity across various domains. In this article, we will explore the fundamentals of kNN, its applications, and implementation. Whether you are a beginner or an experienced practitioner in machine learning, this article will provide valuable insights into the capabilities of kNN and how it can be leveraged to make accurate predictions. So, let's dive into the world of k-Nearest Neighbors and unlock its potential!

Keywords: KNN, Machine Learning, Classification, Supervised Learning

1. Introduction : MACHINE LEARNING

Machine learning is a field of study and practice that focuses on developing algorithms and models that enable computers to learn and make predictions or decisions without being explicitly programmed. It is a subset of artificial intelligence (AI) and involves the use of statistical techniques and computational models to analyze and interpret complex data patterns.

The goal of machine learning is to enable computers to learn from experience or historical data, and improve their performance or decision-making abilities over time. This is achieved by training machine learning models on large datasets, where the models learn patterns, relationships, and trends within the data. Once trained, these models can be used to make predictions, classify new data, or discover insights from previously unseen data.

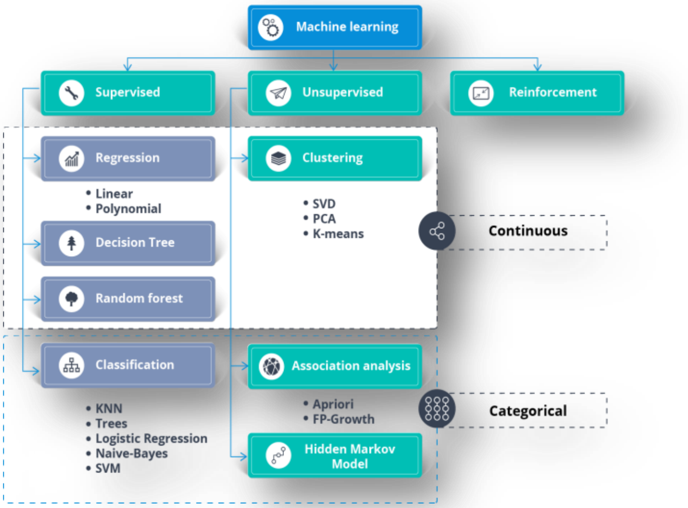
Machine learning can be categorized into three types:

- Supervised Learning
- Unsupervised Learning
- Reinforcement Learning

Supervised Learning: In supervised learning, the model learns from labeled data to make predictions or classify new data. It uses input variables and corresponding output labels to find patterns and make accurate predictions.

Unsupervised Learning: Unsupervised learning deals with unlabeled data. The model discovers patterns and structures within the data without any predefined output labels. It helps in clustering similar data points or finding hidden relationships.

Reinforcement Learning: Reinforcement learning involves an agent learning to make decisions by interacting with an environment. It receives feedback in the form of rewards or penalties and learns to maximize its cumulative reward by optimizing its actions.



k-Nearest Neighbors (kNN)

k-Nearest Neighbors (kNN) is a machine learning algorithm that determines the class or value of a new data point based on its proximity to the neighboring data points in the training set. It belongs to the supervised learning type of algorithms, where the data is labelled and used to make predictions. The algorithm finds the "k" closest neighbors to the new data point and assigns the majority class or calculates the average value of their labels as the prediction. kNN is easy to understand and implement, making it a popular choice for simple classification and regression tasks.

UNDERSTANDING K-NEAREST NEIGHBORS (KNN)

IJFANS INTERNATIONAL JOURNAL OF FOOD AND NUTRITIONAL SCIENCES

ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 11, Iss 12, Dec 2022

The k-Nearest Neighbors (kNN) algorithm is a simple yet powerful classification algorithm in machine learning. It follows the principle that similar instances tend to belong to the same class. The kNN algorithm makes predictions based on the labels of its nearest neighbors in the feature space.

The key idea behind kNN is to measure the proximity or similarity between data points. This is done by calculating the distance between the feature vectors of the instances. The choice of distance metric, such as Euclidean distance or Manhattan distance, depends on the nature of the data and the problem at hand. The distance metric defines the notion of "closeness" between two data points.

In the kNN algorithm, the value of k determines the number of neighbors to consider when making a prediction. For example, if k is set to 5, the algorithm will find the five nearest neighbors to a given data point. The class label that occurs most frequently among these neighbors is assigned to the data point being classified.

One of the advantages of kNN is its simplicity and interpretability. The algorithm does not make strong assumptions about the underlying data distribution and can be easily implemented. Additionally, kNN allows for flexibility in choosing the value of k and the distance metric, making it adaptable to different scenarios.

However, there are some considerations and limitations when using kNN. The performance of kNN can be sensitive to the choice of k and thedistance metric. The algorithm may also be computationally expensive, especially when dealing with large datasets. Furthermore, kNN is more suitable for problems with balanced class distributions and continuous features.

APPLICATIONS OF K-NEAREST NEIGHBORS (KNN)

k-Nearest Neighbors (kNN) algorithm has found numerous applications across various domains. Its simplicity and versatility make it a popular choice for solving classification and regression problems. Some common real-world applications of kNN include:

ISSN PRINT 2319 1775 Online 2320 7876

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1. Customer Segmentation
2. Recommendation Systems
3. Fraud Detection
4. Image and Speech Recognition
5. Medical Diagnosis

The versatility of kNN allows its application in a wide range of domains, from finance and marketing to healthcare and image processing. Its ability to handle both categorical and numerical data, along with its intuitive nature, makes it a valuable tool in various problem-solving scenarios.

IMPLEMENTING K-NEAREST NEIGHBORS (KNN)

To implement the k-Nearest Neighbors (kNN) algorithm, follow these steps:

Data Preprocessing:

- **Handle missing values:** Fill in or remove any missing values in the dataset.
- **Normalize the data:** Scale the features to a common range to ensure all features contribute equally to the distance calculations.
- **Split the data:** Divide the dataset into a training set and a test set for model evaluation.

Distance Calculation:

- **Select a distance metric:** Choose a suitable distance metric, such as Euclidean distance or Manhattan distance, based on the nature of the data.
- **Calculate distances:** Compute the distance between the test instance and each instance in the training set using the chosen distance metric.

Selecting the Value of k:

- **Determine the value of k**: Decide on the number of nearest neighbors (k) to consider when making predictions. This can be based on domain knowledge or using techniques like cross-validation to find the optimal value.

Finding Neighbors:

- **Identify the k nearest neighbors:** Sort the distances in ascending order and select the k instances with the shortest distances to the test instance.

ISSN PRINT 2319 1775 Online 2320 7876

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Class Prediction:

- **Make predictions:** Assign the class label of the majority of the k nearest neighbors to the test instance. In the case of regression problems, calculate the average of the k nearest neighbors' values.

Evaluate the Model:

- **Assess the model's performance:** Use evaluation metrics such as accuracy, precision, recall, or mean squared error to measure the effectiveness of the kNN algorithm on the test set.

PERFORMANCE AND EVALUATION OF K-NEAREST NEIGHBORS (KNN)

When evaluating the performance of the k-Nearest Neighbors (kNN) algorithm, several metrics can be used to assess its effectiveness. These metrics provide insights into the model's predictive accuracy and its ability to correctly classify or predict instances. Some commonly used evaluation metrics include:

1. Accuracy:

- **Formula:** - $(Number\ of\ correctly\ classified\ instances)$ $/(Total\ number\ of\ instances)$
- Accuracy measures the overall correctness of the model's predictions by calculating the ratio of correctly classified instances to the total number of instances.

2. Precision:

- **Formula:**

$$(True\ Positives)\ /\ (True\ Positives + \ False\ Positives)$$

- Precision quantifies the proportion of correctly predicted positive instances out of all instances predicted as positive. It focuses on the accuracy of positive predictions.

3. Recall (Sensitivity):

- **Formula:**

$$(True\ Positives)\ /\ (True\ Positives + \ False\ Negatives)$$

- Recall calculates the proportion of correctly predicted positive instances out of all actual positive instances. It emphasizes the ability of the model to capture positive instances.

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4. F1-score:

- **Formula:**

$$2 * (Precision * Recall) / (Precision + Recall)$$

- The F1-score is the harmonic mean of precision and recall. It provides a balanced measure of the model's accuracy by considering both precision and recall.

The choice of distance metric in kNN can significantly impact its performance. Different distance metrics, such as Euclidean distance, Manhattan distance, or cosine similarity, have varying effects on the calculated distances between instances. The choice of the distance metric should align with the characteristics of the data and the problem at hand.

Cross-validation is an essential technique in evaluating the performance of the kNN algorithm. It involves partitioning the data into multiple subsets (folds) and iteratively using each fold as a test set while training the model on the remaining folds. This allows for a more robust evaluation of the model's performance, reducing the risk of overfitting or underfitting.

Parameter tuning is another crucial aspect of kNN performance. The choice of the value of k, the number of nearest neighbors to consider, can impact the model's performance. Using cross-validation or other techniques, finding the optimal value of k can help maximize the model's accuracy and prevent overfitting or underfitting.

By considering these evaluation metrics, selecting appropriate distance metrics, employing cross-validation, and tuning the parameters, you can effectively assess and optimize the performance of the kNN algorithm for your specific classification or regression tasks.

CASE STUDY

Title: Categorizing Skill Levels using kNN

Statement: We begin by working with a dataset consisting of 100 instances, which includes information on aptitude, English proficiency, programming skills, and the corresponding skill levels. The skill levels range from novice to expert, representing different stages of skill development in a particular domain. The problem statement revolves around building a model that can predict the skill level of an individual based on their aptitude, English proficiency, and programming skills.

Before we begin, it's important to mention that the test data used in this project was collected from my class students via a Google Form. The goal of this implementation is to use the k-Nearest Neighbors (kNN) algorithm to predict the proficiency level of students in subjects like "Apptitude," "English," and "Programming" based on their skills.

ISSN PRINT 2319 1775 Online 2320 7876

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To achieve this, we have a pre-existing training dataset that already contains these attributes along with the corresponding class labels indicating each student's proficiency level. The training dataset was prepared beforehand, ensuring it accurately represents the range of skill levels in the class.

For evaluating the performance of the kNN algorithm, we extracted the test data solely from the students' responses in the Google Form. It has the same attributes as the training dataset. The aim is to use the trained kNN model to predict the proficiency level of students in the test data by finding similar patterns in the training dataset.

By leveraging the kNN algorithm, we can make predictions for each student in the test data by considering the similarities between their skill levels and those of the students in the training dataset.

This implementation allows us to assess how well the kNN algorithm predicts the proficiency level of students based on their skills. It demonstrates the practical application of machine learning in education, where such predictions can help educators assess students and provide appropriate support.

Note: The implementation is carried out using Python programming language, leveraging libraries such as pandas, numpy, matplotlib, seaborn, and scikit-learn.

Implementation

1. Importing Required Libraries

```
Import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sb
```

2. Loading Dataset

```
#Loading Test and Train Datasets
 • Loading Training Dataset
 • Loading Testing Dataset
```

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3. Data Preprocessing

```
• Checking Nulls, Duplicates
• Encode categorical variables if
  necessary.
```

Splitting the Dataset

```
#Splitting Input& Output Features
x_train -> Training Input Features
y_train -> Training OutputFeatures
x_test -> Test Input Features
y_test -> Test Output Features
```

Applying kNN:

```
#Fitting Input and Output Features
from sklearn.neighbors import KNeighb
orsClassifier
knn=KNeighborsClassifier()
knn.fit(x_train, y_train)
```

Predicting Skill Level:

```
#Predicting the Skill Level
y_pred=knn.predict(x_test)
x_test['Skill Level ^']=y_pred
x_test
```

Performance Of The Model -

```
#Accuracy
from sklearn.metrics import accuracy_
score
print('Model Accuracy Score - {0: 0.4
f}'.format(accuracy_score(y_test, y_p
red)))
```

Output –

```
Model Accuracy Score -  0.9355
```

Inference:

Based on the provided dataset, the following table represents the predicted skill levels for each student:

Apptitude	English	Programming	Skill Level ^
5	5	5	Genius
4	5	5	Genius
4	5	4	Genius
4	4	3	Lexical Logician
2	5	4	Code Linguist

ISSN PRINT 2319 1775 Online 2320 7876

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4	5	2	Lexical Logician
5	5	5	Genius
4	5	4	Genius
4	5	2	Lexical Logician
4	4	0	Lexical Logician
5	5	5	Genius
5	5	4	Genius
3	5	3	Speaker
3	4	3	Novice
4	4	3	Lexical Logician
1	4	2	Speaker
0	2	1	Novice
5	5	4	Genius
4	5	5	Genius
5	5	3	Lexical Logician
5	5	4	Genius
4	5	1	Lexical Logician
2	1	1	Novice
1	3	3	Novice

This table displays the predicted skill levels for each student based on the attributes "Aptitude," "English," and "Programming." The predicted skill levels include categories such as "Genius," "Lexical Logician," "Code Linguist," "Speaker," and "Novice." These predictions were made using the implemented k-Nearest Neighbors (kNN) algorithm, which considered the similarities between the students' skill levels and those in the training dataset to assign the appropriate skill level category.

By examining the predicted skill levels, we can gain insights into the proficiency of each student in different subjects. This information can be valuable for educators and stakeholders in identifying areas where students excel or require additional support. The kNN algorithm's ability to predict skill levels based on similar instances demonstrates its potential in educational contexts for personalized learning and student assessment.

Conclusion

The k-Nearest Neighbors (kNN) model achieved an accuracy of **93.55%** on the given dataset. This indicates that the kNN algorithm performed well in classifying the instances based on their features. The accuracy score demonstrates the effectiveness of the kNN model in predicting the class labels of the test data. The kNN algorithm's simplicity and interpretability make it a suitable choice for various classification tasks.

ACKNOWLEDGMENTS

We are deeply grateful to **Dr. Kompalli Udaya Sri**, M.B.A., M.Sc.,(IT), M.Tech.(CSE), MA(Astro), Ph.D., Gold Medal, World Book of Records, FSIESRP, our mentor and guide, for her exceptional guidance and unwavering support throughout this project. Her profound expertise and insightful feedback have been invaluable in shaping our research and achieving

ISSN PRINT 2319 1775 Online 2320 7876
Research paper UGC CARE Listed (Group -I) Journal Volume 11, Iss 12, Dec 2022

our goals. Her expertise in the field of Artificial Intelligence and Machine Learning has been instrumental in shaping our understanding and driving the success of our work.

Furthermore, we would like to express our appreciation to our peers and fellow students for their encouragement and collaboration. Their constructive discussions and feedback have greatly enriched our work and inspired us to push the boundaries of our knowledge.

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We, the authors of this article, are second-year **B.Sc.** students specializing in **Artificial Intelligence and Machine Learning** in the **Department of Computer Science** at **P B Siddhartha College of Arts and Science.** With a keen interest in exploring the applications of machine learning algorithms, we collaborated to investigate and implement the k-Nearest Neighbors (kNN) classification algorithm.

Our collective efforts and passion for the subject have driven us to conduct this study and share our findings. By combining our knowledge and skills in AI and ML, we have delved into the intricacies of the kNN algorithm, analyzed its performance, and explored its applications in predicting skill levels of students.

It is our sincere hope that this article provides valuable insights and contributes to the field of machine learning. We extend our gratitude to our peers for their constant support and encouragement throughout this endeavor.

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https://docs.google.com/forms/d/e/1FAIpQLSdpT4P3DXF2Ttjj2QHeSpSnXz1OrEYAX6KP6VwHa ywNVgJ6g/viewform?usp=sf link

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Balancing Act: A Theoretical Framework for Analysing Work-Life Balance Among Educational Institution Employees

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Abstract

Work-life balance is an integral aspect of the modern educational landscape, profoundly impacting the well-being and effectiveness of educators and staff. This article embarks on a comprehensive exploration of work-life balance within educational institutions, introducing the innovative "Balancing Act" theoretical framework. This framework, rooted in established theories such as role theory, boundary theory, and resource-based theories, offers a structured approach to comprehending, analysing, and enhancing work-life equilibrium in this unique context.

We embark on a journey through the historical evolution of work-life balance in education, dissect the pivotal factors influencing balance, and delve into the distinct experiences of faculty members and educational administrators. Gender disparities and the intricate interplay between work-life balance and mental health are meticulously examined.

In the age of technological transformation, we investigate how digital advancements have reshaped the dynamics of work-life balance, particularly in the realms of virtual teaching and remote work. The potential benefits and drawbacks of technology in this context are scrutinized, shedding light on its transformative potential.

As we conclude, we reiterate the paramount importance of work-life balance in educational institutions and underscore the need for further research and action. Through the lens of the "Balancing Act" framework, this article provides a comprehensive view of work-life balance in education, serving as a guiding compass for researchers, policymakers, and practitioners in their quest to navigate and improve this vital domain.

Keywords: Work-life balance; Theoretical framework; Educational institutions; Faculty experiences; Technology impact; Gender disparities

ANVESAK
ISSN : 0378 – 4568
UGC Care Group I Journal

DAY EFFECT, WEEK EFFECT, MONTH EFFECT AND YEAR EFFECT ON COMMODITY DERIVATIVES: EMPIRICAL EVIDENCE FROM THE SELECTED DERIVATIVES IN INDIAN DERIVATIVE MARKET

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Abstract:
The main objective of the paper is to identify the impact of day of the week effects on selected commodity derivatives traded in MCX During 2015 to 2020. The study identifies the impact of day, week, month and year's impact on selected commodity derivatives in the MCX. The study has considered Gold, Cotton and aluminium derivatives for the study. The study considered 6 years returns of selected commodity derivatives. The study used advanced excel and SPSS for data analysis.

Keyworks: Derivatives, Commodity, Returns, Effect, MCX

1. Introduction:

Both commodity and capital markets are characterized by risk. The interaction of demand and supply factors causes price fluctuations in agricultural and non-agricultural commodities over time. Due to the ever-increasing wave of globalization and liberalization sweeping the globe, the amount of international trade and industry has risen by a factor of ten in the last two decades. As a result, financial markets have seen dramatic changes in interest and exchange rates, as well as stock market values, exposing corporations to increased financial risk. An otherwise profitable business suffers losses as a result of increased financial risk. This emphasizes the significance of risk management in dealing with uncertainty. Derivatives are a safe way to deal with the risk that comes with uncertainty and volatility in the underlying asset. Derivatives are risk management techniques that aid in the successful transfer of risk within an organization. Derivatives are financial derivatives with no intrinsic value. Their worth is determined by the underlying asset. Financial or non-financial assets may be used as the underlying asset. The main objective of the paper is to identify the impact of day of the week effects on selected commodity derivatives traded in MCX During 2015 to 2020.

IMPACT OF SELF HELP GROUPS (SHGS) ON WOMEN EMPOWERMENT

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ABSTRACT

The contribution of women entrepreneurs is still invisible and needs to be properly investigated. The objective of the analysis is intended to replicate the social impact of the self-help group of women to investigate the changes in the SHGs social clause, to assess the influence of the SHGs on the social status of individuals and to differentiate the attitude of individuals from the SHGs and their social impact. The inquiry is separate with the ultimate aim of making use of only critical data. The data was collected 300 respondents by survey method through structured questionnaire from selected Krishna and Guntur Districts of Andhra Pradesh. Convenient sampling technique is adopted for the study. The data obtained was analyzed using discriminate analysis through SPSS. The major findings of the study have been The P value is equal to .000 ($p<0.05$) level for the seven conditions like to start a business, to promote savings, to avail credit, to meet household expenses, to strengthen the leadership quality, compulsion from other members and for other reasons are associated between the dependent and the independent variables are statistically significant [$F(6,293) = 256.74$, $p=0.000$], the P-value is equal to .000, which is less than .05. Then the result is statistically significant. It concludes that an economic activity of SHG paves the way for women's empowerment in enhancing their socio economic status, not only in rural areas but also in urban areas.

Keywords: Women Empowerment, Self Help Group, Economic freedom of women.

Introduction

From time immemorial women have been forced to occupy a secondary place, though they are half of the world's population. Moreover, the societal system made women are unable to take the place as a free and independent individual. On contrary, the constitution of India gives women a status equal to men. The SHG plays an important role in making them realize their importance of empowerment. SHG makes women to bring out their potentials and capabilities and make them confident to face the challenges more effectively. Dr. Preema Rose Jincy Jose Nichlavose (2017) In their Analysis impact of SHG initiatives on Socio-Economic status of members, in the State of Kerala, suggested that there is a

राष्ट्रहिताय संस्कृतम्

Journal of Fundamental & Comparative Research

Dr. BJP

This is to certified that the article entitled

PRACTICE OF BLUE OCEAN STRATEGY IN COMPETITIVE CORPORATE WORLD

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Published in

Shodhsamhita : Journal of Fundamental & Comparative Research
Vol. VII, No. 1 : 2020-21
ISSN: 2277-7067
UGC Care Approved, Peer Reviewed and Referred Journal
Kavikulaguru Kalidas Sanskrit University, Ramtek

2019-20

UGC
Approved Journal

Editor
Prof. Shrinivasa Varkhedi

Organisation Theory: A theorical abstraction as a universal Operating System.

Authors : Sambhu Prasad G[1], Rajesh C. Jampala[2]

Abstract

This is a study of Organisation studies looking for fundamentals of a formal organisation theory and design. A literature review brings an overview and purpose of organisation studies and shows how changes in current theorisation moved dynamically with the changes in operational, social, technological and competitive environment making them limited practical models of context specific applications. The study looks for a theoretical construct for an organization as a wholesome entity that can stand ontological and epistemological enquiry of validity. The study explores concepts from Indian Traditional Knowledge (ITK)[3] which have been studied for ages, abstracting a universal conceptual framework for a formal organisation and identifies an opportunity in the evolutionary model keeping in view the basic purpose of an organisation to survive, sustain and fulfill its objectives. The framework enables an organisational design and structure with five levels of identifiable distinct organization forms and underscores their practicality. The study also points to areas of enormous opportunity for future research.

Key words: organisations studies; organisation theory; organisation design; Indian Traditional Knowledge(ITK)[3]; survival; sustenance; fulfilment.

Introduction.

Organisations enable most of what happen around us and are thus concerned with people by the people and for the people. People as part of an organisation affect others and are also affected by other organisations. Organisation studies deal with their objectives and everything that affects these objectives. Organisation gives identity to the individual as much as the individuals to the organisation. This mutuality brings multiple dimensions to our perspective of organization from social sciences, psychology and management which spread the whole gamut of human ecology. A business organisation in contrast to others like government, cultural, sports or film making or informal ones, chases shifting goals throughout its existence of intended perpetuity. A business entity which trades the value it creates in a product, service or activity for a mutually agreed benefit with the recipient for a monetary consideration for an immediate, short term or long-term objective is at the centre of organization studies in general.

Organisation studies attempts at two distinctive goals. First, to provide a theoretical frame of reference to understand in what ways organisation conducts the way it does to be relevant. Second, to provide a path to understand how to conduct itself in the environment to remain relevant. Organisation is born with an identity and does coordinated activities throughout its life. As all coordinated repeatable activities follow a process, an organisation is 'an entity and a process' (Langley et al, 2013). This duality is source for various theories that emerged over the last century. Notwithstanding the fact that business as a coordinated activity has been happening for thousands of years, we do not have recorded evidence of a theory behind them. From the Indian experience, based

Studies in Indian Place Names

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Dr. B. JAYA PRAKASH

has been awarded Certificate of Publication for research paper titled

Published in Vol-40-Issue-13-February- 2020 of **Studies in Indian Place Names** with ISSN:: 2394-3114

QUALITY OF WORK LIFE & WORK LIFE BALANCE IN MODERN CORPORATE WORLD

UGC Care Approved International Indexed and Referred Journal

Impact Factor 6.3

SHSharma

Editor, **Studies in Indian Place Names**

Our Heritage
(UGC CARE JOURNAL)

ISSN: 0474-9030
Vol-68-Issue-54-February-2020

BUSINESS OPPORTUNITIES AND CHALLENGES FOR ECO-TOURISM IN GLOBAL SCENARIO

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Abstract

Tourism is now a booming, fast-growing industry next to the oil and jewelry industries. The tourism has a great potentiality because each and every destination has unique culture, traditions, food habits, folklore, craft, languages, etc. all of which would be of great interest to national and international visitors. Tourism turns the largest industry worldwide in terms of employment and gross domestic product. As more people are interested in spending their holidays in nature, ecotourism as well as rural tourism has become a growing segment of the tourism industry. This creates opportunities in areas characterized by natural attractions, wildlife and wilderness habitats, agriculture, farm stay, local craft, bird watching, local cuisines, etc. This paper explores on business opportunities and challenges for eco-tourism in global scenario.

Keywords: Tourism, ecotourism, ecopreneurship, service quality, hospitality industry, etc.

1. Introduction

The emerging attention and popularity of environmental strategies within companies over the last couple of decades, companies are becoming increasingly aware of their impact on the environment, mainly due to increased regulations, research and media attention. Moreover, they also became aware of the effect of global warming. The increased awareness of peopleon nature also caused consumers to increasingly value environmental progress in companies as well as eco-friendly products, and they are often willing to put a price on that. The consumers are willing to pay more for eco-friendly products, which presents a substantial market niche. Companies voluntarily adapt environmentalism because they can benefit from this, through:

ISSN: 0474-9030
Vol-68-Issue-54-February-2020

- Operational improvement, which reduces costs of inputs, waste and energy;
- Anticipating and influencing climate change regulations;
- Accessing new sources of capital, because most governments introduced or are currently introducing financial incentives to reduce greenhouse gasses;
- Improving risk management;
- Improving corporate reputation;
- Identifying new market opportunities.
- Enhancing human resource management.

2. Ecopreneurship

Ecopreneurship is a combination of ’ecological’ and ’entrepreneurship’. Ecopreneurship will be focused on start-up companies as well as on market opportunities and innovations. Ecopreneurship is about the recognition of environmental opportunities and innovation; a combination of competitive advantage, commitment, and doing the right thing for the environment. Ecopreneurs are individuals within startup companies who identify environmental opportunities, resulting in operational efficiencies, new technologies and products, and collecting the resources needed to exploit these opportunities. It must be recognized that ecopreneurs can have different motivations to start up a green business. Some will do it out of their own believes, while others are more focused on market niches and opportunities

3. Reasons of ecopreneur initiatives

- To promote young entrepreneurs creative initiatives.
- To increase employment opportunity.

- To open new market for eco-friendly business and environment friendly technology.
- To add value for green economy.
- To create international collaboration for eco mission.
- To create ecopreneur climate and culture.
- To raise entrepreneurial skills and opportunity to incubation.

4. Opportunities for eco-tourism business

The trends for traveling and tourism is leaning toward more experiential and diverse experiences, and less toward group tours and mass travel experiences, so starting an ecotourism business is one way to help people get the travel experiences they desire, while making a living and making a difference. The concept of this green business idea is similar to travel agents in the traditional sense. In an ecotourism business, however, you can guide travelers to an eco-friendly trip and introduce them to eco-tourism destinations that they may not otherwise be aware of. Sustainable travel and ecotourism might include some alternative forms of transportation that have lower carbon footprints, more eco tours, travel to sustainable agriculture destinations, human-powered trips such as bike touring or backpacking, boat housing back waters, national parks and other wilderness preserve destinations, and visits to places like Costa Rica, New Zealand, Kerala (India) and Iceland that traditionally rank very well in national sustainability indexes. We have the opportunity to appeal to a growing spirit of sustainable learning too by sending eager learners on adventures on the farm as agri-tourists.

5. Organic day Spa

An organic day spa provides personalized service for health and relaxation. These might include massages (Thai, deep tissue, Swedish, etc.), facials, manicures, pedicures, waxing, and saunas. Organic day spas do these services without the traditional use of chemicals, and the most holistic of spas not only use organic oils,

ISSN: 0474-9030
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creams and other personal products, but also supply organic tea in the waiting room, soy candles with non-lead wicks, and other touches of healthy, sustainable luxury. Those who want to join a fast-growing segment of the hospitality industry, while also supporting the organic beauty products movement, and then a day spa that specializes in using products with only natural and organic ingredients could be the potential business.

6. Significance ecotourism

According to experts it was ‘sand & sea beach’ that attracted tourism during 1970s. However by 1980s, the focus shifted to cultural tourism which involves visit to cultural and historical sports. Then in the new millennium, interest shifted to nature. It is the uniqueness of nature that the travelers are looking for these days. They can get the experience anywhere. What they are looking for is something very different. Hence, develops the need for proper regulation and monitoring in ecotourism. View to enforce regulations for conservation and protection of sensitive natural areas & safety of the tourists. To Promote tourism as an industry provide employment opportunities for all those who work in related sectors. Enhance socio-cultural development uphold traditional values &beliefs contain educational features. Society & nature generate economic benefits for host country. Generate name & fame for host country as regards international tourism & attract further more tourists promote local area development.

7. Ecotourism: Challenges and solutions

Ecotourism as an important branch of the tourism industry is vulnerable to the consequences of global climate change. The potential consequence of global warming on ecotourism is a challenging issue. Climate change and global warming are the challenges to the communities and their livelihood bringing harsh weather conditions. Storms are getting stronger; summers are getting hotter, and discovering new deceases, rise of the sea level, melting of snow caps and more. Poor fisher folks are losing their home from strong storm surges. One of the successful adaptation measures for the climate change challenges is ecotourism. Ecotourism plays a major

ISSN: 0474-9030
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role in economic growth for countries with wildlife and scenic landscapes. Across the many countries of the world, tourism contributes significantly to economic growth, surpassed only by agriculture. Sadly, both tourism and agriculture are very vulnerable to climate change. If action is not taken in time, drought, floods, diseases and other climate change–related disasters will kill both sectors. The tourism sector is partly responsible for climate change because of the emission of greenhouse gases caused by the burning of fossil fuels during travel and the destruction of forests for luxurious tourist hotels that rely on unsustainable energy. Often tourism also generates waste that ends up in landfills and pollutes oceans with water-related tourist activities.Ecotourism is responsible travel to natural areas that conserves the environment and improves the well-being of local people. Ecotourism can change people's attitudes toward the environment and overcome the challenges of ecotourism with the following best practices.

Conservation of energy: Adopting clean energy in tourist facilities, for example, solar, biogas and energy-saving stoves for cooking, lighting and warming bath water and switching off lights when not in use help to mitigate climate change.

Waste management: Kitchens and restaurants generate a lot of waste. Such waste in landfills generates the greenhouse gases responsible for global warming. Organic waste can be converted to compost or used in biogas digesters to generate energy.

Kitchen gardens: Next to tourist facilities can absorb composted kitchen waste, supply vegetables and promote organic farming.

Protection and management of water: Using forests and wetlands, through tree planting, reforestation and rehabilitation, helps ensure water availability as well as increases absorption and storage of carbon dioxide from the atmosphere.

Cultural beliefs: Some traditional beliefs and practices such as totemism contribute toward protection of nature, for example indigenous tree species that play an important role in overall carbon sequestration.

Agroforestry: Promote agroforestry and reliance on forest products such as honey, fruits, fibres, resins, gums and essential oils control loss of forest cover.

Transportation measures: Use of sustainable transport curbs emission of greenhouse gases during transportation of tourists.

8. Conclusion

Indeed, "**going green**" is the big news on the media these days. In fact, it's one of the hottest trends now with lots of new opportunities and this trend still has a lot of growth potential because people are just becoming aware of the need to be eco-conscious and friendly. The whole eco-friendly buzz was borne out of the need to protect our planet from pollution and global warming. While technological advancement has been good to us and made life easier, it also has its negative effects just like everything else in the world. Technology has brought about some damages to our environment that we have to make conscious efforts to eliminate. The awareness of the need to preserve the ecosystem is rapidly on the increase; and consumers are switching over energy saving and cost saving products, for greater convenience and health benefits.

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ISSN: 0474-9030

Vol-68-Issue-30-February-2020

Women Empowerment in MSME- Challenges and Opportunities

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Abstract

The Micro, Small and Medium Enterprises (MSMEs) play a significant role in the national economic development of any country. Societies with greater gender equality not only offer better socioeconomic opportunities for women, but also tend to grow faster and more equitably. There are gains in poverty reduction, environmental sustainability, consumer choice, innovation and decision-making on a wider set of issues. Not only MSME, the Government of India has taken various steps towards women empowerment and safety. Initiatives like Beti Bachao, Beti Padhao, Stand Up India, Mission Indradhanush, Mudra Yojana Scheme, TREAD (Trade Related Entrepreneurship Assistance and Development) Scheme, Mahila Udyam Nidhi Scheme, Annapurna Scheme, Sthree Shakti Package for Women Entrepreneurs, Bharatiya Mahila Business Bank Loan, Dena Shakti Scheme, Udyogini Scheme, Cent Kalyani Scheme and many more have added to the welfare of the women population in India. This paper focuses on role of women empowerment in MSME, challenges and opportunities and various schemes available to them.

Key Words: MSME, Schemes, Women Empowerment, Opportunities and Challenges.

Introduction

The Micro, Small and Medium Enterprises (MSMEs) play a significant role in the national economic development of any country. They provide variety range of new jobs and produce the creativity and innovation that leads to economic progress. In India, the Ministry of Micro, Small and Medium Enterprises (MSME) is taking number of initiatives and implementing the promotional schemes for the development of micro, small and medium enterprises. Ministry of Micro, Small & Medium Enterprises, popularly known as the engine of growth in the country and incubators of entrepreneurship has emerged as the torchbearers of women empowerment on a global platform. Last year, on the eve of International Women's day 2018, Ministry of MSME launched Udyam Sakhi, a network for nurturing social entrepreneurship creating business models revolving around low-cost products and services to resolve social inequities. The portal cater needs of around 8 million Indian women who have started or running their own businesses through its platform for entrepreneurship learning tools, incubation facility, training programs for fundraising, providing mentors, one-on-one investor meet, provide market survey facility and technical assistance. To put it in nutshell, it can be easily inferred that Indian Govt. has been incessantly involved in revolutionizing the role of women outside the four walls of their home. Women, nowadays, take risks, trust their vision and settle for nothing less.

Women Empowerment at Global Level

There is good news for spurring growth and equity in the form of the billion or so women poised to engage in economic activity. Empowering women to participate equally in the global economy could

ISSN: 0474-9030

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add $28trillionin GDP growth by2025. Lowering the barriers faced by women entrepreneurs at home and internationally, and helping more businesswomen to connect to international value chains, would bolster growth and inclusion. It would create more – and better-paying – jobs for women, not least since women-owned firms hire more women, especially at senior levels. That is why taking gender into account matters when developing and implementing trade policy. Placing women at the heart of global policy making will go a long way towards realizing the United Nations 2030 Agenda goal of achieving gender equality and empowering all women and girls. However, Economic development and gender equality go hand-in-hand. So why haven't we invested more in supporting and developing these aspects of 3 the global economy? One of the key challenges, as highlighted in the recently launched World Trade Organization Buenos on Trade and Women Economic Empowerment is that steps to empower women economically is happening slowly – and not systematically.

Women Empowerment -Opportunities

Women are the pillars of society and when women are empowered, the whole world is empowered Ministry of Micro, Small and Medium Enterprises (MSME) is empowering women entrepreneurs through its different schemes helping women spark their talent and build their own identity. 1.38 lakh projects have been set up by the women entrepreneurs under Prime Minister's Employment Generation Programme (PMEGP) Scheme since inception and up to 23.01.2019. The projects set up by women entrepreneurs are about 30% of total projects set up under PMEGP. Under the scheme, women entrepreneurs are covered under Special Category and are entitled to 25% and 35% subsidies for the project set up in urban and rural areas respectively. For women beneficiaries, own contribution is only 5% of the project cost while for general category it is 10%. During 2016-17 and 2017-18, under the Khadi Programme of KVIC, women entrepreneurs have set up 30437 projects for which margin money of 85,305 lakh Rupees have been disbursed.

Societies with greater gender equality not only offer better socioeconomic opportunities for women, but also tend to grow faster and more equitably. There are gains in poverty reduction, environmental sustainability, consumer choice, innovation and decision-making on a wider set of issues. Not only MSME, the Government of India has taken various steps towards women empowerment and safety. Initiatives like Beti Bachao, Beti Padhao, Stand Up India, Mission Indradhanush, Mudra Yojana Scheme, TREAD (Trade Related Entrepreneurship Assistance and Development) Scheme, Mahila Udyam Nidhi Scheme, Annapurna Scheme, Sthree Shakti Package for Women Entrepreneurs, Bharatiya Mahila Business Bank Loan, Dena Shakti Scheme, Udyogini Scheme, Cent Kalyani Scheme and many more have added to the welfare of the women population in India. The majority of women entrepreneurs run micro, small and medium-sized enterprises (MSMEs) – more than 30% of MSMEs are owned by women. Yet only one in five exporters is a women-owned business.

MSME Schemes for Women Entrepreneurs

Women Entrepreneurs can be seen everywhere in the startup-up ecosystem of India. Women too are seen leaving their high-profile jobs as well as some stepping out of the four walls of their homes and joining the pool of Entrepreneurship in India. The major factor to jump start the entrepreneurial journey is capital and various banks offer specialized loans for women entrepreneurs that have slightly different and more flexible set of terms and conditions. Here is a list of various schemes and loans exclusively for women that aim at promoting and easing out the process for them.

Mudra Yojana Scheme: This general government scheme for small units is also applicable to women who want to start a small enterprise such as a beauty parlor, tuition center, tailoring unit, etc. It is also useful for a group of women who want to startup together. Loans from Rs 50,000 onwards and upto Rs 50 lakh are sanctioned under this scheme.

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TREAD (Trade Related Entrepreneurship Assistance and Development) scheme: This scheme aims to empower women by providing credit to projects, conducting specific training and counseling, and eliciting information on related needs. The scheme provides for a government grant of up to 30 percent of the total project cost as appraised by lending institutions. These institutions would finance the other 70 percent.
Mahila Udyam Nidhi Scheme: This Scheme is offered by Small Industries Development Bank of India (SIDBI), this scheme provides financial assistance of up to Rs 10 lakh to set up a new small-scale venture.
Annapurna Scheme: This scheme applies to women entrepreneurs who have started a food catering unit. They can avail a loan of up to Rs 50,000 to purchase kitchen equipment such as utensils and water filters.
Sthree Shakti Package For Women Entrepreneurs: It is offered to women who have majority ownership (over 50 percent) in a small business. The women also need to be enrolled in the Entrepreneurship Development Programmes (EDP) organized by their respective state agency.
Bharatiya Mahila Business Bank Loan: This scheme involves a loan of up to Rs 20 crore for women business owners of manufacturing enterprises. Under the Credit Guarantee Fund Trust for Micro and Small Enterprises, there is no need for collateral for loans up to Rs 1 crore. The loans under this bank loan scheme are to be repaid in seven years. The scheme was implemented by Bhartiya Mahila Bank which was merged with State Bank of India in 2017.
Dena Shakti Scheme: This scheme provides loans up to Rs 20 lakh for women entrepreneurs in agriculture, manufacturing, micro-credit, retail stores, or similar small enterprises. There is a concession of 0.25 percent on rate of interest.
Udyogini Scheme Women entrepreneurs: This scheme applies the women between the ages of 18 and 45, who are involved in agriculture, retail and similar small businesses, can avail loans up to Rs 1 lakh under this scheme. Further, her family's annual income should be below Rs 45,000 in order to avail the loan. However, no income limit exists for widowed, destitute or disabled women. For widowed, destitute or disabled women from SC/ST categories, a subsidy of 30 percent of the loan, up to Rs 10,000, is provided.
Cent Kalyan Scheme: It is offered by the Central Bank of India, this scheme is for women business owners in multiple areas such as agricultural work or retail trading. Under this scheme, loans up to Rs 1 crore are sanctioned and no collateral or guarantors are required.

Women Empowerment-Challenges

Women entrepreneurs encounter many problems in their efforts to develop the enterprises they have established. The main problems faced by the women entrepreneurs may be analyzed as follows.
Shortage of Finance: Women and small entrepreneurs always suffer from inadequate financial resources and working capital.
Difficulties in Marketing and Sales: For marketing their products, women entrepreneurs are often at the mercy of the middlemen who pocket the chunk of profit. Further, women entrepreneurs find it difficult to capture the market and make their products popular.
Cut- throat Competition:. They have to face severe competition from organized industries and male entrepreneurs.
Organizational Set up : Many of the women enterprises have imperfect organizational setup
Lack of Education: In India literacy among women is very low. Due to lack of education, majority of women are unaware of technological developments, marketing knowledge, etc.

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Lack of information: Lack of information and experience creates further problems in the setting up and running of business enterprises.
Low Ability to Bear Risk: Women have comparatively a low ability to bear economic and other risks because they have led a protected life. Sometimes, they face discrimination in the selection for entrepreneurial development training.
Problems of Attitude: The biggest problem of a women entrepreneur is the social attitude and the constraints in which she has to live and work. Despite constitutional provisions, there is discrimination against women.
Low Mobility: One of the biggest handicaps for women entrepreneurs is mobility or travelling from place to place. Women on their own find it difficult to get accommodation in smaller towns. A single woman asking for accommodation is still looked upon with suspicion.
Family Responsibilities: In India, it is mainly a woman's duty to look after the children and other members of the family. Her involvement in family leaves little energy and time for business.
Absence of Entrepreneurial Aptitude: Many women take the training by attending the Entrepreneurship Development Programs without entrepreneurial bent of mind.
Credit Facilities: Women are often denied credit by bankers on the ground of lack of collateral security.
Shortage of raw-materials: Women entrepreneurs encounter the problems of shortage of raw-

Conclusion

'Women Empowerment' denotes a situation when women become free of the all the kinds of dependency and deprivations whether social or economic. The Micro, Small and Medium Enterprises (MSMEs) play a significant role in the national economic development of any country and encouraging women empowerment concept. Women are the pillars of society and when women are empowered, the whole world is empowered Ministry of Micro, Small and Medium Enterprises (MSME) is empowering women entrepreneurs through its different schemes helping women spark their talent and build their own identity. Women, as the integral part of the talent pool available to any industry, have been significantly contributing to the global economy. Swami Vivekananda, one of the greatest sons of India, quoted that,' There is no chance for the welfare of the world unless the condition of women is improved, it is not possible for a bird to fly on only one wing' Therefore, the inclusion of 'Women Empowerment' as one of the prime goals in the eight Millennium development goals.

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PUBLICATION CERTIFICATE

This publication certificate has been issued to

A. Siva Naga Lakshmi

For publication of research paper title

A STUDY ON SAFETY MEASURES OF CUSTOMERS & EMPLOYEES AT RETAIL MALLS DURING COVID-19

Published in

Purakala with *ISSN: 0971-2143*

Vol.31 Issue 16 Month April Year 2020

Impact Factor 5.7

The journal is indexed, peer reviewed and listed in UGC Care.

Editor

ISSN: 0971-2143
Vol-31 Issue-16 April 2020

A STUDY ON
SAFETY MEASURES OF CUSTOMERS & EMPLOYEES
AT RETAIL MALLS DURING COVID-19

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ABSTRACT

Retailing includes selling goods or services to the final customers for personal use. People are highly depended on retail shops for their daily needs. As entire countries came under the quarantine orders and consumers around the world start to avoid human contact, retailers are mess up to adopt. The major challenges to retailers during this pandemic are managing with time schedule, demand fluctuations, shoring-up the cash reserves, supply chain management problems and finally most important part is protecting people. This paper focuses on safety measures adopted by retailers in safeguarding the people health.

KEYWORDS: Retailers, Covid, Sanitization, hygiene, solidarity.

I. Introduction: COVID-19 Corona Virus Disease is an infectious disease caused by severe acute respiratory syndrome. As of 1st May 2020 more than 3.25million cases have been reported across 187 countries and territories, resulting in more than 2,33,000 deaths. Symptoms are fever, cough, shortness of breath, loss of smell etc., the major risk factors are travel, viral exposure etc., the preventive measures are hand-washing, face covering, quarantine and social distance etc. In this situation all 187 countries are announced lockdown for the safety of people. Movements of the people are restricted; going out of the home is between 6am to 9am. The retail shops are allowed to open in this time only, so it is the most rush time to the retail shops. At the time of shopping customers have to maintain social distance, shops have to follow some guidelines, take some precautions at shopping area too. In this study researcher is trying to attempt how the retail shops are maintaining social distance, steps followed by retail malls for enhancing safety of customers.

II. Need of the Study: It is every individual responsibility to safeguard themselves and society. Even government announced lockdown people are going for shopping for their necessities because it is unavoidable for them. Safety is primary at shopping during this pandemic. The retailers have to provide facilities to their customer and suggest hygiene factors to employees. The study focused on the safety precautions provided by retailers to safeguard the health of customers and employees to break the spread of virus.

III. Objectives of Paper:

- The primary objective of the study is to identify various precautions taken by the retail malls for promoting wellbeing of the customers.
- To identify and suggest the tips to improve retail employee health and hygiene.

IV. Safety Measures at Retail-malls:

A. Customer centric Measures

Social distancing has a significant impact on the retail sector business in these days, while operating store, retailer needs to follow some safety precautions. The following are the observed precautions during pandemic

- **Incline up Hygiene Policies:** Clean every surface and object accurately and regularly with disinfectant. Provide training and informational materials to all staff and suppliers, so they are up to date with standard personal preventive measures.
- **Face Mask:** Wearing of masks is compulsory at supermarkets, convenience stores, medical stores, markets and public places. People without masks can be refused to enter into the malls.
- **Social Distance Circles:** The malls' management drew circles on the floor to maintain social distancing to curb corona-virus spread; people have started implementing the same. The idea is proving a healthy option for people who come out of their homes to purchase groceries and vegetables.
- **Hand Sanitizer**: Hand sanitizer is also one of the best options available to defeat the germs at malls with this intention they are providing hand sanitizers to their customers as a precaution.

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- **Temperature Screening:** The malls are implementing temperature screening of customers by the entry point so that they will be able to identify the covid affected people. They will utilize thermal scanners and/or infrared thermometers for this. It helps to scrutinize the health, if any one presenting with symptoms, the staff will stop them and suggest them to the government health facility.
- **Single Person entry**: Retail malls like Metro is restricted the entry facility in order to control the crowd at mall. They are allowing only one person into the mall for shopping at a time so that there won't be any physical touch with others.
- **Token/Timely allow:** Retail malls like D Mart, Metro are issuing colored token which are fully sanitized to the customers. They will alert the customers with time limit. Maximum time limit allowed for each color token is 20 to 30 minutes.
- **Announcements:** Making announcements frequently about time slots to the customers will reduce overflow of them to the cash counters.
- **Stock review** – In response to the huge shift in buying behavior of the customers, regular inventory reviews to assess shelf-life and seasonality, and adjust accordingly. Need to run promotions or offer discounts on certain lines while maintaining full-price on others for longer.
- **Packing of loose commodities**: Some retail malls are packing the loose commodities like flours, sugar, cereals etc., are packing with different quantity sizes for the avoiding the human touch.
- **Contactless payments:** Some banks issued wi-fi enabled microchip cards for the transactions it helps retailers to provide contactless payments. Retailers who allow new payment methods will facilitate more people to complete purchases with them.
- **Smart Dome:** Smart Dome looks like a dome security camera typically seen in many stores. However, it operates much differently. Upon detecting people in the monitored area, it announces a message such as "For your safety, please maintain at least six feet of social distance." Simple but effective. It is especially helpful that retailers can implement this potentially life-saving measure rapidly. Since the device is battery-operated, store staff can quickly self-install these compact devices – no technician or wiring required. Versatile mounting options facilitate placement above areas where reminders are most needed, such as checkouts, service counters, entrances, and busy departments.

- **Staff review** – If possible try to re-organize staff which can move from in-store to for example e-commerce assistance. Many retailers will experience a higher pressure online, so staff can be quickly retrained and redeployed to help where it is needed.
- **Customer & staff interaction review** – work to implement remote or contactless customer assistance to safeguard staff and customer health. With attendant tablet solutions such as our Attendant Tablet, staff can approve purchases and assist customers with age verification or product identification without physically interacting on the same device.
- **Show solidarity, and be kind**-There's a lot we can do to support each other during these difficult times. You can offer free home delivery for customers who are in quarantine or self-isolating. Check in with employees who are sick, or are caring for someone sick. Share clear information to help decrease anxiety and fear, including tips on how to handle stress. Show empathy to people who are affected by the illness. Research says that it's human nature to be kind and helpful when others need us. These are the times to show the best of us to our coworkers, customers, neighbors. We'll talk business tomorrow.
- **Only essentials and less than three:** Except for food and essentials such as toiletries, bath and personal hygiene etc., all other shopping should be avoided to release pressure on the backward supply chain as well as reduce the involvement of the shopkeepers and store personnel. Also, retailers should put a cap on the amount to avoid frequent stock outs.
- **Keep track of traffic**-Activate measures to ensure that there are not too many people into the store at the same time. Make sure people can maintain a safe distance as advised by your health authorities.
- **Role of corporate:** It is high time for companies such as Uber, Ola, Zomato, Swiggy to assist local administrations to manage doorstep deliveries, courier and logistics companies, airline companies to assist in the back-end logistics and cargo and organized food retailers such as Big Bazaar, Big basket, Reliance, etc. to provide warehousing and shopping services in cities and suburbs. For villages, the involvement of post offices, banks, cooperatives, sahakari and bazaar samitis, local businessmen, etc. is important to facilitate non-stop flow of essentials to households so that people don't rampantly move out during community spread and mass spread phases. Organised retailers/corporates can do handholding of unorganised retailers on sanitisation, awareness, close contact avoidance, screening and health as well as safety measures.

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B. Managing Employee Health:

- Instruct employees with symptoms associated with COVID-19 to report them to their supervisors.
- If an employee is sick at work, send him home immediately. Clean and disinfect surfaces in the workspace. Others at the facility with close contact (i.e., within 6 feet) of that employee during this time should be considered exposed.
- Inform fellow employees of their possible exposure to COVID-19 in the workplace, if an employee is confirmed to have COVID-19, while maintaining confidentiality.
- Employers - Pre-screen (e.g., take temperature and assess symptoms prior to starting work).
- Employers - Disinfect and clean work spaces and equipment, and consider more frequent cleaning of high touch surfaces.
- Employees - Regularly self-monitor (e.g., take temperature and assess symptoms of coronavirus).
- Employees - Wear a mask or face covering.
- Employees - Practice social distancing and stay at least 6 feet from other people whenever possible.

C. Personal Hygiene for Employees

- Emphasize effective hand hygiene including washing hands for at least 20 seconds, especially after going to the bathroom, before eating, and after blowing your nose, coughing, or sneezing.
- Always wash hands with soap and water. If soap and water are not readily available, then use an alcohol-based hand sanitizer with at least 60% alcohol and avoid working with unwrapped or exposed foods.
- Avoid touching your eyes, nose, and mouth.
- Use gloves to avoid direct bare hand contact with ready-to-eat foods.
- Before preparing or eating food, always wash your hands with soap and water for 20 seconds for general food safety.
- Cover your cough or sneeze with a tissue, then throw the tissue in the trash and wash hands after.

V. Finding from the Study:

- It is observed that almost all the retail malls are following the safety measures in order to protect the health of customers and employees.
- Retail malls are practicing different aspects like loose materials pre-packing, sanitizing the surroundings and taking all precautions which are issued by central government from time to time.
- Big retailers are presently dispensing only essential items amid the lockdown, are taking precautionary measures for supporting social distance.
- It is not possible for the employees to work from home in case of retail malls. So managements are screening the employees at the time of entry and continuously asking employees to wash hands and keep social distance at work place.
- Further malls are giving training to the employees regarding how to be hygiene in person.

VI. Conclusion: To summarize, shoppers should be vigilant as shopping is no longer a leisure activity. They should minimize shopping frequencies, do shopping, do pooling, do rationing, avoid close contacts, use protective gears such as masks and sanitizers, avoid sending kids and the elderly people out, and restrict shopping expeditions. The government should enforce shopping discipline, make shopping/selling guidelines for local retailers, train them on sanitization, avoid close contacts and facilitate digital payments and home deliveries. Retailers should priorities safety, awareness, discipline, service and empathy over their businesses. There are so many social activities are changed during this period, hopefully we all are being protected and fight for safe tomorrow.

VII. Scope for further Research: In this paper researcher tried to cover the safety measures took by retailers only, there are various factors which will influence retailers during this pandemic period like supply chain management gaps, managing demand, handling price challenges etc.

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Impact of age of the company on Performance of Initial Public Offering (IPOs) in India

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Abstract:

Age could actually help firms become more efficient. Over time, firms discover what they are good at and learn how to do things better. They specialize and find ways to standardize, coordinate, and speed up their production processes, as well as to reduce costs and improve quality. The previous findings of various researchers suggest that, there is significant relation between age of the firm and aftermarket performance. This paper focuses on the evaluation of price performance of IPOs up to a period of 36 months including the listing day. In this paper the main emphasis is on the study of age of the company on after market performance of the selected IPOs in short-run and as well as long-run. The paper presents fresh evidence on IPO performance, i.e., short-run underpricing and long-run underperformance for 146 Indian IPOs issued during the period 2007-2008.

Key words: Age, Returns, IPOs, Short-run, and Long-run

1. Introduction:

The age of the company could actually help firms become more efficient. Over time, firms discover what they are good at and learn how to do things better They specialize and find ways to standardize, coordinate, and speed up their production processes, as well as to reduce costs and improve quality (**Ericson and Pakes**, 1995). Age of the firm defined in terms of years, is

Sambodhi
(UGC Care Journal)

ISSN: 2249-6661
Vol-43, No.-03 (IV) November-December (2020)

Stock Index Prediction using Deep Learning (LSTM - RNN) with reference to NSE NIFTY50

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Abstract:-

Financial Analytics plays a very important role interms of Prediction and analysis of stock market data. Financial Analytics has become very important for Better Risk Management and Risk Analysis. Stock Index price prediction needs timely information that helps the traders to take important decisions. Time Series are extremely nonlinear in nature and hence, accurate stock price forecasting has been a challenge. Accurate Prediction of Stock Prices and the direction of index price movements is also essential for a stock trader to trade profitably as well as hedger to design risk management strategies. Deeplearning approach to stock price forecasting is been presented in this study. Deep learning models based on LSTM RNN (Long-Short Term Memory – Recurrent Neural Networks) using Keras open source wrapper with TensorFlow library in the backend are designed and empirically evaluated on the index of NIFTY 50 for the time period 2007 to 2019. Long Short-Term Memory (LSTM) networks are a modified version of Recurrent Neural Networks, which makes it easier to remember past data in memory. Prediction of next 30 days and plot of the output indicates that a downward movement is expected. Results indicate that deep learning models proposed in this study can generate stock index price forecasts which can be used for basis of Risk Management.

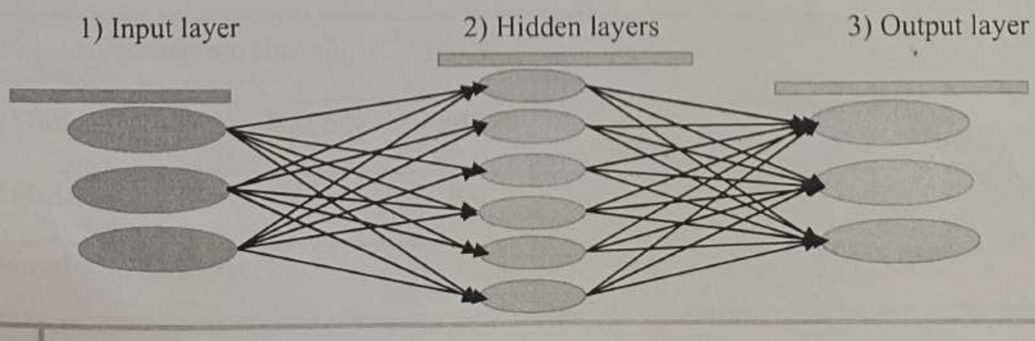
Keywords:- Finanical Analytics, Deep Learning, LSTM RNN, Keras, training,testing

1. Introduction:

Analytics has become very important in the Industry of Finance, which is used for Better Risk Management and Risk Analysis. Stock Market is a place where stocks of a company will be bought and sold. Predicting the returns of the stock market is one of the most difficult to analyse because of involvmenet of many factors which include both micro and macro factors. Stock Market can be categorized in to Primary Market (IPO) and Secondary Market. Primary market is where the new issues are introduced to the market through the process of IPO's (Initial Public Offerings). Secondary market is where investors trade securities (buy or sell). Stock market is having a highly volatile and non-linear time series data. A time series is a set of data measured over time to know the status of volatality. Linear models such as AR, ARMA, ARIMA etc have been used for stock market returns forecasting. The problem exists with these models are they work only for a model identified for a particular index and it won't perform well for another. Stock Market forecasting takes higher risk and it is one of the most important reason for the difficulty in stock market prediction. Here is where the application of deep-learning models in financial forecasting comes in to the picture. Deep Neural Networks got its name due to the use of the architecture of neural network in Deep Learning models and it is also called as Artificial Neural Network(ANN). ANNs are capable to learn and generalize from their experience. Practical application of Artificial Neural Network's in forecasting problems is very successful.

Figure 1.1.1: Artificial Neural Network

In general, an Artificial Neural Network (ANN) consists of three layers:



SOUTH INDIA JOURNAL OF SOCIAL SCIENCES
ISSN: 0972 - 8945

ROLE OF IMPACT OF SELF HELP GROUPS (SHGS) BANK LINKAGE PROGRAMME ON PSYCHOLOGICAL EMPOWERMENT OF WOMEN IN INDIA: WITH REFERENCE TO KRISHNA DISTRICT, ANDHRA PRADESH

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Abstract:
The aim of the present study is to understand the impact microfinance in the psychological empowerment of women in Krishna District, Andhra Pradesh. As the successive governments pushing microfinance agenda as a panacea of all problems it has grown into unmanageable proportions and resulted in crisis like situation. The study has conside 750 sample in the Krishna District of Andhra Pradesh and it identify various issues in SHG Bank Linkage programme in women empowerment. The study aims at an in depth analysis of various key factors in the microfinance sector and to suggest measures for proper delivery of the desired goals.

Key Words: Micro Finance, Women Empowerment, SHG, Psychological Empowerment

1. Introduction:

NABARD, through its' Micro Credit Innovations Department has continued its role as the facilitator and mentor of microfinance initiatives in the country. The overall vision of the department is to facilitate sustained access to financial services for the unreached poor in rural areas through various microfinance innovations in a cost effective and sustainable manner.

After more than 25 years of SHG Bank linkage, the programme has grown exponentially; the system has evolved and matured enabling the SHGs access to large loans under SHG BLP besides loans that SHGs have been able to access from their own federations and the NGO MFIs. As on 31 March 2020 the SHG BLP programme has reached many a milestone with a total membership of about 1.02 crore groups covering 12.4 Crore households across India. The programme has made

Impact of Visual Merchandising on Sales in Retil Store

Rajesh C.Jampla, P.Adi Lakshmi, M. Dhaurya Naik

Abstract*—The basic point and determinationof the examination is to definevisual advancing impactcustomerattention.The investigate paperemphases on sixkeydimensionof visual advertising and preliminary of theory are based on these i.eof thing appear, window appear, shading, lighting, store structure and thing show and how it sway the thought buyers.The stratified reviewing technique is used.The diagram was driven in picked retail stores at Vijayawada. A composed Questionnaires of Likert's five point scale is used for the survey. Where 200 Questionnaires were distributed to the respondents who were identified shopping in picked retail stores. It found that the theories for thing appear, window show and shading assortment have been recognized that they have a confident and important impact on buyerbuying conduct. Research express that the retail storer should concentrate on visual advertising methods for pulling in new customers and rise the walk of store which may moreover prime to achievement influence over contenders.

Keywords*— Retail store, visual merchandising dimension of retail and customers etc.

INTRODUCTION

In the past multi decade retail has grabbed generously more attention in publicizing time where India attains'the next fundamental retail objective' all around among thirty creating markets. India is set fourth greatest economy nation after United States of America,China and Japan in the locale of purchasing power parity (PPP). The visual showcasing is tomake careful the buyer, to update the stores' image, and to help different arrangements by appearing with decorations. Retail stores are endeavoring to make also stimulating, acknowledging visual presentations in forceful market. Indian purchasers slant toward state of craftsmanship stock that have fine quality and are of overall standardsNeha P. Mehta andPawan K. Chugan(2013). It is the primary system to make vitality in retailing. Retailers by organizing pushed usage of store opening can facilitate the customers' wants and providerobust contention. Therefore, it is imperative to examine visual advancing in retailing and support the retail stores to appreciate the way in which they can isolate themselves from contenders.

SIGNIFICANCE OF THE STUDY

The essential purposebehind conduction this outline is to separate the effect ofvisual advancing and its attributes of customerattention.This is a fundamental gadget where retailer to find imaginative way to deal with catch the thought of buyers. The components of visual advertising are thing appear, window appear, shading, lighting, store arrangement and thing show which accept a fundamental occupation in attracting customers.This look at empowers us in evaluating and finding impact of visual advancing on accomplishment of customer thought and their acquiring conduct.

LITERATURE REVIEW

The investigator state that,YasirAliSoomroet al (2017)in their article, it was communicated that the speculations for shading, lighting, window and inside limit wereaccepted as having a confident and essential impact on the thought of consumers.The visual showcasing fittingly isolates the retail brand from battling brands, sets brand tendency among customers was discussed by Park et al (2014), it basic association between customer acquiring behavior and window appear, floor advertising and constrained time signage byNeha P. Mehta (2013).According to, Darden, W. (1983)found that window show is anaverage which makes starting acquaintance in the customer's mind with purchase the stock. Physical intrigue of the store motivates customers inconceivably for store selection.BellandTernus (2012) in their examination reinforced the theories given by before specialists and included lighting can redesign the retail space and augmentation the estimation of thing in customer's mind. The insignificant focal points of the things were enhanced.Sen, Block (2002) influences that the window indicates influences store entry and purchase decisions. It furthermore makes a regard for stock kind for the area on the other hand it demonstrates how the stock is to be shown in window indicates which would affect acquiring decision.

Research Methodology

Objectives

- To find the impact of thing appear, window appear, shading, lighting, store configuration and thing displayon buyer obtaining conduct towards retail store.
- To break down the impact of visual showcasing on arrangements towards retail store.

Research Design, Sample and Data

The examination finished is realistic andcross sectional in nature. The technique is arranged toestimate the impact ofvisual advancing on arrangements towards retail

Revised Manuscript Received on April 12, 2019.

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IOSR Journal of Business and Management (IOSR-JBM)
e-ISSN: 2278-487X, p-ISSN: 2319-7668. Volume 21, Issue 4. Ser. VI (April. 2019), PP 40-46
www.iosrjournals.org

Impact of Dividends on Equity Market Volatility with Reference to Select Stocks in India

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Abstract: *This study examined the impact of dividends index impact on the select indices volatility. For this study historical time series data has been considered of Nifty – 50 dividends Points index and various sectoral stocks from the period of 2012-13 to 2017-18, which are paying high dividends. The study adopted the Auto regressive conditional heteroskedasticity test to identify the volatility effect of the Nifty – 50 dividends Points index on the selected stock price volatility. The Garch effect has been observed on the selected stocks returns volatility. Nifty – 50 Dividends Points Index influence has been measured with the Ordinary least square has been applied and the result stated that the nifty – 50 dividends points index impact on the returns of selected stocks.*

Keywords: *ARCH, Dividends Points Index, GARCH, Nifty – 50, Stocks Returns and Volatility.*

Date of Submission: 07-04-2019 Date of acceptance: 23-04-2019

I. Introduction

The financial managers have made critical decisions in an ever-changing economic environment such as privatization, liberalization and globalization together with rapid technological changes; have brought the intense competition in among the listed companies. The organizations are under sever-pressure to performance as per the expectations of the investors or stakeholders. In order to stay ahead in the competitive world by adding the value to the organizations, the financial managers decision on distribution of dividends not only set the good corporate image, but also instills the confidence among the investors on the future growth prospective. The dividend policy states that the firms payment to the shareholders and the reinvestments on new ventures from the firms earnings keeping in view of future financial requirements.

Dividend is one of the motivating factors to the investment fraternity for the investments on equity shares and is thus desirable from the shareholders perspective. In one side paying the dividend makes the investors happy and on the other hand payment of dividend will decrease organizational capital requirements for making the investments in future opportunities. This phenomenon may hamper the growth of the firm, which may affect the shareholders wealth. The policy on the dividends is one of the three decisions of the financial management; mainly it affects the flow of funds, organizational liquidity and financial structure. The dividend policy influence will be there on the investors' behaviour and attitude, which will have the significant association with the investment decision making. The investors risk appetite will vary based on the dividend policy. Many authors and researchers have proved that the dividend policy will have the significant impact on the share price volatility.

Dewasiri N J and Weerakoon Y K (2015): The aim of the paper is to study the relationship between the divided policy and stock price volatility. The study has been carried out on 40 sample companies of Colombo stock exchange from the period of 2003 to 2012 years. The study has considered the dividend yield and dividend payout influence has been measured on the stock return volatility and returns performance. The results indicates that the under the cross sectional random effect model, stated that the dividend payout influenced significantly negative to the stock price volatility. The study observed that the dividend yield does not granger-cause the stock price volatility.

Werner-Ria Murhadi (2008): The study result reveals that the signaling theory relevance in influencing the movement of share price. The study adopted the life cycle theory and the result stated that the dividend policy cycle is having the significant impact on the stock price growth. The study argued that the structure of the ownership to dividend policy is not associated with the agency theory. The research also enunciated based on the findings, which were supported by the agency theory observed the cash flow influence on the share price.

Rimza Sarwar and Nadia Naseemtheir (2014): The study examined the dividend per share and earnings per share influence on the equity share holders' wealth. The authors observed that the higher dividend paying companies will have the positive impact on shareholders and also found that the existing share holders will motivate the other investors to take the position due to the stable economic condition. The study observed that the global charted accountants stating to enforce the standards on the dividend policies.

Research Gap:

Few organizations consider the dividend policy will have the impact on the stock prices and few organizations have considered the dividend policy irrelevant impact on the stock prices. Many researchers have proved both the theories. Based on the review of literature many studies have focused on the impact of dividend on volatility of the equity stocks in different sectors. But no research has been emphasized to know the impact of dividends index on the various indices with reference to NSE India. Hence the present study made an attempt to fill the gap by considering the Dividend index Impact on the select indices of the NSE India.

Objectives of The Study:

1. To study the dividends bench mark impact on the select stocks volatility
2. To study the impact on the returns of the select stocks price movements.

Hypothesis Of The Study:

H0: There is no effect of Nifty – 50 dividends points on sectoral stocks volatility.
H0: There is no effect of Nifty – 50 dividends points on sectoral stocks returns.

Scope of The Study:

The present research extends to and confines to the study on impact of Dividend index (Nifty – 50 Dividends points Index) and 5 select companies which are part of the base index of Nifty - NSE India. The period of the study is from 2012-13 to 2017-18. The select stocks are Aurobindo pharmaceuticals, Godrej Consumer Goods, LIC Housing Finance, MRF and Sail.

Research Methodology: The study has considered the time series data of five different sectoral stocks prices from base index Nifty from NSE India and the Nifty – 50 Dividends Points Index (Dividends Bench Mark) influence on the select stock price returns volatility. The Garch model has been applied to know the index volatility on the selected stock return volatility.

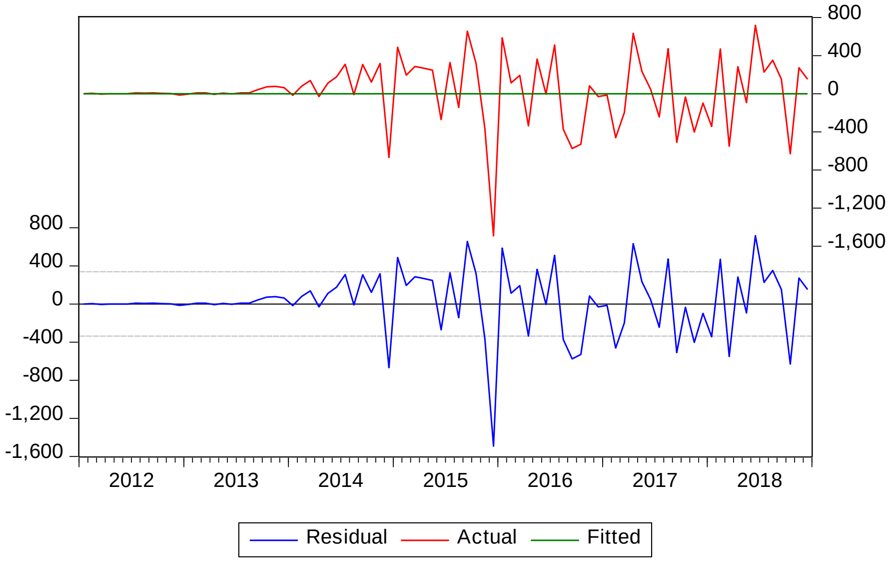
The robust least square method has been applied to measure the impact of independent variable (Nifty – 50 Dividends Points Index) on the dependent variables (equity market prices).

Tabulation Of Data Analysis

1. To study the dividends bench mark impact on the select stocks volatility

The analysis framed by using ARCH family model – GARCH, to Know GARCH effect exists between companies with dividend index. For this ARCH LM-test (i.e., Heteroskedasticity test) satisfied that Null hypothesis is reject i.e., Existence of ARCH effect between the select sectoral companies with Nifty 50 dividend points index.

Figure – 1: Aurobindo Residual Graph



Source: Secondary Data

Residual figures estimate that, Aurobindo Pharma return trend line movement has crossed the fitted lines, which indicates the pro long clusters were formed during the study period i.e., from the 2014 mid to 2018. Therefore it concluded that Volatility effect has been observed and applied the GARCH effect.

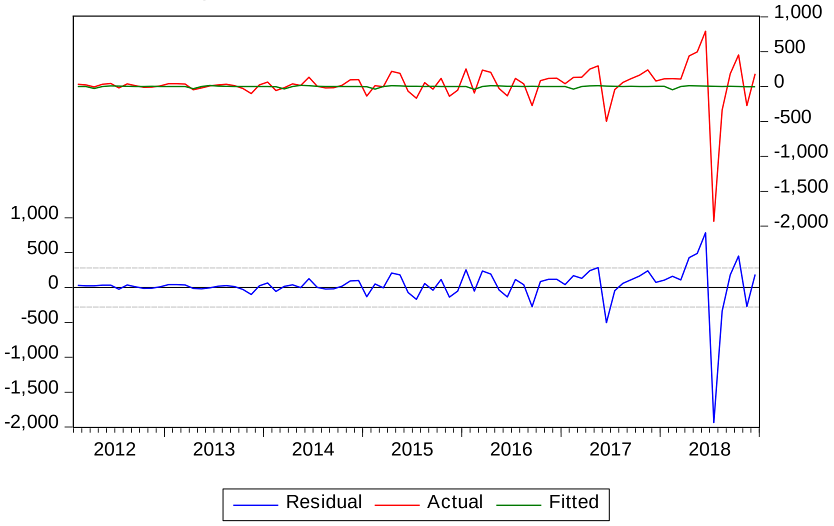
Table – 1: Garch Effect of Aurobindo Pharma, Godrej and LIC Housing Finance

Dependent Variable: AURO				
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)				
Sample: 2012M01 2018M12				
Coefficient covariance computed using outer product of gradients				
Presample variance: backcast (parameter = 0.7)				
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
Dividend - Auro	3.400005	0.032270	0.001053	0.9992
Ddividend - Godrej	0.381059	0.000416	915.6087	0.0000
Ddividend - LIC	-0.467833	0.000275	-1698.128	0.0000
Variance Equation – Aurobindo				
C	10.43501	12.48849	0.835570	0.4034
RESID(-1)^2	0.580128	0.233713	2.482222	0.0131
GARCH(-1)	0.686292	0.140601	4.881143	0.0000
Variance Equation – Godrej				
C	-69.66892	33.05020	-2.107973	0.0350
RESID(-1)^2	-0.113204	0.043224	-2.619013	0.0088
GARCH(-1)	1.207881	0.059794	20.20065	0.0000
Variance Equation – LIC Housing				
C	163.3365	238.1419	0.685879	0.4928
RESID(-1)^2	-0.146745	0.098706	-1.486685	0.1371
GARCH(-1)	1.171208	0.120360	9.730881	0.0000
R-squared	-0.005369	Mean dependent var		24.49099
Adjusted R-squared	-0.005369	S.D. dependent var		336.2481
S.E. of regression	337.1495	Akaike info criterion		12.96559
Sum squared resid	9434594.	Schwarz criterion		13.08134
Log likelihood	-540.5547	Hannan-Quinn criter.		13.01212
Durbin-Watson stat	2.246185			

Source: Secondary Data

Table - 1 Depicts the GARCH volatility impact of the Nifty 50 Dividend Points Index on Aurobindo Pharma Return. The result shows that the dividend is negatively influenced by Aurobindo Pharma, while the p- value appears to be Greater than 0.05, which states that the volatility influence does not exist between the issuing of Dividend on Aurobindo pharma.

Figure – 2: Garch Effect of Godrej consumer



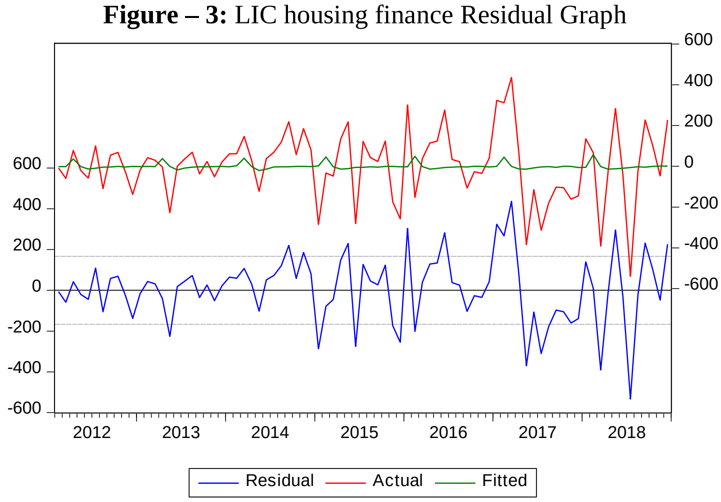
Source: Secondary Data

Residual figures estimate that, Godrej consumer return trend line movement has crossed the fitted lines, which indicates the pro long clusters were formed during the study period i.e., from the 2017 to 2018. Therefore it concluded that Volatility effect has been observed and applied the GARCH effect.

Garch Effect on Godrej

Table – 1 illustrates the GARCH volatility Impact of Nifty 50 Dividend Points Index on Godrej Consumer Returns. The result indicates that Godrej Return is influence significant positive on Dividend index that mean unit rise in Godrej return, 1.207 units variation is observes in Dividend index and p-value is less than 0.05, which states that the volatility influence exist between issue of dividend on Godrej consumer.

Figure – 3: LIC housing finance Residual Graph



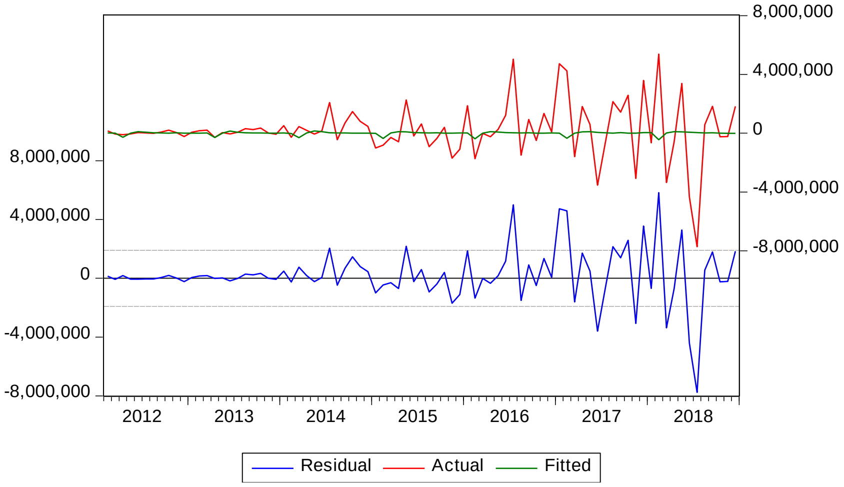
Source: Secondary Data

Residual figures estimate that, LIC housing finance return trend line movement has crossed the fitted lines, which indicates the pro long clusters were formed during the study period i.e., from the 2013 to 2018. Therefore it concluded that Volatility effect has been observed and applied the GARCH effect.

Garch effect of LIC housing Finance

Table – 1 illustrates the GARCH volatility impact of Nifty 50 Dividend points Index on LIC Housing Finance. The result indicates that LIC housing Finance is positive influences on Dividend Index that states one unit rise LIC housing finance, 1.17 units variation is occurs in dividend index and p-value is less than 0.05, that means volatility impact exist between issue of dividend on LIC housing finance.

Figure – 4: MRF Residual Graph



Source: Secondary Data

Residual figures estimate that, MRF tyres return trend line movement has crossed the fitted lines, which indicates the pro long clusters were formed during the study period i.e., from the 2016 semi to 2018. Therefore it concluded that Volatility effect has been observed and applied the GARCH effect.

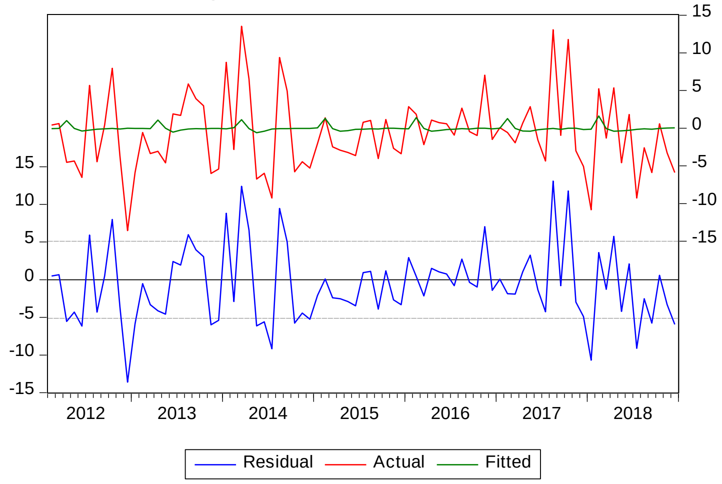
Table – 2: Garch effect on MRF and SAIL

Dependent Variable: MRF				
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)				
Sample (adjusted): 2012M02 2018M12				
Presample variance: backcast (parameter = 0.7)				
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
Ddividend - MRF	3597.762	924.8343	3.890169	0.0001
Ddividend - SAIL	-0.013354	0.018580	-0.718693	0.4723
Variance Equation – MRF				
C	5.52E+09	7.19E+09	0.768070	0.4424
RESID(-1)^2	0.548792	0.238332	2.302637	0.0213
GARCH(-1)	0.664629	0.104184	6.379354	0.0000
Variance Equation - SAIL				
C	3.884077	2.861070	1.357561	0.1746
RESID(-1)^2	0.288564	0.218302	1.321857	0.1862
GARCH(-1)	0.596105	0.257816	2.312137	0.0208
R-squared	-0.035309	Mean dependent var		222957.4
Adjusted R-squared	-0.035309	S.D. dependent var		1879694.
S.E. of regression	1912591.	Akaike info criterion		30.84647
Sum squared resid	3.00E+14	Schwarz criterion		30.96304
Log likelihood	-1276.129	Hannan-Quinn criter.		30.89330
Durbin-Watson stat	2.112717			

Source: Secondary Data

Table – 2 depicts the GARCH volatility Impact of Nifty 50 Dividend point Index on MRF tyres Returns. The result indicates that MRF Tyre return has a significant positive influence by the Dividend Index which states that one units increase in MRF tyres, 0.664 units' variation occurs in Dividend index. There by confirming that volatility influence exists between issues of dividend on MRF tyre

Figure – 5: SAIL Residual Graph



Source: Secondary Data

Residual figures estimate that, SAIL return trend line movement has crossed the fitted lines, which indicates the pro long clusters were formed during the study period i.e., from the 2012 to 2014 and 2017 to 2018 semi. Therefore it concluded that Volatility effect has been observed and applied the GARCH effect.

Garch Effect on SAIL

Table depicts the GARCH volatility Impact of Nifty 50 Dividend point Index on SAIL Returns. The result indicates that SAIL return has a significant positive influence on Dividend Index which states that one units increase in SAIL, 0.596 units' variation occurs in Dividend index. Hence, the study concluded that volatility influence exists between issues of dividend on SAIL industries.

2. To study the Impact of dividend index on the select sectoral stocks returns

In the study Nifty – 50 dividend points index has been considered and along with five index stocks were considered. The following hypothesis has been framed.

H0: No significant impact of Nifty 50 dividend points index on Sectoral companies.

Table – 3: Impact of Nifty -50 dividend Point Index

Independent Variable: Nifty – 50 Dividend Point Index				
Method: Least Squares				
Sample: 2012M01 2018M12				
Included observations: 84				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
AURO	0.008535	0.025161	0.339225	0.7353
GODREJ	0.013674	0.034351	0.398057	0.6917
LIC	-0.024118	0.059355	-0.406340	0.6856
MRF	0.000642	5.31E-06	1.137817	0.2586
SAIL	-3.395544	1.618695	-2.097705	0.0391
R-squared	-3.460129	Mean dependent var		67.29933
Adjusted R-squared	-3.685958	S.D. dependent var		34.80247
S.E. of regression	75.33716	Akaike info criterion		11.53950
Sum squared resid	448379.3	Schwarz criterion		11.68419
Log likelihood	-479.6591	Hannan-Quinn criter.		11.59767
Durbin-Watson stat	0.264707			

Source: Secondary Data

The above table – 3 Least Square Method illustrates the impact of Nifty 50 Dividend Point on select sectoral companies. The result shows that SAIL has a significant influence of -3.39 (i.e. negative), which means units increase in SAIL and a dividend index decrease by -3.395 units. While the remaining companies, such as Aurobindo Pharma, Godrej consumer, LIC housing finance and MRF tyres, are influenced by their respective coefficient values of 0.0085, 0.0136,-0.024 and -0.000642, but the p-value of these companies is greater than 0.05, which means that the dividend index is insignificant.Therefore concluded that null hypothesis accepts, while rejects null hypothesis with the company (SAIL), i.e. Significant influence of Nifty 50 dividend points index on SAIL.

II. Findings of the Study

1. The residual study examined the select sectoral companies consisting of a cluster during the study period, i.e. 2012-2018.
2. The study found with the Garch effect on Godrej consumers is high volatility (1.207), followed by LIC housing finance (1.17). Whereas the SAIL industry (0.596) shows the lowest volatility influence.
3. It has examined by the least square method that selected sectoral companies, with the exception of SAIL, have insignificant influence on dividend index.
4. It stated that the dividend index has a negative influence on SAIL, which means that the increase in SAIL will have a down trend in the dividend issue.

III. Conclusion of the Study

The present study examined the Impact of dividends bench mark (nifty – 50 Dividends points index) on the volatility of the select stocks. The study has considered five equity stocks from different sectors which were paying higher dividends from the period of 2012-13 to 2017-18. The Nifty – 50 Dividends points Index Impact on the stocks volatility have been measured with the Garch effect and observed that the majority of the selected stocks returns volatility got influenced. The ordinary least square has been observed that the Nifty – 50 dividends Points index influence has been found on the stocks returns. Hence, this study reflects the periodical dividends payout will have the significance influence on the volatility of the stock returns volatility. Therefore further research is needed to know the dividend payout impact companies future project investments.

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Impact of Visual Merchandising on Sales in Retil Store

Rajesh C.Jampla, P.Adi Lakshmi, M. Dhaurya Naik

Abstract—The basic point and determinationof the examination is to definevisual advancing impactcustomerattention.The investigate paperemphases on sixkeydimensionof visual advertising and preliminary of theory are based on these i.eof thing appear, window appear, shading, lighting, store structure and thing show and how it sway the thought buyers.The stratified reviewing technique is used.The diagram was driven in picked retail stores at Vijayawada. A composed Questionnaires of Likert's five point scale is used for the survey. Where 200 Questionnaires were distributed to the respondents who were identified shopping in picked retail stores. It found that the theories for thing appear, window show and shading assortment have been recognized that they have a confident and important impact on buyerbuying conduct. Research express that the retail storer should concentrate on visual advertising methods for pulling in new customers and rise the walk of store which may moreover prime to achievement influence over contenders.

Keywords— Retail store, visual merchandising dimension of retail and customers etc.

INTRODUCTION

In the past multi decade retail has grabbed generously more attention in publicizing time where India attains'the next fundamental retail objective' all around among thirty creating markets. India is set fourth greatest economy nation after United States of America,China and Japan in the locale of purchasing power parity (PPP). The visual showcasing is tomake careful the buyer, to update the stores' image, and to help different arrangements by appearing with decorations. Retail stores are endeavoring to make also stimulating, acknowledging visual presentations in forceful market. Indian purchasers slant toward state of craftsmanship stock that have fine quality and are of overall standardsNeha P. Mehta andPawan K. Chugan(2013). It is the primary system to make vitality in retailing. Retailers by organizing pushed usage of store opening can facilitate the customers' wants and providerobust contention. Therefore, it is imperative to examine visual advancing in retailing and support the retail stores to appreciate the way in which they can isolate themselves from contenders.

SIGNIFICANCE OF THE STUDY

The essential purposebehind conduction this outline is to separate the effect ofvisual advancing and its attributes of customerattention.This is a fundamental gadget where retailer to find imaginative way to deal with catch the thought of buyers. The components of visual advertising are thing appear, window appear, shading, lighting, store arrangement and thing show which accept a fundamental occupation in attracting customers.This look at empowers us in evaluating and finding impact of visual advancing on accomplishment of customer thought and their acquiring conduct.

LITERATURE REVIEW

The investigator state that,YasirAliSoomroet al (2017)in their article, it was communicated that the speculations for shading, lighting, window and inside limit wereaccepted as having a confident and essential impact on the thought of consumers.The visual showcasing fittingly isolates the retail brand from battling brands, sets brand tendency among customers was discussed by Park et al (2014), it basic association between customer acquiring behavior and window appear, floor advertising and constrained time signage byNeha P. Mehta (2013).According to, Darden, W. (1983)found that window show is anaverage which makes starting acquaintance in the customer's mind with purchase the stock. Physical intrigue of the store motivates customers inconceivably for store selection.BellandTernus (2012) in their examination reinforced the theories given by before specialists and included lighting can redesign the retail space and augmentation the estimation of thing in customer's mind. The insignificant focal points of the things were enhanced.Sen, Block (2002) influences that the window indicates influences store entry and purchase decisions. It furthermore makes a regard for stock kind for the area on the other hand it demonstrates how the stock is to be shown in window indicates which would affect acquiring decision.

Research Methodology

Objectives

- To find the impact of thing appear, window appear, shading, lighting, store configuration and thing displayon buyer obtaining conduct towards retail store.
- To break down the impact of visual showcasing on arrangements towards retail store.

Research Design, Sample and Data

The examination finished is realistic andcross sectional in nature. The technique is arranged toestimate the impact ofvisual advancing on arrangements towards retail

Revised Manuscript Received on April 12, 2019.

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International Journal of Innovative Technology and Exploring Engineering (IJITEE)
ISSN: 2278-3075, Volume-8, Issue- 6S4, April 2019

Predictive Analytics in Stock Markets with Special Reference to BSE Sensex

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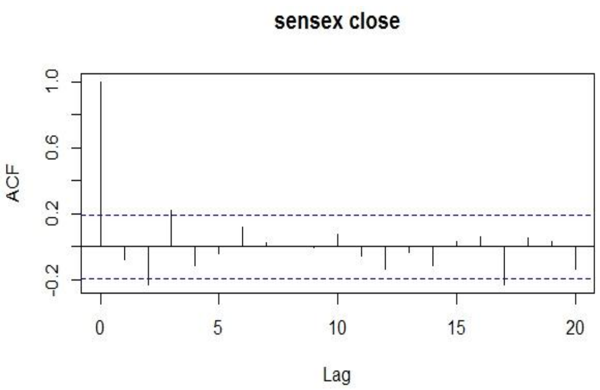
Abstract*—Predictive analytics in finance is the art and science of using substantial quantities of data to find arrays. An Array can be termed as pattern or movement. Predictive analytics identifies patterns in large data volumes and helps to minimize future uncertainties. Predicting stock market returns is a puzzling task due to the multifaceted nature of the data. The present study is an applied application of the prediction and random walk theory on SENSEX behavior at an advanced level. Stock Market is the most dynamic element in the financial system and will play a crucial role in the progress of any country. The focus is on how much more on how to improve the forecasting models in terms of the performance of indices. The present model shows some commendable results in the prediction modelling reference to Indian stock market (BSE SENSEX). The designed model is also having utility for traders and investors estimating price movements of stocks at near future. Generally, the Fundamental Analysis comprises of evaluating the company's profitability on the basis of its current business environment and financial performance in the future. Technical Analysis includes interpreting the charts and using statistical figures to identify the patterns in the stock market. A number of market indicators are believed to offer signals which are beneficial in anticipating future prices. For this purpose data of BSE Sensex data has been taken (January 2010- September 2018) from bseindia.com. The results exhibit that the Sensex would also gain momentum in the year 2019.

***Key words*— Predictive Analytics, Sensex, Moving Averages, R- Studio**

1. INTRODUCTION:-

Predictive analytics in finance states about using the past data, artificial intelligence, machine learning and Trend Analysis models to predict what will be the pattern or performance of individual stock or index in the future. Normally, the historical data is used in a model which predicts trends and key patterns. These models are applied to the present data in order to forecast future movements or trends. Predictive analytics identifies different patterns by using large volumes of data and also helps to minimize future uncertainties. The data is transformed into forecasting models from which new observations can be obtained. With the help of statistical techniques and with algorithms, the historical data is been evaluated and the results are used to make predictions in terms of future performance. Strategic decision-making can be facilitated by using the outcomes of the model. Predictive analytics in finance recognizes the unseen patterns so that the managerial team can implement the necessary measures pertaining to the context. Specific forecasts and analyses provide a comprehensive root for decisions and increase the company's financial competencies. Resources can be used more competently and be made available for other value creation accomplishments. Because of the automation, resources can be saved and the mistakes can be avoided which ultimately reduces the costs. Predicting the price movement of the stock is having its own importance in the arena of capital markets. The very pecuniary nature has drawn attention from various sections of business & academia. However, the moot question of whether the prediction of stock markets is possible or not remains the same. The concept of random walk theory explains that the stock prices are collocated in a random way and it signifies the stock markets are impulsive in nature. Many analysts have designed their own models to predict the stock prices. They have their own applicability with reference to market predictions.

Predictive Analytics deals with voluminous and varied data and uses many mathematical formulae to get the best assessment of a given context. The Predictive analytics may provide the company with a cutting edge with reference to forecasting its financials. Predictive Analytics is considered as a data science that eliminates presumptions while making decisions and also helps in finding the right solutions in the shortest possible time. Predictive analytics considers a wide variety of tools & techniques such as data mining and statistics. Game Theory is also widely used to analyze past & present to predict the upcoming events. Through learning from the rich historical data, predictive analytics offers the strategist or the analyst something outside standard business reports and also in terms of earnings forecasts. These models involve both offline and online data to foresee which investors and traders may buy, respond, click, convert, and cancel.



Graph1.1 Depicting the Returns of BSE Sensex from 2008 to 2018

Revised Manuscript Received on April 12, 2019.

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International Journal of Advance and Innovative Research
Volume 6, Issue 2 (VI): April - June, 2019 Part - 6

ISSN 2394 - 7780

THE GROWTH OF MEDICAL TOURISM IN INDIAN MARKET SCENARIO

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ABSTRACT

Medical Tourism in India has emerged as the fastest growing segment of tourism industry. High cost of treatments in the developed countries, particularly the USA and UK, has been forcing patients from such regions to look for alternative and cost-effective destinations to get their treatments done. The Indian medical tourism industry is presently at a nascent stage, but has an enormous for future growth and development. Medical tourism, alternatively called health tourism and wellness tourism, is a term that has risen from the rapid growth of an industry where people from all around the world are traveling to other countries to obtain medical, dental, and surgical care while at the same time touring, vacationing, and fully experiencing the attractions of the countries that they are visiting. It is a silent revolution that has been sweeping the healthcare landscape of India for almost a decade. The article focuses on growth potentiality, cost compressions and other factors that are responsible for the growth of the 'medical tourism market' in India.

Keywords: Medical Tourism, Growth Potentials, Traveling.

INTRODUCTION

Patients from around the globe are beginning to realize the enormous potential of modern and traditional Indian medicine. Indian hospitals, medical establishments and the government of India have also realized the potential of this niche segment and have begun to tailor their services for foreign visitors. International marketing divisions have been set up by most of the top India Hospitals like Apollo, Max, Fortis, Wockhardt, etc. A few top Medical tourism providers are Asia health, Medical Singapore, Thai Medical Health are helping the hospitals in this task Visitors, especially from the United States of America, United Kingdom and the middle-east find Indian hospitals a very affordable and viable option to coping with insurance and National medical systems in their respective countries. Travelers prefer to combine their medical treatments with a visit to the 'exotic east' with their families, visiting places like the Taj Mahal in Agra, the palaces in Rajasthan, the serene beaches in Goa, the beautiful places in Mumbai, the mountains of Kashmir, the backwaters of Kerala among others. The total price of an overseas treatment with airfare, hotel accommodation and even a few days of vacation is often far less than just the procedure cost back in the US or UK. Judging by the buzz in the hospital circuit, it won't be very long before every cosmopolitan private hospital offers yoga, ayurvedic massages, aromatherapy, mud baths, panic healing, and meditation classes. With time more and more visitors will flock to this part of the globe for their treatment and relaxation needs.

Health and medical tourism is perceived as one of the fastest growing segments in marketing 'Destination India' today. While this area has so far been relatively unexplored, we now find that not only the ministry of tourism, government of India, but also the various state tourism boards and even the private sector consisting of travel agents, tour operators, hotel companies and other accommodation providers are all eying health and medical tourism as a segment with tremendous potential for future growth.

USP'S OF MEDICAL TOURISM MARKET IN INDIA

The key "selling points" of the medical tourism industry are its "cost effectiveness" and its combination with the attractions of tourism. The latter also uses the ploy of selling the "exotica" of the countries involved as well as the packaging of health care with traditional therapies and treatment methods. Price advantage is, of course, a major selling point. The slogan, thus is, "First World treatment' at Third World prices". The cost differential across the board is huge: only a tenth and sometimes even a sixteenth of the cost in the West.

- Medical services
- Customized Areas where Indian healthcare excels
- Clinical outcomes being on par with the world's best centers.
- Internationally qualified and experienced doctors.
- Technology edge.
- Competitive costs - 1/5th to 1/10th of costs in the west.
- Quality of service.

1

Satisfaction of Telecom Subscribers: Impact of Service Quality, Value and Trust

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Abstract: *Satisfaction in services is a very relative term. Individuals have different perceptions and besides operator parameters, peer groups, family, other acquaintances could land up exerting their influence. Satisfaction is critical for brand and company to sustain in the long run. There is a necessity to see how operator parameters like quality of service, trust in the company / brand and value obtained by subscribing to the operators' services have a bearing on the level of customer's satisfaction.*Telecom customers numbering 636 at *Vijayawada (rural locales) were engaged in responding to structured queries about constructs chosen for the study and profile data. Multiple regression analysis was executed to ascertain the outcome in terms of impact of independent variables on dependant variable.*

Keywords: *Telecom, Service Quality, Value, Trust, Satisfaction.*

I. INTRODUCTION

The second quarter of this year (web 1 and Table 1) revealed that Reliance Communication registered a slight growth in subscriber base. Tata Teleservices and BSNL had losses. Bharti Airtel and Vodafone Idea had fluctuations but no major change. Reliance Jio was steadily registering growth. The total dipped in May 2019 and then had a rise in June 2019.

Table 1: Andhra Circle Telecom

	04-2019	05-2019	06-2019
Bharti Airtel	27914445	27714365	27865264
Reliance Communication	1972	2045	2055
Vodafone Idea	22161387	21538117	21546770
Tata Teleservices	1227200	1113693	1057674
BSNL	10118284	10090124	10086993
Reliance Jio	25171351	25924717	26415879
Total Subscriber Base	86594639	86383061	86974635

II. NEED FOR THE RESEARCH

Satisfaction in services is a very relative term. Individuals have different perceptions and besides operator parameters, peer groups, family, other acquaintances could land up exerting their influence. Satisfaction is critical for brand and company to sustain in the long run. There is a necessity to see how operator parameters like quality of service, trust in the company /

2

Switching Dissuasion and Other Determinants: Imperatives for Loyalty in Telecom Services

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Abstract: *Customers' affinity keeps changing and telecommunication services are no exception. It is therefore imperative to analyse why customers are leaving their current telecom operator and switching to others. Hence there is a need to analyse whether it was pricing, promotion or failure of current telecom operator to dissuade the customer from switching. This paper analyses the key determinants of loyalty by ascertaining the perceptions of 522 mobile telecom customers.*

Keywords: *Telecom, Pricing, Promotion, Switching Dissuasion, Loyalty.*

I. INTRODUCTION

Switching Dissuasion is very critical task for telecom operators, else they stand to lose their grip on existing customers who may be looking for greener pastures. Loyalty from customers cannot be taken for granted. Customers can get enticed by stimulating offers, irresistible pricing and quality service.

The subscriber counts (Table 1) for the first three months (web 1) of the current year indicate interesting trends. Bharti Airtel, Reliance Communication, Vodafone Idea and Tata Teleservices witnessed a drop. BSNL made up for lost ground while Reliance Jio kept gaining.

Table 1: Subscriber Count in Andhra Telecom Circle

	01-2019	02-2019	03-2019
Bharti Airtel	29807948	29803288	28220681
Reliance Communication	2304	1919	1923
Vodafone Idea	22929051	22632175	22283084
Tata Teleservices	1648423	1567617	1484357
BSNL	10176735	10147764	10171597
Reliance Jio	23301106	23884329	24568739
Total Subscriber Base	87865567	88037092	86730381

II. NEED FOR THE RESEARCH

It is imperative to analyse why customers are leaving their current telecom operator and switching to others. Hence there was a need to analyse whether it was pricing, promotion or failure of current operator to dissuade the customer from switching.

International Journal of Recent Technology and Engineering (IJRTE)
ISSN: 2277-3878, Volume-8 Issue-4, November 2019

10

Retention of Andhra Telecom Circle GSM Mobile Subscribers

Dasari Siloyam, Rajesh C. Jampala

***Abstract:** Telecommunication has always been part of societal development in the last half century and continues to march toward innovative technologies and better living. The wireless subscriber base is growing at a rapid pace. All operations and communication across the world are being enabled by GSM mobile communication. Web services too involve the need to use GSM mobile communication for authentication and processing. The Andhra Telecom circle (which includes Telangana as well) is significant because of major industries and services sector, the best example being Information Technology services. This paper endeavours to assess the level of retention by telecom service providers. Structural Equation Modelling reveals the causal relations based on primary data collected from 1159 telecom subscribers.*

***Keywords:** Telecom, Service Quality, Value, Pricing, Trust, Satisfaction*

I. INTRODUCTION

Telecommunication has always been part of societal development in the last half century and continues to march toward innovative technologies and better living. The wireless subscriber base is growing at a rapid pace. All operations and communications across the world are being enabled by GSM mobile communications. Web services too involve the need to use GSM mobile communications for authentication and processing.

The Andhra Telecom circle (which includes Telangana as well) is significant because of major industries and services sector, the best example being Information Technology services. The subscriber statistics for the first half-year of 2019 (web 1) is presented in Table 1.

Bharti Airtle has been consistently in the top position (Table 1) based on subscriber base while Reliance Jio comes second (good performance for a relatively new entrant). Vodafone Idea is placed third subsequent to the merger between Idea and Vodafone. Reliance Communication has not made much headway while the Government-owned Bharat Sanchar Nigam Limited (BSNL) is struggling to survive.

Table 1: Andhra Telecom Circle Subscribers

2019	January	March	June
Bharti Airtel	29807948	28220681	28220681
Reliance Com.	2304	1923	1923
Vodafone Idea	22929051	22283084	22283084
Tata Tele.	1648423	1484357	1484357
BSNL	10176735	10171597	10171597
Reliance Jio	23301106	24568739	24568739
Total	**87865567**	**86730381**	**86730381**

Revised Manuscript Received on November 15, 2019.

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II. NEED FOR THE RESEARCH

Cut-throat competition and introduction of portability (of the mobile number) combined with other factors are putting the mobile service operators in a fix. Adding more subscribers every month is but natural but what is competitive is retaining existing subscribers. This is an herculean tasks as subscribers are very sensitive and price-conscious and even a small trigger leading to dissatisfaction may propel them to search for alternatives. i.e. other service providers.

III. REVIEW OF LITERATURE

Pricing: Salomi and Selvan (2017) aimed to analyse the entry of Jio in competitive environment of telecommunication sector. It was found that the Jio attained tremendous growth in a short span. Jio adopted 4G technology and offered free services during its launch period, which was the main reason behind itssuccess in the market. Jio relied on consumer behaviour in relation to its pricing. Its pricing system was in the form of Jio prime membership and 'Dhan Dhana Dhan' offer at moderate tariffs. Moreover, Jio offered post-paid services along with pre-paid connections with various level of prices as per customer needs. Therefore, the new strategy implemented by the Reliance Jio effectively dealt with the competitive environment of telecom sector. To sum up, it was found that Jio entry has changed the telecom sector and customers are being provided more services at low cost.

Service Quality: Jere and Mukupa (2018) measured the customer satisfaction and loyalty drivers in mobile telecom industry in Zambia. Results showed that network coverage was the stronger determinant; it indicates higher network coverage and contributes more to customer satisfaction. Customer service was the second most important aspect while service was the third largest predictor of customer satisfaction.

Kungumapriya and Malarmathi (2018) examined the impact of service quality, perceived value, and customer satisfaction in calculative commitment and customer loyalty in Indian telephone sector. Findings showed that perceived value, calculative commitment, customer satisfaction, and service quality had positive and significant effect on loyalty intentions of customers. Moreover, loyalty intentions had positive effect on attitudinal and behavioural loyalty of customers.

Sharma and Jhamb (2017) endeavoured to measure service quality in the telecom industry in India. It was found that gap in service quality may indicate several problems such as lack of trained employees, poor capacity of the firm, poor technical and infrastructure to offer services. In order to remove these

A Study on RoleofMGNREGA in Rural Development: with reference to Krishna District, Andhra Pradesh India

September 2018

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Abstract

Still, 27.5 percent of people in rural areas are living below the poverty line. The Indian Government is striving to eradicate poverty in rural areas by launching various kinds of poverty eradication programmes. Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) gives a legal guarantee of providing at least 100 days of wage employment to rural households whose adult members are willing to do unskilled manual labor. Providing 100 days of employment to the rural-poor especially during the lean agricultural season improves the socioeconomic status of the labor force in rural India. At present, the programme is implemented in 691 districts and 25.03 crore rural workers are engaged in this programme. The government of India spending nearly Rs.55,000crores on the programme during the year 2018-19. This study has been attempted to examine the impact of the MGNREGA programme on rural development in India with reference to Krishna district of Andhra Pradesh. The study also traces the satisfaction levels of the respondents on the programme.

International Journal of Research **ISSN NO: 2236-6**

A Study on RoleofMGNREGA in Rural Development: with reference to Krishna

2018

INNOVATIVE HUMAN RESOURCE MANAGEMENT PRACTICES

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Abstract

The rapid rise of multinational Corporations (MNCs) from emerging economies has led to greater interest and urgency in developing a better understanding of the deployment and diffusion of managerial practices and strategies from their perspective. Human Resources (HR) is a rapidly developing business function. The young HR professionals enjoy the excellent career in the area of the HR Management. They contribute to the steadily development of the competitive advantage. The organization does have to focus on building innovative and creative human resource management practices. The HR Management becomes the strategic advantage of the organization. The HR Roles and Responsibilities in the organization do change dramatically. The organization requires the motivated workforce, skilled managers and inspirational leaders. HR develops tools, programs and procedures to build a better organization, which can compete successfully on the market. Therefore the innovative and modern HR Management becomes essential in today's competitive global corporate world.

Keywords: HR, Innovative, HRM Practices, Human Capital.

I. Introduction

The innovative and creative HRM is about the performance management, internal equity, succession planning, talent development, and providing competitive benefits. The development of the innovative Human Resources is a long journey. It took many years to design and develop the efficient HR Business creative Model, but the modern organizations do realize benefits of the design. The HR Management focuses on the building the uniqueness in the organization and providing simple, useful tools for managers and employees. The primary focus of HR changed from providing services to employees to providing managerial and leadership tools to managers. HR does help to employees by cultivating the corporate culture and by teaching managers to be better managers.

The constantly changing business scenario of globalization and privatization has changed the working nature of an organization. This is more so with the organizations in the knowledge industry where the employees, the 'human capital' are the revenue generators of a company. This makes Human Resource Management an important part of the organization. Its measurement plays a major role in the effective management of human capital that is likely to impact upon the organization's performance in the market place. The human capital measures are soft measures that are the

Souring dreams (Some post-Independence problems in former colonies: a statement and an example)

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Abstract - One of the novels written by the Nobel Prize winning Doris Lessing, *The Sweetest Dream* (Flamingo Paperback, 2001), presents the post-independence situation in a fictionalized African country as one of its themes. Many African countries were under colonial domination of European powers. Nigeria, Ghana, Zimbabwe, Kenya were some of the British occupied- African countries, like India, Ceylon and other South Asian countries. All of them experienced exploitation of one kind or the other. We in India have noticed the impact of colonization on our economy, and culture, and on our country's heritage, in general. The situation in the African countries had been more acute than in India. As the novels of Chinua Achebe testify, there had been a total or near-total deculturization of their native cultures and their near-total westernization. Things simply fell apart in these countries.

I. Introduction

The Indian situation was slightly better, though the exploitation was as wide. Perhaps because of stronger cultural roots or a well-organized intelligentsia, or maybe a more advanced civilization, India did not succumb to the colonial pressures to the same degree as the African Nations did. But in historical terms, Indians were already weakened economically and morally, so that Europeans did not have too much difficulty in overcoming the native powers and established their regime.

There was also a lot of difference in the way India got independence from the way many African countries did. Once again the intellectual and cultural heritage helped India become free without any armed conflict. Nations like Nigeria and Kenya were not so lucky. They were dogged by the myth of backwardness in terms of civilization: for the Europeans, Africa had, for long, been a 'dark continent'. Foreign forces or imported ideologies had to come to their rescue as they fought the British imperial powers for their freedom. Novels like *Kanthapura* present the comparatively peaceful means by which India attained Independence. In contrast we see bloody conflicts or emergence of insurgent outfits (like the Mau Mau in Kenya) such as are described in Ngugi's *A Grain of Wheat*. Whatever differences one could notice in the post-independence situation maybe in terms of greater intensity of experience in the African countries and the longer time it has taken for some of the symptoms to come to surface in India. After over 50 years of independence, and after so much of visible development in industrial and technological sectors, India remains far behind many developed and even some developing countries in the field of health services, in literacy and in controlling the fast growing population and galloping poverty. Even now we hear of villages and hamlets which do not possess primary health centres, do not have a school for children, not even roads to connect them with the civilized world. No young person who has spent a great amount of money to qualify as doctor cares to make a career in a village, away from the comforts of city life. No politician would sincerely strive to better the lot of the poor people: it serves him well to keep them poor and illiterate.

The greatest negative point is corruption. A time has come when corruption has become universal. Responsible and educated political leaders have publicly stated that corruption is a global phenomenon. Such statements and attitudes indicate complacency, and may also imply endorsement, making corruption a virtue, so that one who is not corrupt in public life is considered weak and incompetent. The newspapers and other media proclaim this every day. There is no need for it to get reflected in literature.

II. Other Novels

But Kamala Markandaya's *Nectar in a Sieve* (1955), *A Handful of Rice* (1906), *The Coffer Dams* (1969), *The Golden Honeycomb* (1977) present these aspects clearly enough. With Harshad Mehtas all around us, and with innumerable scams, from grass to Oil to IT, involving semi-literate political leaders to highly educated intellectuals, there is no need for fictional representation. All the same, Vikram Seth's *A Suitable Boy* (1993) deals with the days soon after Independence, and gives a satirical picture of national politics and caste system, particularly the conflict between the upper castes and the poorer castes. Vikas Sarup's *Q & A* (2005 - the source for the movie, *The Slumdog Millionnaire*) presents life in the slums of Bombay: poverty and squalor, the crimes and the romances, male chauvinism and chivalry – all serve as the background against which the Quiz programme is played out.

III. The White Tiger

Similarly, Aravind Adiga's *The White Tiger* (2008) talks of class struggle and corruption in higher places; it tries to present a nation trying "to shed a history of poverty" and backwardness, and the rat race in which "whoever succeeds

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ISSN : 2454-9150

is the hero" (*Jo jeetasikandar*, as the Hindi saying goes). The young hero, Balaram, learns the art of corruption through his association with his betters, and through murder and bribery rises to a strong position in the society. He rationalizes and defends his actions: he believes that his freedom (personal) was worth the loss of his entire family and worth all the crimes he had committed. The more recent *Revolution 2020* by Chetan Bhagat has as its theme love, personal ambition and corruption in political and educational fields. The cynical attitude of the people towards education, which should be establishing and maintaining values in the society emerging into the new century, is vitiated by bribery and political corruption. The situation in African countries is no different: Achebe's *A Man of the People* presents, like the later novels of Ngugi,a portrait of political corruption in Nigeria and Kenya respectively.

IV. Doris Lessing

All these fictional presentations take one or two of the issues for treatment. Evidently these are all the common themes of the erstwhile colonies. But in Doris Lessing's novel, they all come together. While dealing with the spirit of the 1960s and the various factors that were weakening Communism, *The Sweetest Dream* devotes nearly 200 pages to the experiences in Zimlia, a thinly veiled version of Zimbabwe, from where Ms Lessing had been alienated and exiled for personal and political reasons. This is only a segment of the novel, but a significant segment in which some of the characters from the 'main' story participate, and the fallout from which reshapes the later part of the main narrative.

All the former colonies had enjoyed a different kind of economy to the industrial one the European powers imposed on them. People had an emotional bond with the land: the tiller of the soil in India, or the farmer in Zimbabwe, felt that they belonged to the land. The introduction of industrial economy, leading to consumer economy, gave rise to personal possessions, worship of money, and desecration and destruction of land and landscape, in the interest of profit. This is well brought out by Markandaya in *Nectar in a Sieve* and *Coffer Dams*. Here is Doris Lessing describing the bond between man and land:

...A hundred years ago the whites had arrived in a country the size of Spain, with a quarter of a million black people in all that enormous territory. You'd think – the *you* here is the Eye of History, from the future – that there had been no need to take anyone's land, with so much. But what that eye, using a commonsensical view, would be discounting were the pomp and greed of Empire. Besides, the whites wanted land to have and to hold, with tidy fences and clear-cut boundaries, while the blacks' attitude to land was that it was their mother and could not be individually owned. (357)

This passage also echoes the anguish of Rukmani and Nathan in *Nectar in a Sieve* when their land is taken away for the tannery.

The common people look forward fondly for a better tomorrow; they "had been promised everything by their rulers" (369) – food, a bit of literacy and a little more of health. There are the paltry sheds and huts of Africa, "wanting everything, lacking everything, and everywhere people ... working so hard to – well, what? To put a little plaster on an old weeping wound" (367). Here is a description of the pathetic condition of the school in Kwadere: the school Inspector, Mr Phini, comes visiting the 'school', only to find the buildings in poor condition, the teachers unqualified, and no text books nor exercise books. He is shocked:

Six buildings, each holding four class rooms, bursting with children, from small ones to young men and women. They were all exuberantly welcoming and all complained to the Representative from the higher places of power that they needed textbooks... There was neither a globe nor an atlas in the whole school. When he had asked, the children did not know what they were. (310)

And what about the hospital where Sylvia comes to work?

The path turned down a rocky slope and in front of her were some grass roofs supporting poles stuck in reddish earth, and a shed whose door was half open. A hen emerged from it. Other chicken lay on their sides under bushes, panting, their beaks open...

'Where is the hospital?'
'Here is the hospital'
Now Sylvia took in that lying around under the trees, bushes, or under the grass shelters, were people. Some were cripples. 'A long time, no doctor', said the youth, 'and now we have a doctor again'...

She made a quick tour of her patients lying about here and there,... A dislocated shoulder...She put it back there and told the young man not to stay and rest. and not to use it for a bit, etc... (176-178)

In both cases, schools as well as hospitals, the bureaucrats are incompetent and corrupt and the politicians are too busy sharing power or amassing wealth to care for the common man or look to his needs.

V. Sylvia's Narration

Sylvia, the protagonist of this section of the narrative, is the daughter by a former marriage of Johnny's second wife, Phillida. She is nurtured and brought up by Frances and Julia, the first wife and the mother of the irresponsible communist leader Johnny. After Julia's death Sylvia volunteers to work in the hospital run by Christian missionaries in Kwadere. The patients are dying of Malaria, broken limbs and AIDS. She works with missionary zeal to do something for these poor patients. But she is defeated because the authorities choose to close down the hospital. When the president of the country is busy making money, the other ministers cannot be far behind. Replying to a question from a Correspondent, Minister Franklin says, in justification of his acts:

"And why should we not own a farm? Am I to be barred from owning land because I am a Minister? And when I retire how shall I live? I must tell you, I would muchher be a simple farmer, living with my family on my own land." (387)

This is not too different from Balaram's attitude in *The White Tiger*. Franklin had learnt the ways of corruption, inspired by their president Comrade Ho. Towards the end of the narrative Sylvia is forced to go to him for getting visas for the two kids whose mother had died for want of medicine. The hospital had been closed based upon the misinformation given by cantankerous Rose about some 'stolen equipment' for the hospital. Since Franklin is not as bad as others in the matter of corruption and because he had admiration for Sylvia, he is persuaded to issue visas for the kids at her request.

VI. Conclusion

Some of the youngsters who had been nurtured by Frances and had been fed at her dining table in the other part of the novel had their roles to play:Andrew, Geoffrey, Daniel, and Rose, and Franklin; they play out their roles and recede into the background. Their actions undermine the efforts of Sylvia, herself one of those youngsters. While she dies, her dreams remain in the shape of the two kids she hands over to Frances to be cared for. These dreams for the people of Zimlia are far more meaningful than the dreams of Johnny. They are the sweet dreams every newly independent nation has dreamt, and continues to dream. Sylvia's dreams are for the welfare of the common man, whether it is in Zimlia, India or elsewhere. In that sense this segment of the novel assumes greater significance, because it connects directly to the title of the novel.

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